INSTITUT DES PARCS NATIONAUX DU CONGO BELGE | INSTITUUT DER NATIONALE PARKEN VAN BELGISCH CONGO

Exploration du Parc National de la Garamba

MISSION H. DE SAEGER

en collaboration avec

P. BAERT, G. DEMOULIN, I. DENISOFF, J. MARTIN, M. MICHA, A. NOIRFALISE, P. SCHOEMAKER, G. TROUPIN et J. VERSCHUREN.

FASCICULE 3

Exploratie van het Nationaal Garamba Park

ZENDING H. DE SAEGER

met medewerking van

P. BAERT, G. DEMOULIN, I. DENISOFF, J. MARTIN, M. MICHA, A. NOIRFALISE, P. SCHOEMAKER, G. TROUPIN en J. VERSCHUREN.

AFLEVERING 3

TURBELLARIA

BY

ERNESTO MARCUS (São Paulo)

BRUXELLES 1955 | BRUSSEL 1955

PARC NATIONAL DE LA GARAMBA
MISSION H. DE SAEGER
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TURBELLARIA

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INTRODUCTION

The President of the « Institut des Parcs Nationaux du Congo Belge », Professor V. VAN STRAELEN, kindly intrusted me with the valuable collection of *Turbellaria* gathered from june 1951 to august 1952 by M. HENRI DE SAEGER, chief of the « Mission H. DE SAEGER » in the National Garamba Park, Uele, in 1949-1952. Mrs. EVELINE DU BOIS-REYMOND MARCUS has studied the material together with me and has done the illustrating.

List of localities.

Belgian Congo (Uele), National Garamba Park, between Lat. 3° 40′ N and 4° 40′ N, Long. 29° 22′ and 29° 45′ E. For further details see DE SAEGER (1954, p. 91-95, maps II and III).

5. Savanna in valley, where dense vegetation with 3-5 m high *Gramineæ* (*Urelytrum*) grows on old alluvial terraces and borders the forest in a narrow zone. II g d, 8.VIII.1951. Sample 983 : *Microplaninæ* sp.

8. Springs of swampy character, not surrounded by trees. This biotope hardly differs from that of the rivers. II g d, 20.VI.1951. Sample 747 : *Planariidæ* sp. 2. 8.XI.1951. Sample 1423 : *Planariidæ* sp. 3, *Othelosoma saegeri*, n. sp., *Rhynchodemus* sp. 8.VIII.1952. Sample 1978 : *Planariidæ* sp. 3. II h d, 27.VIII.1951. Sample 1032 : *Microplaninæ* sp.

9. Wooded rivers or wooded parts of their course. Morubia, right tributary of river Kassi. 12.III.1952. Sample 1806 : *Planariidæ* sp. 3. II d d, 7.VII.1952. Sample 1914 : *Planariidæ* sp. 3. II i d, 12.VII.1952. Sample 1968 : *Planariidæ* sp. 3.

10. Rivers in open, not wooded land, sometimes with isolated trees. Shore vegetation frequently aquatic or paludicole. II f d, 25.VI.1951. Sample 775 : *Planariidæ* sp. 3. II g d, 11.II.1952. Sample 1650 : *Planariidæ* sp. 3. II g d, 23.VIII.1952. Sample 2040 : *Phænocora foliacea* BÖHMIG.

11. Swampy areas. II f c and II f d, 14-24.VII.1951. Samples 871, 894, 921 : *Mesostoma evelinæ*, n. sp., *Planariidæ* sp. 3. II f d, 4.X.1951. Sample 1244 : *Planariidæ* sp. 3.

13. Permanent ponds supplied by floods, and in the dry season sustained by percolating water. Aquatic vegetation generally abundant. Shores often swampy. II f c and II f d, 31.VIII-8.X.1951. Samples 1060, 1123, 1161, 1227, 1280 : *Planariidæ* sp. 4.

14. Temporary, eurythermic, shallow ponds supplied by floods and rain, that dry up completely in the dry season (december-february). II g d, 15.VI.1951. Sample 718 : *Phænocora foliacea* BÖHMIG.

14 S. Temporary, eurythermic, savanna ponds, generally formed over rock or a ferrugineous layer and sustained by rain water only. As they are shallow, they evaporate rapidly and change from wet to dry. There are little or no water plants, but aquatic animals re-appear fast. II g d, 18.VII.1951. Sample 890 : *Phænocora foliacea* BÖHMIG.

River Dungu, near Station Nagero. 8.III.1951. Sample 372 : *Planariidæ* sp. 1.

Aka. Upper course of river Aka, near Mount Inimvua (see DE SAEGER 1954, p. 95). 14.V.1952. Sample 1765 : *Planariidæ* sp. 5.

Dedegwa. Upper course of this river, near Mount Inimvua. 17.V.1952. Sample 1768 : *Planariidæ* sp. 3.

RHABDOCŒLA (NEORHABDOCŒLA).

Phænocora foliacea BÖHMIG.

(Fig. 1-3.)

Phænocora foliacea (*Derostoma foliaceum*) BÖHMIG, 1914, pp. 89-91, f. 1-4.
Phænocora chappuisi BEAUCHAMP, 1935, pp. 148-151, f. 5 (synonymy established by BEAUCHAMP, 1940, p. 23, note 1).
Phænocora foliacea MARCUS, 1955, f. 1-2. One specimen from Transvaal.

Material. — II g d 14, 15.VI.1951. Sample 718. — II g d 14 S, 18.VII.1951. Sample 890. — II g d 10, 23.VIII.1952. Sample 2040. — A total of 12 specimens.

The largest animal was 2,8 mm long, 1,1 mm broad. All worms are deep black, perhaps due to the cork stoppers of the vials; some of them have a lighter anterior end. The following characters must be added to our previous description : The inner epithelium of the pharynx contains scarce nuclei as in the 3 brazilian species of the genus (MARCUS, 1946, t. 15, f. 83, 84, 87) and generally in *Phænocora* (LIPPITSCH, 1889, p. 153; WAHL, 1910, p. 42; LUTHER, 1921, p. 9; GILBERT, 1935, textfig. 1 A-F; id., 1938, f. 2; RUEBUSH, 1939, f. 1). The asymmetrical size of the walls of the pharynx (fig. 2, f) is probably not constant, as LUTHER noted in *Westbladiella obliquepharynx* (1948, p. 48).

As the present worms are smaller than that from Transvaal, it is not strange that the testes are less extended. On the other hand the constriction between an inner seminal vesicle (r) and an outer granule vesicle (q) that was not noted in the specimen from Transvaal exists here like in BÖHMIG's (1914, f. 4) and BEAUCHAMP's (1935, f. 5) material.

The vitellaria (w) are restricted to the ventral side in the sectioned worm. The ovary (o) lies on the right side and opens into the female genital canal (n). The latter receives the vitelloducts (v) and a gland (d) that was not yet described for *Ph. foliacea*, though it is common in other species of the genus (GILBERT, 1938, p. 219 : « the usual gland opens into the oviduct »). A comparison with the figure of the worm from Transvaal shows a different position of the pear-shaped appendages (u) of the atrium superius (s). This difference is due to contraction of the atrial musculature and has no systematic value. Entally to the female genital canal follows a short, nucleated portion of the genito-bursal canal, the inner continuation of which has strong annular muscles (c) but no nuclei. The duct opens into a spacious bursa (b) with a folded ventral wall in the sectioned specimen. The conically projected entrance of the genito-bursal canal into the bursa agrees well with BEAUCHAMP's diagram (1935, f. 5). The communication between bursa and intestine (i) consists of two pores (g) in the present worm, not only of one, but this detail is taxonomically insignificant. The bursa contains spermatozoa that pass to the gut, and

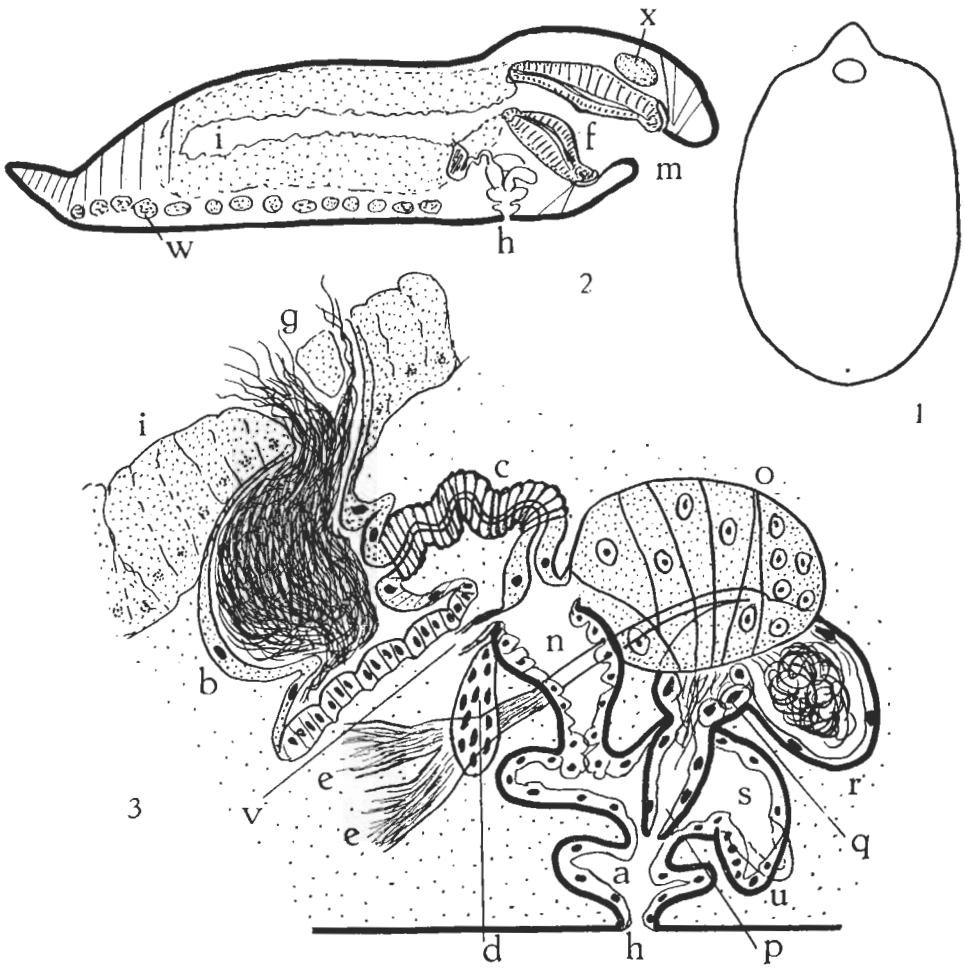

FIG. 1-3. — *Phænocora foliacea* BÖHMIG, preserved material.

1. Outline of preserved worm. — 2. Median section. — 3. Diagram of reproductive organs. a, atrium inferius; b, bursa; c, genito-bursal canal (muscular portion); d, gland of female genital canal; e, efferent ducts; f, pharynx; g, bursa-intestinal pores; h, gonopore; i, gut; m, mouth; n, female genital canal; o, ovary; p, penis; q, granule vesicle; r, seminal vesicle; s, atrium superius; u, pear-shaped appendages; v, one of the vitelloducts; w, vitellaries; x, brain.

it is known that also exceeding yolk masses go this way in *Phænocora* (LUTHER, 1921, p. 25; SCHULZ, 1938, p. 176).

The intestine contained debris, Diatoms, Crustaceans, and a Turbellarian, either a *Stenostomum* or a *Microstomum*.

Further distribution. — Cape Peninsula; Transvaal; Kenya, Lake Naivasha, 1.900 m; Mount Elgon, 4.000 m; Belgian Congo, Albert National Park (Mission H. DAMAS, 1935-1936).

Mesostoma evelinæ n. sp.

(Fig. 4-10.)

Material. — II f d 11, 18.VII.1951. Sample 894 (holotype). — II f c 11, 14. and 24.VII.1951. Samples 871 and 921. — A total of 75 specimens.

External characters. — The worms are up to 4,2 mm long, 2 mm broad, and about 1 mm thick. The back is more or less convex, the belly plane and broader than the dorsal side. The transverse section is nearly triangular. The greatest breadth lies in the middle of the body; the hind end is somewhat cuspidate. The broad flat ventral side suggests that the animals swim adhering to the surface film of the water with their broad bellies and with the dorsal side directed downwards.

Also the peculiar distribution of the colour indicates that the worms swim upside-down. The back is colourless or light greyish, the ventral side black. HOFSTEN (1916, p. 711) saw *Mesostoma maculatum* frequently swimming with the intensely coloured ventral side upwards. Also GELEI (1933, p. 195) correlates the dense brown pigment of the ventral side of *M. productum* with its swimming upside-down. There are further *Mesostominæ*, the ventral side of which is darker than the dorsal one, f. ex., *Mesostoma platygastricum* HOFSTEN (1925, p. 3) and *M. macroprostatum* HYMAN, 1939 *a* (for this species see discussion). Addendum p. 26.

Between the black parenchymal pigment and the ventral epidermis there are light golden-yellow chromatophores (fig. 6), the different appearance of which recalls the different phases of those in *Bothromesostoma evelinæ* MARCUS (1946, p. 92). As a physiological change of colour with expansion and contraction of the pigment was observed in the latter, one may presume the occurrence of the same phenomenon in the present species. Some of its xanthophores are small and nearly spherical, others spread in arborescent or stellate form. A few concentrated yellow pigment celles lie near the dorsal surface too.

The black ventral pigment leaves two windows free around the eyes, the photoreceptors of which are therewith exposed to light when the worm swims with the belly upwards. *Mesostoma maculatum* HOFSTEN (1916, p. 711, f. 6) has light spots in the same position. The outer mouth (m) that is located slightly in front of the middle of the body is surrounded by a small pigment-free area.

Internal characters. — As in other species of *Mesostoma* the tip of the head has a zone nearly without parenchyma surrounded by the

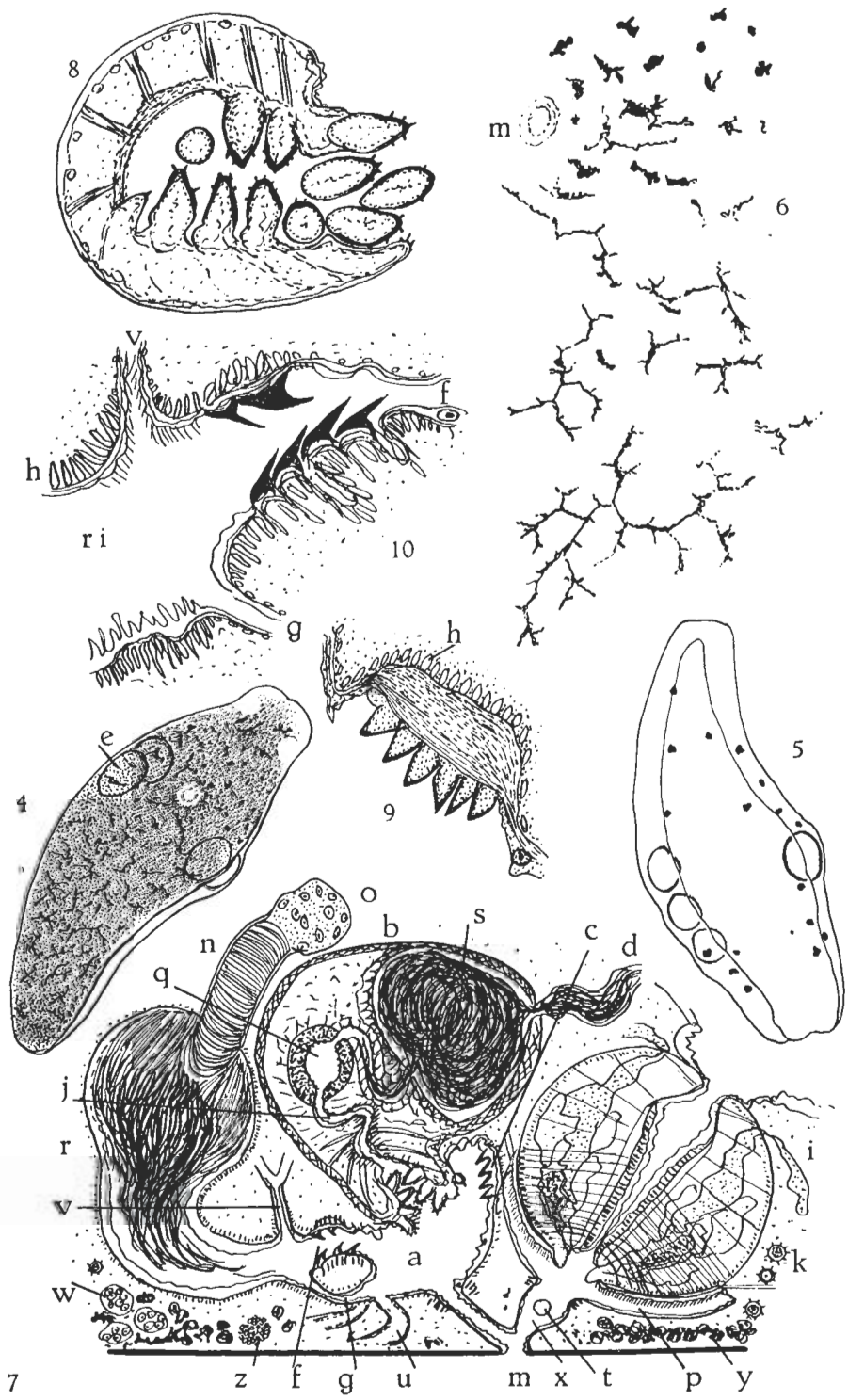

FIG. 4-10. — *Mesostoma evelinæ* n. sp., preserved material.

rhammite tracts and ventral basophil glands. The rhammites are produced by dorsal adenal cells on the level of the brain. The histological state does not allow for a description of the epidermis and the muscles. In four of the six sectioned series the entire parenchyma is obscured by masses of « crystalloids » (LUTHER, 1904, pp. 141-143, t. 9, f. 1-8), thick-walled sporangia of fungi (*Archimycetes*, *Chytridiaceæ*), nearly uniform in size, viz. 7-10, generally 8 μ in diameter, each with 6-8 points. The pigment of the ventral melanophores (y) consists of very fine granules; the grains of the yellow pigment (z) are much bigger, about 1 μ in diameter. The optic cell is very large, the pigment cup pale, functionally perhaps substituted by the parenchymal pigment of the physiologically superposed ventral side.

The cavity ental to the outer mouth (m), the excretion beaker (x), communicates with the pharyngeal pocket (p) in front, the ciliated end stems of the excretory tubules (t) to the sides, and the genital atrium (a) backwards. The pharyngeal pocket has no cilia, its longitudinal muscle fibres are numerous, and it surrounds the ectal third of the typical rosulate pharynx. The outer muscles of the grasping border of the pharynx, longitudinal and circular, are thick, the corresponding inner layers thin. The bulb of the pharynx has a ciliated outer epithelium. The outer longitudinal muscles are very thin, the annular ones still thinner and very numerous. Also the inner longitudinal and circular muscle fibres are very fine, only in the middle thicker. The radial fibres are strongest inward from the grasping border, they continue dense in the anterior half of the pharynx and become scarce farther ectally. The four differently staining types of pharyngeal glands open near together; one of the eosinophil types (i), the salivary glands (GELEI, 1933, p. 119), lies partly outside the pharyngeal bulb. The state of histological preservation does not favour the description of details in the œsophagus and the intestine.

EXPLANATION OF THE FIGURES 4-10.

4. Ventral view. — 5. Dorsal view. — 6. Details of xanthophores near mouth. — 7. Combined median section of pharynx and reproductive organs; the ovary is drawn removed from its natural position. — 8. Oblique section of penial papilla. — 9. Section of anterior atrial wall. — 10. Section of female genital canal.

a, atrium; b, penial bulb; c, atrial spines; d, seminal duct; e, thick-shelled eggs; f, dorsal opening of female canal; g, ventral opening of female canal; h, annular muscle fibres; i, extra-bulbar salivary gland; j, ejaculatory duct; k, sporangia of fungi; m, opening of mouth and gonopore; n, oviduct; o, ovary; p, pharyngeal pocket; q, granule vesicle; r, receptaculum seminis; ri, female genital canal; s, seminal vesicle; t, end stems of emunctories; u, uteri; v, common vitelloduct; w, vitellarian follicles; x, excretion beaker; y, black pigment; z, xanthophores.

The testes which are dorsal to the intestine extend, when completely developed, from near the tip to the hind end. In the mid line they are reduced or in front even absent. The type of the testes corresponds to LUTHER's diagram D (1904, p. 87). The numerous testicular follicles constitute a rather smooth, not distinctly lobed organ. From the union of the right and left efferent duct the seminal duct (d) arises that enters the anterior wall of the enormous penial bulb (b) from the left side. A web of principally spiral muscles forms the wall of the bulb that encloses the volumous seminal vesicle (s) and the much smaller granule vesicle (q) that are united by a winding duct. The high epithelium of the granule vesicle is stuffed with red granules. Although the glands that secrete these granules were not found in the six series of sections, they are probably located outside the bulb near its top, because fine strands of erythrophil secretion were seen crossing the bulb from the entrance of the seminal duct to the granule vesicle. The loops of the ejaculatory duct ental and ectal (j) to the granule vesicle make an eversion of the penis papilla possible that evidently functions as a cirrus. The ectal portion of the ejaculatory duct, the male genital canal or common male duct, is provided with strong annular muscles and radial divaricators that originate on the wall of the bulb (fig. 8). The penis papilla projects, as in most species of the genus, into the atrium (a). The duct is widened in the papilla and bears thick conical warts, about 30 μ high and 17 μ thick at the base. These cones (fig. 8) are coated with a spinous cuticle; some of them are located on the border of the penis, that was perhaps partially everted when the worms were preserved.

The angle between the penis papilla and the anterior wall of the atrium is slighty deepened. The wall has cuticular spines (c) on a plasmatic cushion without nuclei. Under this cushion the annular atrial musculature is thickened.

The ovary (o) lies on the right side and is feebly developed in all sectioned worms. It continues without boundary into the broad oviduct (n) that is composed of flat, thin, disc-like cells as usual in *Mesostoma*. The following chamber, the ample receptaculum seminis (r), contains masses of sperm, the tails of which are fastened to the inner wall. The epithelium of the receptaculum is stretched and very low in the ental, widened, and high, foliaceous and cyanophil in the ectal, narrower part. The female genital canal (ri) passes to the left of the penis. It receives the common viteiloduct (v) through its dorsal wall and the erythrophil secretion of the shell glands that lie ventrally. The female genital canal is connected with the atrium (a) twice, by a 30-40 μ broad dorsal (f) and a 6-15 μ broad ventral (g) tube. In the dorsal tube the annular muscles are strengthened to a sphincter, and on this level cuticular spines are directed towards the atrium. Perhaps their function is to fasten the spinous papillæ of the cirrus while the worms are mating.

The vitellarian follicles (w) are ventral. The uteri (u) go out from the middle of the atrium on the right and left side and proceed laterodorsally. They are farther extended in the posterior half of the body and contain up to 9 thick-shelled dormant eggs each. The greatest diameter of the eggs is about 0,4 mm, the shell still shows the boundaries of the yolk cells that have formed it.

DISCUSSION OF *MESOSTOMA EVELINÆ*.

The diagnosis of the subfamily *Mesostominæ*, then tribus *Mesostomida* or *Mesostomatini*, established by LUTHER (1904, p. 217), was copied by GRAFF (1904-1908, p. 2538; 1913, p. 262). At that time the only other subfamily of the *Typhloplanidæ* with testes dorsal to the vitellaries were the *Olisthanellinæ* (HOFSTEN, 1907, p. 408) that differ from the *Mesostominæ* by two excretory pores independent from the mouth. Later on the *Opistominæ* were transferred to the *Typhloplanidæ* (BEKLEMISCHEV, 1920, pp. 72-73). This is the third subfamily with testes dorsal to the vitellaries; its single excretory pore lies between mouth and gonopore. The fourth subfamily with dorsal testes are the *Phænocorinæ* (MEIXNER, 1924, p. 19, 21), the fifth the *Ascophorinæ* (FINDENEGG, 1924, p. 20). Both have two excretory pores separate from the mouth and the genital atrium. The openings of the emunctories can not be verified in many marine *Typhloplanidæ* (LUTHER, 1946, p. 17), and sometimes their type has even led to artificial systematic arrangements (id., 1948, pp. 117-118). Notwithstanding a freshwater Typhloplanid as the present one can be classified with certainty. It belongs to the *Mesostominæ*.

This subfamily contains two genera, *Mesostoma* and *Bothromesostoma*, as *Metamesostoma* SCHUBOTZ, 1922 must be removed from the *Mesostominæ* (DU BOIS-REYMOND MARCUS, 1951, p. 78). While *Bothromesostoma* has a ventral pit anterior to the pharynx and a spermatic duct between the bursa canal and the female genital canal, all species of the *Mesostominæ* without these two features are called *Mesostoma* in a somewhat summary manner. Even the morphologically aberrant species *Mesostoma arctica* HYMAN (1938) from Canada and *M. macropenis* HYMAN (1939) and *M. columbianum* HYMAN (1939 *a*), both from the United States, have been maintained in *Mesostoma*. *Mesostoma macroprostatum* HYMAN (1939 *a*, p. 629) has, as Miss HYMAN kindly informed by letter, « a pit in the midventral line, anterior to the pharynx, and I guess it should be transferred to *Bothromesostoma* ». As the histological condition of the present worms is poor, I prefer not to make the species the type of a new genus.

Specifically *Mesostoma evelinæ* differs widely from the other species of *Mesostoma*. A spinous cirrus does not occur in this genus, and also the clearly eversible penis (LUTHER, 1904, p. 256) of *Bothromesostoma personatum* (O. SCHMIDT) is not a cirrus. The tip of the penis of *Mesostoma nigri-*

rostrum BRAUN bears tiny cuticular points (BRINKMANN, 1905, p. 100, t. 4, f. 5, 8). The armature of the cirrus in *M. evelinæ* however is comparable rather with that of *Opistomum pallidum* O. SCHMIDT (1848, p. 38, t. 5, f. 14 a) or some species of *Phænocora* (VEJDOVSKY, 1895, t. 5, f. 38, 40; HOFSTEN, 1907, t. 25, f. 17). Also the canal between seminal vesicle and granule vesicle of *M. evelinæ* is exceptional in *Mesostoma.*

Another uncommon character of *M. evelinæ* is the absence of a bursa copulatrix. The inconspicuous atrial pouch with cuticular spines (c) does not deserve this designation. Sperm was not seen in it. *Mesostoma baoense* RUEBUSH has a bursa that is histologically not set off from the atrium (1939, p. 55, f. 2, bc), but it is certainly an atrial diverticle. With FERGUSON and HAYES (1941, p. 16) I do not consider RUEBUSH's species a variety of *M. lingua* (ABILDGAARD).

In several *Typhloplanidæ*, but not in *Mesostoma*, cuticular elements occur in the atrium and at the basis of the bursa canal (LUTHER, 1904, p. 104; 1946 : *Thalassoplanella*; PAPI, 1951 : *Castrada*; etc.). The structure most similar to the atrial spines of *M. evelinæ* is probably the spinous plate of *Castradella granea* (BRAUN) (NASSONOV, 1926, p. 877, t. 2, f. 10, g).

The spines in the entrance of the female genital canal and the two connections (fig. 10, f, g) of the latter (ri) are peculiarities of the present species. Many *Typhloplanidæ* have a « stalked » receptaculum seminis, that means : a special canal between ductus communis and receptaculum. As an example the first figure of *Dochmiotrema limicola* HOFSTEN (1907, t. 22, f. 16) can be mentioned, that was emended later on (LUTHER, 1946, f. 8, 9). One might imagine that such an originally independent receptaculum had fused with the oviduct and only retained an independent duct to the atrium.

TRICLADIDA PALUDICOLA.

PLANARIIDÆ sp. WITHOUT REPRODUCTIVE ORGANS.

Planariidæ sp. 1.

(Fig. 11-12.)

Material. — Rivière Dungu, 8.III.1951. Sample 372. — 20 immature Planariids of very different sizes.

The largest measurements are : 10 mm length and 3 mm breadth. The anterior border of the head forms a wide angle, and the auricles are a little produced. The body is flat with sharp margins.

The back is uniformly brownish, the ventral side somewhat lighter. The eyes are a little farther distant from one another than from the borders; they lie in front of the anterior level of the auricles. They are not surrounded by pigment-free halos. The light area of the auricles is broad and attains the margin of the body. The pharynx has no pigment.

There are no snigs of division in this lot.

The pharynx was sectioned to determine the muscular layers. The two outer layers are very thin, together about 6 μ, the inner annular stratum is 25 μ thick. The blue and red strands of the pharyngeal gland secretion are intermingled.

Planariidæ sp. 2.

(Fig. 13-14.)

Material. — II g d 8, 20.VI.1951. Sample 747. — One specimen.

The worm is 6 mm long and 1,5 mm broad. The anterior end is perfectly round. The body is flat.

The back is dark brown with an irregular black middle line; the ventral side is a little lighter. The eyes are farther from the anterior end than from one another and from the sides. They lie in front of the narrow auricular crescents and have small pigment-free areas.

The pharynx is located in front of the middle of the body. This is perhaps a signal of recent division. The outer longitudinal and annular muscle layers are 10 μ thick, the inner annular stratum 30 μ. The pharyngeal nerve plexus is situated in the middle of the pharyngeal parenchyma, not near the outer nuclei.

Planariidæ sp. 3.

(Fig. 15-17.)

Material. — II f d 10, 25.VI.1951. Sample 775. — II f c 11, 24.VII.1951. Sample 921 : one specimen together with *Mesostoma evelinæ*, n. sp. — II f d 11, 4.X.1951. Sample 1244. — II g d 8, 8.XI.1951. Sample 1423 : 40 worms together with one *Othelosoma saegeri*, n. sp., and one *Rhynchodemus* sp. — II g d 10, 11.II.1952. Sample 1650. — Morubia 9, 12.III.1952. Sample 1806. — Dedegwa, 17.V.1952. Sample 1768. — II d d 9, 7.VII.1952. Sample 1914. — II i d 9, 12.VII.1952. Sample 1968. — II g d 8, 8.VIII.1952. Sample 1978. — A total of several hundred worms.

The largest measurements are : length 11 mm, breadth 3,5 mm, height 0,9 mm. Some of the worms are rather swollen, and many have a curled head (fig. 15) or at least the anterior border is bent downwards (fig. 17). The auricles are marked by notches.

The back is brownish or a little spotted, with a concentration of pigment around the pharynx. The belly is much lighter; the margin of the body is white. The eyes that have greyish halos are as far from one another as from the borders. They lie well in front of the narrow auricular areas. These are united around the anterior border by a row of light, sensorial spots.

The pharynx is white. Its outer longitudinal and annular muscle layers are 14 μ thick, the inner annular 30-40 μ. The blue and red strands of secretion are intermingled.

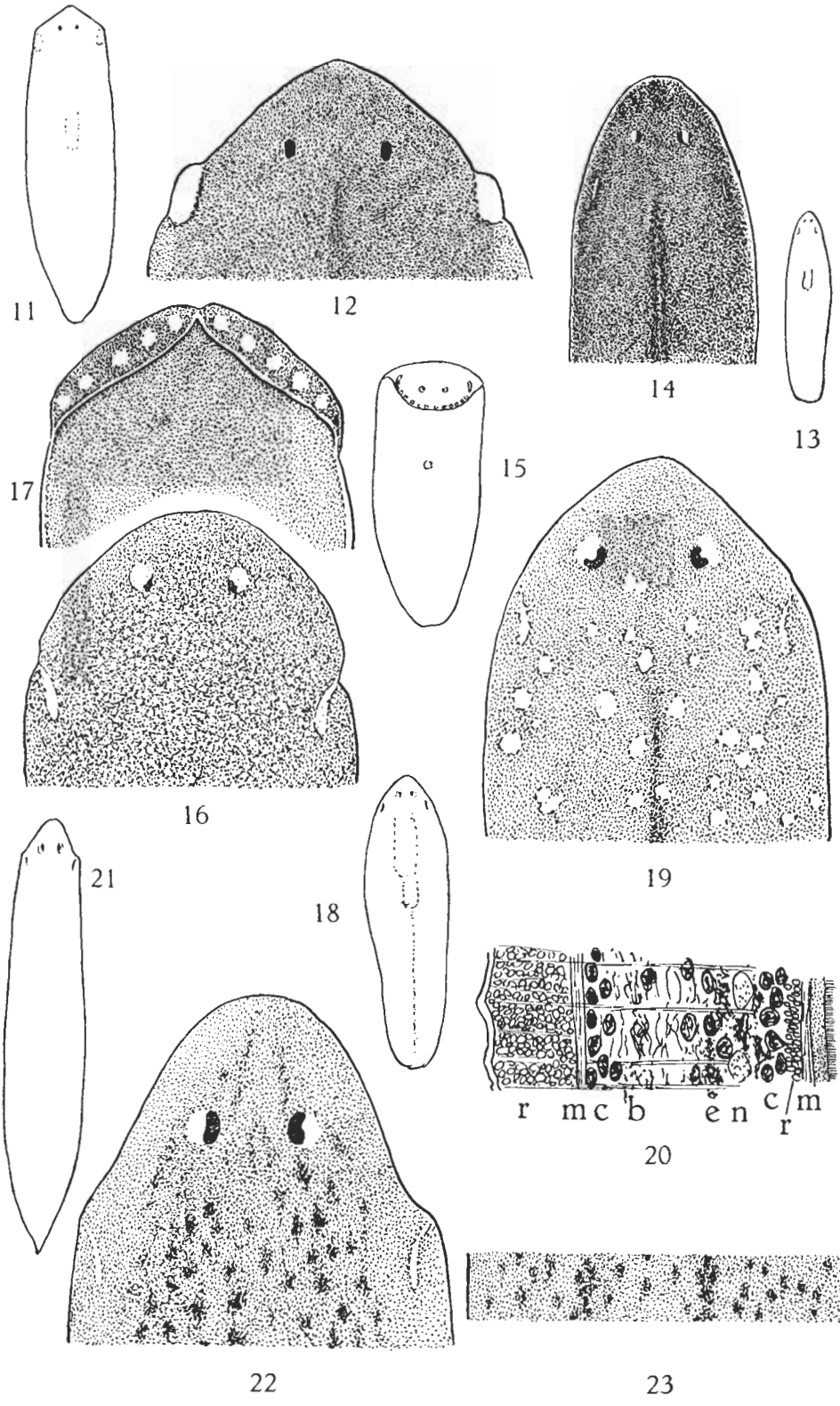

FIG. 11-23. — *Planariidæ* species.

In the largest worm the pharynx is located 2 mm from the tip, and there are several cases of regenerating fore and hind ends, so that the populations seem to be in asexual reproduction by fission.

Planariidæ sp. 4.

(Fig. 18 20.)

Material. — II f c 13, 31.VIII-8.X.1951. Samples 1060, 1123, 1161, 1280. — II f d 13, 4.X.1951. Sample 1227. — A total of several hundred asexual worms, part of which show signs of fission.

The longest worm measures 9 mm, the broadest 3 mm. The body is rather flat, the anterior end roundish triangular without prominent auricles.

The back is greyish brown, sometimes with a dark middle line and occasionally irregular light spots; some specimens have dark mottles. The ventral side is light and the pharynx white. The eyes are as far from one another as from the borders, they lie anterior to the auricles and are surrounded by big halos. The auricular spots are very narrow. In some worms there is a row of light sensorial spots around the fore end.

The two outer muscle layers of the pharynx (fig. 20) are together 10 μ high, the inner annular 18-20 μ. Of the gland secretion the granular erythrophilous strands pass on the outer side around the nerve plexus, the cyanophilous strains run near the inner side.

Planariidæ sp. 5.

(Fig. 21-23.)

Material. — Aka, 14.V.1952. Sample 1765. — About 40 specimens.

The rather crumpled worms are up to 15 mm long and 3 mm broad. The anterior border is prolonged, the auricles stand out. The shape of the head is somewhat like what BEAUCHAMP calls « fer de lance ». The animals are flat with sharp borders.

The back is greyish brown with black stipples, the ventral side has exactly the same colours. The eyes are farther from the front than from one another and from the sides. Their light halos are big. They are situated in front of the very narrow auricular spots.

EXPLANATION OF THE FIGURES 11-23.

11. Species 1. — 12. Species 1, head. — 13. Species 2. — 14. Species 2, head. — 15. Species 3. — 16. Species 3, dorsal view of head. — 17. Species 3, ventral view of head. — 18. Species 4. — 19. Species 4, head. — 20. Species 4, longitudinal section of pharyngeal wall. — 21. Species 5. — 22. Species 5, head. — 23. Species 5, part of ventral side.

b, blue strands of secretion; c, nuclei; e, red strands of secretion; m, longitudinal muscles; n, nerve plexus; r, annular muscles.

The pharynx is white. Its two outer muscle layers are 15 µ thick, the inner annular stratum measures 30-40 µ. The cyanophilous strands of glandular secretion run near the inner wall of the pharynx, the pink ones farther outside.

This species has the typical aspect of *Dugesia gonocephala* (ANT. DUGÈS), but is clearly different by reason of the two layers of outer pharyngeal muscles; in *gonocephala* there are three.

DISCUSSION OF THE *PLANARIID.E* sp. 1-5.

The *Tricladida Paludicola* of *Probursalia* fall into three families, two of which were established by KENK (1930, pp. 150-151, 290, 296), viz. the *Planariidæ* and the *Dendrocœlidæ*. The inner pharyngeal muscle fibres of the *Planariidæ* form separate, those of the *Dendrocœlidæ* intermingled circular and longitudinal layers. The *Kenkiidæ* HYMAN (1937, p. 473) have the same pharyngeal muscles as the *Planariidæ*, but differ by a glandulo-muscular adhesive organ in the centre of the anterior margin.

The present species are all *Planariidæ*, but as only asexual populations are available, the genus or genera can not be determined. The choice may be restricted to *Cura* STRAND, 1942 (new name for *Curtisia* GRAFF, 1916) and *Dugesia* GIRARD, 1950, the only genera of the *Planariidæ* reported from the Ethiopian Region. It is probable that the dividing species 3-5, and perhaps 2, belong to *Dugesia*, as fission has rarely been observed in *Cura*. Nevertheless a comparison must comprise all *Paludicola* of the Ethiopian Region without consideration of their generic denomination :

Planaria venusta BÖHMIG (1897, p. 12). Belgian Congo, Ituri District, 1.250 m, in the brook Qué that gives origin to the Abumbi, a left tributary of the Ituri. Was described after a drawing of the living animal (f. 11) and 3 preserved immature worms (f. 12). The general aspect is somewhat similar to the present species 3, but the position of the eyes on the line that unites the tips of the auricles does not agree with spec. 3. South African specimens classified as *Dugesia neumanni* (NEPPI) by MARCUS (1955, f. 33-34) might be compatible with *venusta*, but this older name is too insecure to substitute *neumanni*.

Planaria brachycephala BÖHMIG (1897, p. 13). Belgian Congo, Ituri District, in a brook (Tarao) that is an affluent of the Duki, a tributary of the Ituri. BÖHMIG had no specimens at his disposal, only drawings (f. 13, 14) and notes by STUHLMANN, hence his species can not be compared with the present preserved material.

The wide difference between the Congoan and Nilotic Paludicolan fauna noted by STUHLMANN (BÖHMIG, l. c.) can evidently only be valued as an incidental result of STUHLMANN's collections; on the other hand the « Eastern Rivers » (WORTHINTON, 1954, p. 70) flowing eastward to the Indian Ocean to the north of the Zambesi basin are much less rich in genera and species of freshwater organisms than the Congoan and Nilotic regions (l. c.).

Dugesia neumanni (NEPPI, 104, p. 309). Abyssinia, South Kaffa. ? Mount Kenya, 2.870-4.000 m (BEAUCHAMP, 1913, p. 4; MARCUS, 1955). Basutoland, up to 3.050 m (MARCUS, 1955). ? Cape Province, Zitzikama forest (ibid.). The figures of the original description (1904, t. 9, f. 7-8) and some that refer to South African material (MARCUS, 1955, p. 34) have a certain likeness with spec. 3.

Planaria tanganyikæ LAIDLAW (1906, p. 177); BAYLIS (1927, p. 380). Lake Tanganyika. The only species of the present material that has a certain likeness with LAIDLAW's is spec. 1, but also this differs by its eyes farther distant from one another, and its more anterior pharynx.

Cura jeanneli (BEAUCHAMP, 1913, p. 8). East Africa, Kilimanjaro, 2.700 m. Anterior margin of head almost straight with prominent auricles.

Planariidæ sp. (BEAUCHAMP, 1935, p. 146). Kenya Colony, Mount Elgon, 3.600-4.100 m. Is not *Dugesia gonocephala* (BEAUCHAMP, 1936, p. 435), because the outer pharyngeal musculature forms only two layers. This character together with a *gonocephala*-like head occurs in our species 5.

Dugesia gonocephala (ANT. DUG.) BEAUCHAMP (1935, p. 147; 1936, p. 435). Belgian Congo, widely distributed (id., 1939, pp. 120-121; 1951, p. 96; MARCUS, 1953, p. 6). Angola (BEAUCHAMP, 1951 *a*, p. 80). As the outer pharyngeal muscles form three layers, none of the spec. 1-5 can belong to *gonocephala*.

Dugesia congolensis BEAUCHAMP (1951, p. 90). Belgian Congo, Uvira. As the pharynx does not differ from that of *D. gonocephala*, none of our species can belong to *congolensis*.

Dugesia lamottei BEAUCHAMP (1952, p. 365). French Guinea. As the head was not figured and the musculature of the pharynx not described, this species can not be distinguished from ours.

Dugesia machadoi BEAUCHAMP (1952, p. 367). Angola. As this species was originally described as *gonocephala* (id., 1951 *a*), one can assume that its pharynx has three outer muscle layers.

Dugesia milloti BEAUCHAMP (1952, p. 368). Madagascar. Differs from all our species by long, slender auricles.

Dugesia astrocheta MARCUS (1953, p. 13). Belgian Congo, Upemba Park. Head similar to spec. 1, but certainly different by much thicker pharyngeal muscle layers.

Dugesia ectophysa MARCUS (1953, p. 17). Belgian Congo, Upemba Park. Pharynx with three outer muscle layers, and therefore different from the present spec. 1-5.

Planariidæ sp. MARCUS (1953, p. 21, f. 18). Belgian Congo, near Upemba Park : Masombwe, 1.120 m. The head is like that of spec. 3.

Dugesia monomyoda MARCUS (1953, p. 22). Natal. Colour and shape unlike the present materials.

Cura evelinæ MARCUS (1955, f. 15-22). Cape Province. Has quite a different head.

Cura paeta MARCUS (1955, f. 23-28). Basutoland, up to 2.900 m. Cape Province from coastal plain up to 2.440 m. Has a black bordered fore end and three outer muscle layers of the pharynx.

Cura tinga MARCUS (1955, f. 29-31). Basutoland, about 3.050 m. Back light yellow.

TRICLADIDA TERRICOLA.

Othelosoma saegeri n. sp.

(Fig. 24-27.)

Material. — II g d 8, 8.XI.1951. Sample 1423 (holotype). — One mature worm together with about 40 *Planariidæ*.

Like two specimens of *Rhynchodemus piptus* MARCUS, 1952 and one of *Othelosoma rudebecki* MARCUS, 1955, also the present worm had evidently fallen into the water. The *Rhynchodemidæ* seem to be sufficiently protected by their mucus against diffusion of water through the epidermis, at least for some time.

External characters. — The length of the body is about 11 mm, the breadth 1,2 mm in the anterior, 0,8 mm in the posterior part of the body, and the creeping sole 0,5 and 0,4 mm broad in the corresponding regions. The pharynx is 1 mm long; the mouth (l) is located at 8 mm, the gonopore (y) 9,9 mm from the tip. The fore end of the body as well as that of the sole are evenly rounded, the hind end is a little more pointed, the transverse section is oval without prominent lateral borders.

From the white sole over the light grey lateral parts of the belly on both sides of the sole the colour becomes gradually darker to the sides of the body and the back, the middle of which is nearly black. The eyes lie so near one another that they form one common black spot. The actual distance between them is 50 μ, the diameter of each is 60 μ.

Internal characters. — The epidermis is 22 μ high on the back, 17 μ on the sides, and 12 μ on the sole. The latter bears 3 μ long cilia, and its nuclei seem to be intra-epithelial; the pink-staining sole glands (g) are not numerous. Eosinophil rhabdites occur in the epidermis except on the sole. In the epidermis and the parenchyma pigment cells (x) are irregularly distributed, though absent on the ventral side. The cutaneous longitudinal muscles (w) are strictly in one layer; the subepidermal nerve plexus (f) is thickened on the ventral side.

The longitudinal parenchymal muscles (m) are strong all around the body, also over the anterior retractor (r). The transverse parenchymal muscles (t) are moderately developed. The retractor is dorsal and about 1,6 mm long. It originates probably on the parenchymal septa between the intestinal diverticula and ends in the parenchyma close behind the eyes. A special sheath (PANTIN, 1953, pp. 210-211) is not visible.

There are about 90 intestinal diverticula on each side, as can be estimated from 8-9 per millimeter in sections of the hind region. The posterior limbs of the gut are separated only by a thin layer formed by the muscularis of each intestinal wall and very little parenchyma.

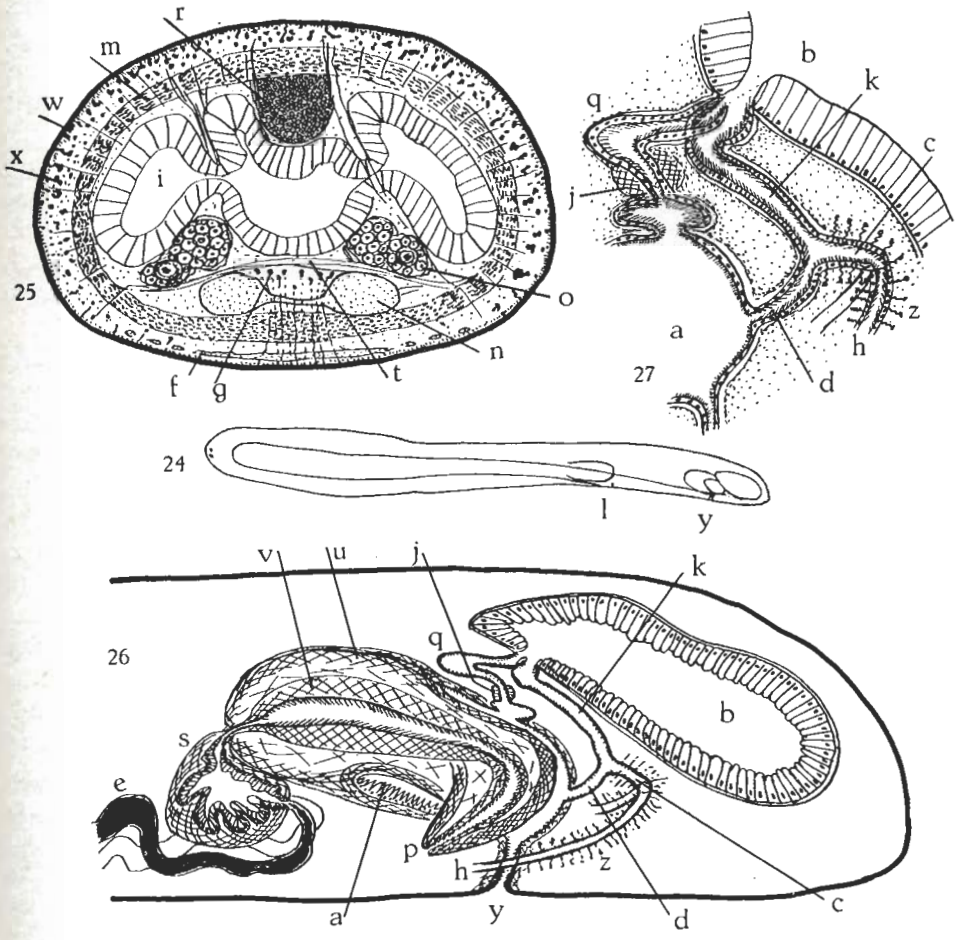

FIG. 24-27. — *Othelosoma saegeri* n. sp., preserved material.

24. Ventro-lateral view. — 25. Transverse section on level of ovaries. — 26. Diagram of reproductive organs. — 27. Female ducts, enlarged.

a, atrium; b, bursa; c, common ovovitelline duct; d, canalis anonymus; e, efferent ducts; f, subepidermal nerve plexus; g, glands of sole; h, ovovitelline ducts; i, gut; j, sphincter of ductus vaginalis; k, Beauchamp's canal; l, mouth; m, longitudinal parenchymal muscles; n, nerve cords; o, ovaries; p, penis papilla; q, ductus vaginalis; r, retractor; s, seminal vesicle; t, transverse muscle fibres; u, outer muscular tunic; v, intrinsic musculature of male organ; w, subepidermal longitudinal muscles; x, pigment cells; y, gonopore; z, shell glands.

The testes begin 1,8 mm from the fore end. The sinuous efferent ducts (e) are dorsal to the nerve cords (n) and swollen by sperm in the sectioned posterior region of the body. The ducts bend forward and open from both sides into the seminal vesicle (s) that lies outside the penial bulb. The vesicle has a muscular, 15 µ thick mantle and a 20 µ high, ciliated and folded epithelium with normal nuclei. Glands were not seen. The ejaculatory duct passes through the thick outer muscular tunic (u) (PANTIN, 1953, p. 209) that limits the penial bulb. Its lumen is narrow and lined by a ciliated epithelium. The duct has a strong coat of intrinsic musculature (v) separated from the outer tunic by feeble loose fibres. The intrinsic layer decreases towards the tip of the conical penis papilla (p), while the outer tunic accompanies the epithelia of the papilla and the atrium (a). The whole male organ is 0,9 mm long and about 0,2 mm in diameter. The ciliated atrial epithelium is 35 µ high on the ventral wall. The cilia continue to the gonopore (y) that communicates with the atrium by a 0,1 mm long, pigmented canal.

The ovaries (o) are young. They lie from 1,3 to 1,4 mm behind the tip of the body and dorsal to the nerve cords (n). Vitellaria are not developed yet. The ovovitelline ducts (h) are very thin in the anterior region of the body. The eosinophil shell glands (z) begin at a little distance in front of the gonopore and continue along the common ovovitelline duct (c). The female ducts, ductus vaginalis (q), Beauchamp's canal (k), and canalis anonymus (d) are all ciliated and weakly muscular. There is a slight dilatation on the point where the common ovovitelloduct opens and Beauchamp's canal begins. The latter is about 0,2 mm long and runs forward and upward. It bends and widens short before its broad, inner opening into the bursa (b). This opening as well as that of the ductus vaginalis (q) is near the anterior wall of the bursa, a 0,4 mm broad, 0,25 mm high, and 0,7 mm long organ that ends 0,2 mm from the tip of the tail. The canalis anonymus (d) is drawn as running in one plane. However it curves to the side and ends 0,1 mm from the median plane. Therewith its length is about 0,15 mm, while the straight course would be 70 µ. The opening of the canalis anonymus into the atrium lies in the posterior wall of the latter, 0,15 mm above the gonopore (y). The distance between this aperture and that of the ductus vaginalis (q) is 0,3 mm. The ductus vaginalis begins at the atrium with a small chamber separated from its ental, tubular part by a sphincter (j). The cilia in the canal-like portion of the ductus vaginalis are directed inwards. This duct opens into the bursa immediately beside the ciliated funnel of Beauchamp's canal (fig. 27).

The name of the new species was chosen in honour of HENRI DE SAEGER, Chief of the first Expedition to the Belgian National Park of the Garamba.

DISCUSSION OF *OTHELOSOMA SAEGERI.*

By chance the morphologically nearest species, *Othelosoma rudebecki*, was also obtained in an aquatic biotope. This species has 3 dorsal stripes. Its subepidermal longitudinal muscle fibres form small bundles in the ventro-lateral region of the body, and its longitudinal parenchymal muscle layer does not pass over the retractor. The seminal vesicle is extra-bulbar as in *O. saegeri*, but the bulb itself is indistinctly set off from the parenchyma. In the female system the principal differences are : Beauchamp's canal opens entally into the vagina, the bursa is nearly globular, and the ectal orifices of canalis anonymus and ductus vaginalis are only 50 μ apart from one another in horizontal direction.

Among the african *Rhynchodemidæ*, the copulatory organs of which are unknown, none agrees with the external characters of *Othelosoma saegeri.*

Microplaninæ sp.

(Fig. 28-31.)

Material. — II g d 5, 8.VIII.1951. Sample 983. Two worms and 4 fragments. — II h d 8, 27.VIII.1951. Sample 1032. Three worms. — All 9 specimens are immature.

External characters. — The animals are short and thick in the first sample, longer and slender in the second, measuring 8 and 15 mm in length respectively, and 2 and 1,2 mm in breadth. Dorso-ventrally they are slightly flattened.

The anterior end is quite blunt, the hind end a little pointed. The creeping sole goes from tip to tip, pointed at both ends, its breadth is one third of that of the body. In the strongly contracted worms 983 the skin shows many transverse folds, in 1032 it is smooth. In the latter sample the dorsal muscles are more contracted than the ventral ones, so that the worms are bent backwards (fig. 28). The mouth lies at the limit of the anterior third.

The colour is black in the middle of the back, changing gradually, without stripes, to the white of the creeping sole. The eyes lie near the tip, 0,43 mm, in a contracted worm, far apart from one another; they are 70 μ in diameter and 130 μ deep.

Internal characters. — At the anterior end there is a 0,12 mm deep sensory pit (h) with erythrophilous rhabdites in its epithelial cells. The dorsal epithelium is 28 μ thick, decreasing to 17 μ on the creeping sole that has 8 μ long cilia and normal nuclei. To both sides of the sole there are sensory tracts (fig. 30, g) recognizable in the sections by their depressed nuclei. These tracts end about 0,6 mm from the tip.

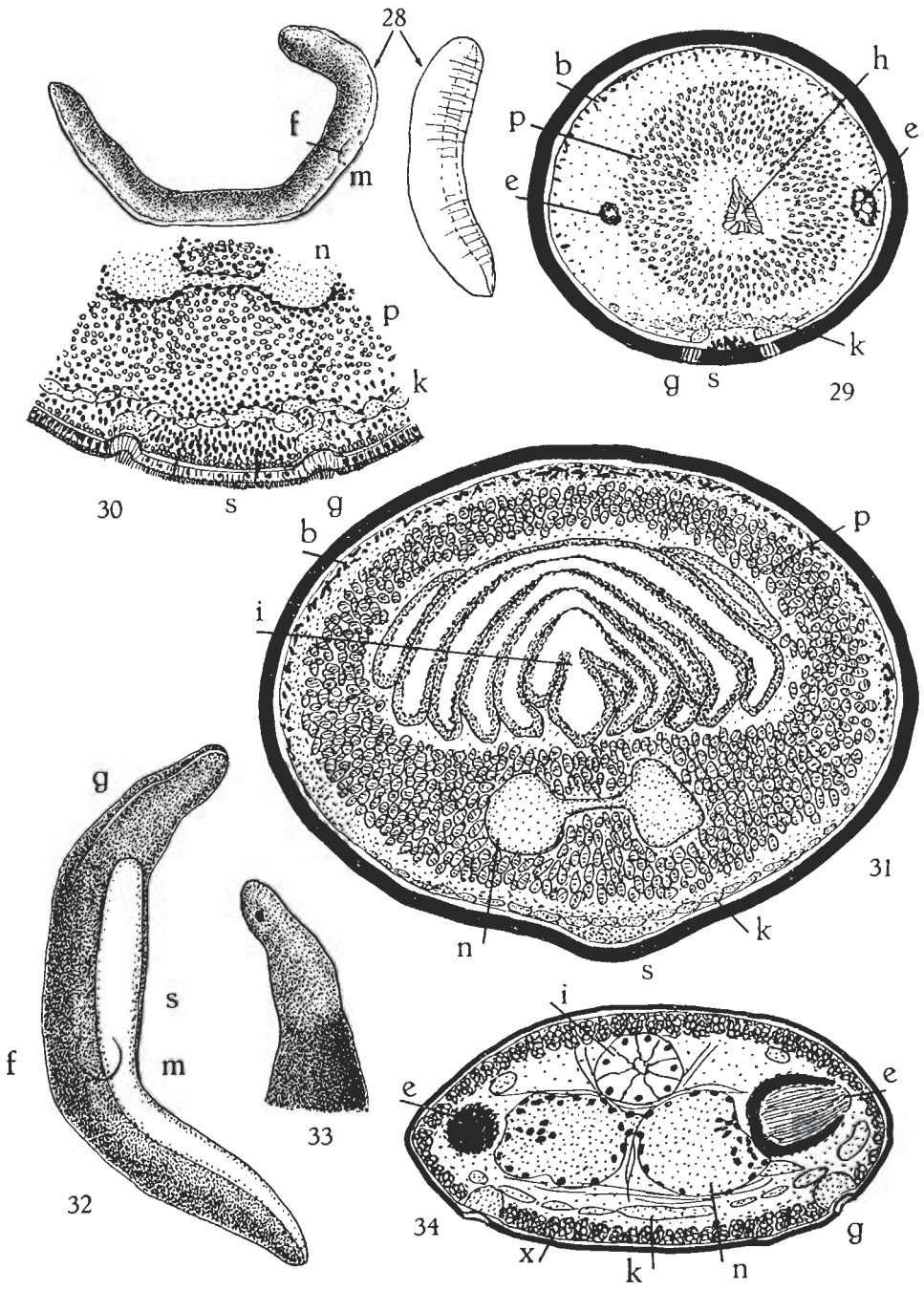

FIG. 28-31. — *Microplaninæ* species, preserved material.
FIG. 32-34. — *Rhynchodemus* species, preserved material.

The subepidermal annular and longitudinal muscles are each in one layer, the ventro-lateral longitudinal ones are sometimes denser. The anterior end has no round, limited retractor, but the strong parenchymal, longitudinal fibres form a thick cone around the brain and act as retractor muscles. Farther backwards, about 1 mm from the tip, these fibres unite to numerous bundles that constitute a pluristratified mantle (p) around the intestine. This mantle involves the ventral nerve cords and diminishes towards the middle of the body. The rest of the parenchyma is laden with pigment on the dorsal side and interwoven with the cutaneous nerve plexus on the belly. A plate of transverse muscles dorsal to the nerve cords is not developed. In the middle of the sole there are some gland cells, not the concentration at the beginning (PANTIN, 1950, p. 28).

The anterior part of the gut appears very different in the sectioned specimens from the contracted and the relaxed sample. In the former there are up to 7 intestinal diverticula on either side of the unpaired branch in a section, while in the latter there is only one. The pouches of the gut are embedded in gland cells that probably belong to the pharynx. The latter is 1 mm long and 0,5 mm in diameter. The intestine contains many eggs of nematods. In none of the specimens any traces of reproductive organs were seen.

DISCUSSION OF *MICROPLANINÆ* sp.

The present species belongs to the *Microplaninæ* PANTIN, 1953, the more primitive of the two subfamilies of the *Rhynchodemidæ*. The following genera of the *Microplaninæ* are known : *Othelosoma* GRAY, 1869 (= *Artiocotylus* GRAFF, 1896, see PANTIN, 1953); *Microplana* VEJDOVSKY, 1890; *Pseudoartiocotylus* IKEDA, 1911; *Diporodemus* HYMAN, 1938; *Incapora* DU BOIS-REYMOND MARCUS, 1953; and *Orthodemus* HYMAN, 1954. To these must be added *Amblyplana* GRAFF, 1896, an ill-defined, probably not valid genus (HEINZEL, 1929, pp. 454-455; PANTIN, 1953, pp. 211-213; HYMAN, 1954, p. 18).

EXPLANATION OF THE FIGURES 28-34.

28. Total specimens; the contracted animal from sample 983, the relaxed one from sample 1032. — 29. Transverse section of worm from sample 983, 0,13 mm from tip. — 30. Same, 0,4 mm from tip. — 31. Same, 1,3 mm from tip.

b, pigment; e, eyes; f, pharynx; g, sensory tract; h, sensory pit; i, gut; k, subepidermal nerve plexus; m, mouth; n, nerve cords; p, parenchymatic longitudinal muscles; s, creeping sole.

32. Total specimen, ventral view. — 33. Head of same in dorsal view. — 34. Transverse section on level of eyes.

e, eyes; f, pharynx; g, sensory furrow; i, gut; k, subepidermal nerve plexus; m, mouth; n, nerve cords; s, creeping sole; x, subepidermal longitudinal muscles.

It is taxonomically insignificant to mention that GRAFF (1912-1917, p. 3230) indicated fine transverse folds of the integument in *Amblyplana*, as such occur in the contracted worms of our sample 983.

Our species can not be attributed to *Pseudoartiocotylus*, because the latter has a peculiar anterior salient sense organ (GRAFF, 1912-1917, p. 2905, t. 44, f. 8), and the « ambulacral pits » of *P. ceylonicus*, the only species of the genus, are less extended (p. 2911, f. 111) than the sensory tracts of the present worms.

The remaining genera cannot be defined without reproductive organs. It is true that the parenchymal longitudinal muscles of the american species of *Dipodoremus* (HYMAN, 1938*a*, 1941, 1943) are less developed than in our material. Also in *D. attemsi* (BENDL, 1909; MARCUS, 1953, p. 52) these muscles are united in bundles; but as the musculature of HYMAN's three species is far from uniform, one cannot exclude an immature worm from *Diporodemus* based upon the muscles. The parenchymatic muscles of *Rhynchodemus musculosus* BEAUCHAMP (1930, p. 724), probably a *Diporodemus* (MARCUS, 1953, p. 52), were not described.

The type-species of *Incapora*, *I. weyrauchi* DU BOIS-REYMOND MARCUS (1953, p. 75) has one outer and one inner layer of parenchymal longitudinal muscle bundles, but these muscles are much less numerous than in the present material. On the other hand *Rhynchodemus anamallensis* BEAUCHAMP (1930, p. 703) that perhaps belongs to *Incapora* (MARCUS, 1953, p. 52) is a species with strong longitudinal parenchymatic muscles.

Finally the *Microplaninæ* with Beauchamp's canal (*Othelosoma*) and without (*Microptana*, *Orthodemus*) cannot be distinguished by their muscles, although the occurrence of an anterior retractor is more common in *Othelosoma*. Exceptions have been recently indicated (MARCUS, 1953, pp. 52-53).

If one tries to classify the present material by a key that contains all *Microplaninæ* known from Africa with consideration of the colour only, our species must be compared with *Othelosoma nigrescens* (MELL, 1904, p. 472; MARCUS, 1953, p. 27) from South West Abyssinia. The parenchymal musculature of *nigrescens* is well, though not strongly developed, contrary to our material.

RHYNCHODEMUS sp.

(Fig. 32-34.)

Material. — II g d 8, 8.XI.1951. Sample 1423. One immature specimen together with *Othelosoma saegeri* and 40 *Planariidæ* spec. 3.

External characters. — The anterior end of the 5 mm long and 0,7 mm broad worm is slender and probosciform. The body widens suddenly about 1 mm from the tip where the creeping sole begins, forming a hood (PANTIN, 1950, p. 28). The back is convex and the belly more or less flat. The breadth of the sole is three fifths of that of the body. The

eyes begin 0,2 mm from the tip. They are 50 μ in diameter and 60 μ long. The mouth is located at 3 mm; the pharynx measures 0,4 mm in length and in diameter.

The anterior end is dark grey with a white sensory furrow (g) on the sides that ends on the level where the creeping sole begins. Farther backwards the back is black, turning grey towards the ventral side, and the creeping sole is white.

Internal characters. — The epithelium of the sensory furrow (g) has depressed nuclei, while those of the creeping sole (s) are partly normal. There seems to be no special concentration of glands at the beginning of the creeping sole (PANTIN, 1950, p. 28). Scattered cyanophil glands occur along the sole.

The subepidermal longitudinal muscles (x) form bundles of 4-6 fibres each. The parenchymatic transverse muscle plate over the nerve cords (n) is present though thin. Of the anterior branch of the intestine one or two diverticula on each side are hit in transverse sections of the anterior third of the worm.

DISCUSSION OF *RHYNCHODEMUS* sp.

The species belongs, with certainty, to the subfamily *Rhynchodeminæ* CORRÊA, 1947, that contains the genera *Rhynchodemus* LEIDY, 1851, *Dolichoplana* MOSELEY, 1877, *Cotyloplana* GRAFF, 1896, and *Platydemus* GRAFF, 1896. A proboscidiform anterior region as it occurs in the present species is known only for *Rhynchodemus* (HYMAN, 1954, p. 17). For each of the other genera at least one more character can be mentioned that is not developed in our material. *Dolichoplana* is characterized by the ventral parenchymal longitudinal muscles (CORRÊA, 1947, p. 60, t. 1, f. 11, m). *Cotyloplana* is recognizable by an adhesive pit on the ventral side of the fore end; the genus is perhaps artificial (BEAUCHAMP, 1933, p. 117). Still more doubtful is *Platydemus*, as is revealed already by the first diagnoses (GRAFF, 1896, p. 70; 1899, p. 514). HEINZEL (1929, p. 426, 431) re-examined *Platydemus bivittatus* GRAFF and *P. victoriæ* (DENDY), and restricted the genus to these species together with *P. grandis* (SPENCER), the type (p. 460), and *P. fasciatus* (SPENCER). He resumed the diagnosis of *Platydemus* (p. 466) : « transverse section broad; nervous system nearly a nerve plate; glandular margin present ». The two last characters do not occur in *Rhynchodemus* spec. 1423. Moreover the head is rounded in *Platydemus*, and the eyes are near the fore end.

The section on the level of the eyes of *Platydemus montanus* MELL (1904, t. 17, f. 18) is not unlike that of the present species (fig. 34), if one considers that MELL's figure was drawn upside-down. Also the shape of the anterior end resembles a *Rhynchodemus*. The transverse section of the posterior region (l. c., f. 15) however is more rectangular than in the present species, and *montanus* possesses a glandular margin (p. 485).

Rhynchodemus hectori var. *marfa* MARCUS (1953, p. 46), the first sure representative of *Rhynchodemus* in Africa, has a creeping sole that begins as a furrow. Farther behind the sole is not distinctly separated from the sides of the belly by its colour. Size, general shape, and position of the pharynx of mature worms like *hectori* var. *marfa* can hardly be compared with the corresponding features of an immature animal as the present. On the whole it is not probable that *Rhynchodemus* sp. 1423 is conspecific with *Rh. hectori* var. *marfa*.

ADDENDUM.

Mesostoma inversum BEAUCHAMP 1954 (Rev. Zool. Bot. Afr., vol. 50, fasc. 1-2, pp. 157-164) from the plancton of Lake Bulera, Ruanda, is a further species of the genus with inverted colouring. Probably also this species swims upside-down (p. 157).

The anterior position of the pharynx is similar in *M. inversum* and *M. evelinæ*; but the cirrus of the latter and its lack of a bursa are among others distinguishing characters.

REFERENCES.

BAYLIS, H. A., 1927, *Turbellaria* from Lake Tanganyika (*Ann. Mag. Nat. Hist.*, série 9, vol. XX, pp. 380-385, London, 1927).

BEAUCHAMP, P. (DE), 1913, *Turbellaria, Trematoda* et *Gordiacea* (*Voy.* CH. ALLUAUD *et* R. JEANNEL *en Afrique Orientale. Résult. scient.*, 22 p., 1 t., Paris, 1913).

— 1930, Turbellariés Triclades de l'Inde Méridionale (*Rev. suisse Zool.*, vol. XXXVII, nº 23, pp. 673-746, t. 8, Genève, 1930).

— 1933, Planaires terrestres du Raffles Museum (*Bull. Raffles Mus.*, nº 8, December 1933, pp. 109-120, t. 6, Singapore, 1933).

— 1935, Turbellariés et Bryozoaires (*Miss. Scient. de l'Omo*, vol. 3, nº 23, 15 février 1936, pp. 141-153, Paris, 1936).

— 1936, A propos d'*Euplanaria cretica* MEIXNER (*Bull. Soc. Zool. France*, vol. LXI, pp. 433-440, Paris, 1936).

— 1939, Quelques stations d'*Euplanaria gonocephala* au Congo Belge (*Rev. Zool. Bot. afr.*, vol. XXXII, pp. 120-121, Bruxelles, 1939).

— 1940, Turbellariés et Rotifères. Croisières du *Bougainville* aux îles australes françaises (*Mém. Mus. nat. Hist. nat.*, nouv. série, vol. XIV, pp. 313-326, t. 9, Paris, 1940).

— 1951, A propos d'une Planaire du Congo Belge (*Rev. Zool. Bot. afr.*, vol. XLV, pp. 90-98, Bruxelles, 1951).

— 1951*a*, Turbellariés d'Angola (*Publicaç. Cultur. Comp. Diamantes de Angola*, Museo do Dundo, Subsidios para o Estudo da Biologia na Lunda, 29 de julho de 1951, pp. 75-84, Lisboa, 1951).

— 1952, Sur les *Dugesia* (Turbellariés Triclades) d'Afrique Tropicale et de Madagascar (*Bull. Soc. Zool. France*, vol. LXXVII, pp. 362-370, Paris, 1952).

BEKLEMISCHEV, W., 1920, Observations sur les Turbellariés des environs de Pétrograd (*Trav. Soc. Natural.*, vol. XLIX, nº 1, pp. 38-77, fig. 1-10, Pétrograd, 1920).

BÖHMIG, L., 1897, Die Turbellarien Ost-Afrikas (K. MÖBIUS, *Die Thierwelt Ost-Afrikas*, vol. IV, nº 2, pp. 1-15, 1 t., Berlin, 1897).

— 1914, Die Rhabdocoelen Turbellarien und Tricladen der Deutschen Südpolar-Expedition 1901-1903 (*D. Südp. Exp.*, vol. 15, *Zool.* vol. 7, pp. 1-33, t. 1-3, Berlin, 1914).

DU BOIS-REYMOND MARCUS, E., 1951, Two Freshwater *Turbellaria* from Natal (*Ann. Natal Mus.*, vol. XII, nº 1, pp. 73-80, Pietermaritzburg, 1951).

— 1953, Some South American Triclads (*Ann. Acad. Brasil. Ciênc.*, vol. XXV, pp. 65-78, Rio de Janeiro, 1953).

BRINKMANN, A., 1905, Studier over Danmarks Rhabdocöle og Acöle Turbellarier (*Videnskab. Meddelelser Dansk Naturhistor. Foren.*, 1906, pp. IV + 159, t. 1-5, Köbenhavn, 1905).

CORRÊA, D. D., 1947, A primeira *Dolichoplana* do Brasil (*Bol. Fac. Fil. Ci. Letr. Univ. S. Paulo, Zool.*, nº 12, pp. 57-82, t. 1-3, São Paulo, 1947).

DE SAEGER, H., 1954, Introduction (*Explor. Parc. Nat. Garamba, Miss.* H. DE SAEGER, fasc. 1, pp. 1-107, t. 1-61, & one coloured, 3 maps, Bruxelles, 1954).

FERGUSON, F. F. and HAYES, W. J. Jr., 1941, A synopsis of the Genus *Mesostoma* EHRENBERG, 1835 (*Journ. Elisha Mitchell Scient. Soc.*, vol. LVII, nº 1, pp. 1-52, Chapel Hill, N. C., 1941).

FINDENEGG, I., 1924, Beiträge zur Kenntnis der Familie *Typhloplanidæ* (*Zool. Anz.*, vol. LXI, pp. 19-30, Leipzig, 1924).

GELEI, J. (v.), 1933, Plankton- und Warmwasser-Turbellarien in den ungarländischen Gewässern (*Zool. Jahrb. Syst.*, vol. LXIV, pp. 111-128, Jena, 1933).

GILBERT, CH. McL., 1935, A comparative study of three new american species of the genus *Phænocora*, etc. (*Acta Zoologica*, vol. XVI, pp. 283-386, t. 1-5, Stockholm, 1935).

— 1938, Two new North American *Rhabdocœles-Phænocora*, etc. (*Zool. Anz.*, vol. CXXII, nº 7-8, pp. 208-223, Leipzig, 1938).

GRAFF, L. (v.), 1896, Ueber das System und die geographische Verbreitung der Landplanarien (*Verhandl. Deutsch. Zoolog. Gesellsch.*, 6e Versamml. Bonn, pp. 61-75, Leipzig, 1896).

— 1899, Monographie der Turbellarien, II (*Tricladida Terricola*, vol. I, XIII + 574 p.; vol. II, 58 t., Leipzig, Engelmann, 1899).

— 1904-1908, *Turbellaria*. I : *Acœla* und *Rhabdocœlida* (H. G. BRONN, *Kl. Ordn.*, vol. IV, Abt. I c, pp. I-XXII, 1733-2599, t. 1-30, Leipzig, 1904-1908).

— 1912-1917, *Turbellaria*. II : *Tricladida* (*Ibid.*, pp. I-XXXVII, 2601-3369, t. 31-64, Leipzig, 1912-1917).

— 1913, *Turbellaria*. II : *Rhabdocœlida* (*Das Tierreich Preuss. Akad. Wissensch.*, nº 35, XX + 484 p., Berlin, R. Friedländer & Sohn, 1913).

HEINZEL, L., 1929, Zur Kenntnis der Rhynchodemiden (*Zool. Jahrb. Syst.*, vol. LVI, pp. 425-462, t. 11-12, Jena, 1929).

HOFSTEN, N. (v.), 1907, Studien über Turbellarien aus dem Berner Oberland (*Zeitschr. wiss. Zool.*, vol. LXXXV, pp. 391-654, t. 22-27, Leipzig, 1907).

— 1916, Turbellarien der Nordschwedischen Hochgebirge (*Naturwiss. Untersuch. Sarekgebirge Lappland*, vol. IV, *Zool.*, nº 6, pp. 697-742, Stockholm & Berlin, 1916).

— 1925, Rhabdocœle Turbellarien (*Rep. Sci. Res. Norweg. Exped. Novaya Zemlya* 1921, nº 28, pp. 1-5, Oslo, 1925).

HYMAN, L. H., 1938, North American *Rhabdocœla* and *Allœocœla*, III (*Americ. Mus. Novit.*, nº 1005, pp. 1-8, New-York, 1938).

— 1938*a*, Land Planarians from Yucatan (A. S. PEARSE, *Fauna Caves Yucatan, Carnegie Publ.*, nº 491, pp. 23-32, Washington, D. C., 1938).

— 1939, North American *Rhabdocœla* and *Allœocœla*, IV (*Americ. Midl. Natural.*, vol. XXI, pp. 646-650, Notre Dame, Ind., 1939).

— 1939*a*, North American *Rhabdocœla* and *Allœocœla*, V (*Ibid.*, vol. XXII, pp. 629-639, Notre Dame, Ind., 1939).

— 1941, Terrestrial Flatworms from the Canal Zone, Panama (*Americ. Mus. Novit.*, nº 1105, pp. 1-11, New York, 1941).

— 1943, Endemic and Exotic Land Planarians in the United States, etc. (*Ibid.*, nº 1241, pp. 1-22, New York, 1943).

— 1954, Some Land Planarians of the United States and Europe with remarks on Nomenclature (*Ibid.*, nº 1667, pp. 1-21, New York, 1954).

LAIDLAW, F. F., 1906, Zoological Results third Tanganyika Exp., etc., *Turbellaria* (*Proc. Zool. Soc.*, pp. 777-779, London, 1906).

LIPPITSCH, K., 1889, Beiträge zur Anatomie des *Derostoma unipunctatum* OE. (*Zeitschr. wiss. Zool.*, vol. XLIX, pp. 147-167, t. 8, Leipzig, 1890).

LUTHER, A., 1904, Die Eumesostominen (*Zeitschr. wiss. Zool.*, vol. LXXVII, pp. 1-273, t. 1-9, Leipzig, 1904).

— 1921, Untersuchungen an Rhabdocölen Turbellarien (*Acta Soc. Fauna u. Flora Fenn.*, vol. XLVIII, n° 1, pp. 1-59, t. 1, Helsingfors, 1921).

— 1946, Untersuchungen an Rhabdocœlen Turbellarien. V. Ueber einige Typhloplaniden (*Acta Zool. Fenn.*, n° 46, pp. 1-56, Helsingfors).

— 1948, Untersuchungen an Rhabdocœlen Turbellarien, VII u. VIII (*Acta Zool. Fenn.*, n° 55, pp. 1-122, Helsingfors).

MARCUS, E., 1946, Sôbre *Turbellaria* Brasileiros (*Bol. Fac. Fil. Ci. Letr. Univ. S. Paulo, Zoologia*, n° 11, pp. 5-254, t. 1-31, Sâo Paulo, 1946).

— 1953, *Turbellaria Tricladida* (*Explor. Parc Nat. Upemba, Miss.* G. F. DE WITTE, 1947-1949, fasc. 21, pp. 1-62, Bruxelles, 1953).

— 1955, *Turbellaria* (HANSTRÖM-BRINCK-RUDEBECK, *South African Animal Life*, vol. I, n° 3, t. 1-12, Stockholm, 1955, in print).

MEIXNER, J., 1924, Monographie der *Kalyptorhynchia*, etc. (*Zool. Anz.*, vol. LX, pp. 1-29 of the separate copy, Leipzig, 1924).

MELL, C., 1904, Die von OSCAR NEUMANN in Nordost-Afrika gesammelten Landplanarien (*Zool. Jahrb. Syst.*, vol. XX, pp. 471-490, t. 17, Jena, 1904).

NASSONOV, N., 1926, Die Turbellarienfauna des Leningrader Gouvernements, I u. II (*Bull. Acad. Sci. de l'URSS*, 1926, pp. 817-836, 869-884, t. 1-2, Leningrad, 1926).

NEPPI, V., 1904, Ueber einige exotische Turbellarien (*Zool. Jahrb. Syst.*, vol. XXI, pp. 303-326, t. 9-10, Jena, 1905).

PANTIN, C. F. A., 1950, Locomotion in British Terrestrial Nemertines and Planarians, etc, (*Proc. Linn. Soc.*, session 162, n° 1, pp. 23-37, t. 1-2, London, 1950).

— 1953, On the name of the Ground Fluke..., on *Othelosoma*, etc. (*Journ. Linn. Soc. Zool.*, vol. XLII, n° 285, pp. 207-218, London, 1953).

PAPI, F., 1951, Ueber einige Typhloplaninen (*Acta Zool. Fenn.*, n° 64, pp. 1-20, Helsingfors, 1951).

RUEBUSH, T. K., 1939, Report on the *Rhabdocœle Turbellaria* ... North India Exped. (*Zool. Anz.*, vol. CXXVI, pp. 49-67, Leipzig, 1939).

SCHMIDT, O., 1848, Die Rhabdocoelen Strudelwürmer des süssen Wassers, pp. 1-66, t. 1-6. Jena (Friedrich Mauke).

SCHULZ, E., 1938, Beitrag zur Fauna des Süssen Sees bei Seeburg (*Ztschr. Naturwiss.*, vol. XCI, n° 3, pp. 175-176, Halle, 1938).

VEJDOVSKY, F., 1895, Zur vergleichenden Anatomie der Turbellarien, I u. II (*Zeitschr. wiss. Zool.*, vol. LX, pp. 90-214, t. 4-10, Leipzig, 1895).

WAHL, B., 1910, Beiträge zur Kenntnis der Dalyelliiden und Umagilliden (*Festschr. 60. Geburtstag* R. v. HERTWIG, vol. II, pp. 39-60, t. 2, Jena, G. Fischer, 1910).

WORTHINGTON, E. B., 1954, Freshwater Organisms : A discussion on the problems of distribution of animals and plants in Africa (*Proc. Linn. Soc.*, vol. CLXV, pp. 68-74, London, 1954).

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