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A COLLECTION OF HIRUDINEA SUBMITTED BY F. M. CHUTTER (NATIONAL INSTITUTE FOR WATER RESEARCH, PRETORIA), AND THE GEOGRAPHICAL DISTRIBUTION OF HIRUDINEA IN SOUTH AFRICA

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Florence

(With 4 Text-figures)

THE leeches collected from the Vaal Barrage and from the streams and rivers of the Vaal Dam Catchment by F. M. Chutter, which I have just studied, constitute a collection of 121 specimens. I sincerely thank Mr F. M. Chutter for having entrusted the determination of the specimens to me. The specimens have all been recorded in a catalogue of the freshwater invertebrate fauna collected by the National Institute for Water Research and the catalogue numbers of the specimens (code lettered Val) are given under each species. Two specimens come from a catalogue coded M.P.

Little is as yet known of the leech fauna of South Africa and the processing of all the material was not an easy task. The collection comprises ten species, seven of which belong to the Glossiphoniidae, a family with very small specimens, a few millimetres in size.

Order RHYNCHOBDELLIFORMES Caballero, 1952

Family GLOSSIPHONIIDAE Vaillant, 1890

Genus **Theromyzon** Philippi, 1867

1. *Theromyzon lineatum* sp.nov.

Val 1048C. Reed-filled pond between Breyten and Lake Chrissie. From Lagarosiphon and Potamogeton. 10. ii. 60. Two specimens, 3·5 × 1·5 mm. and 4 × 2 mm.

Val 1140B. Ibid. Bottom sediment. 4. v. 60. One specimen, 3·5 × 1·5 mm.

Holotype and paratypes in Transvaal Museum, Pretoria. Gonopores separated by two rings: ♂ in XI–XII, ♀ in XII (*a*2/*a*3). Mouth in somite III. Eyes four pairs in II, III (*a*1/*a*2), IV (*a*1/*a*2), V (*a*1/*a*2).

The shape of the body is rather heavy (Fig. 1) and the diameter of the cephalic region is of course smaller than the diameter of the body, but there is no clear separation of the two regions. The oral sucker consists of the first five somites, ten annuli, of which V*a*3 forms the posterior edge. The eight eyes, grouped in

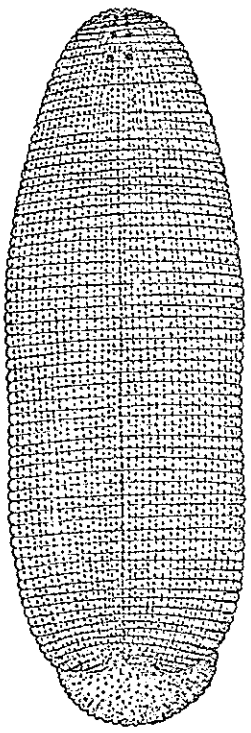

Fig. 1

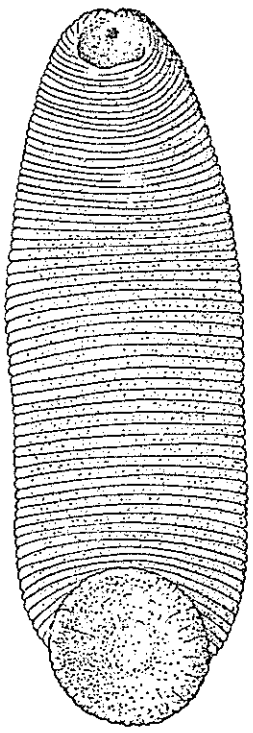

Fig. 2

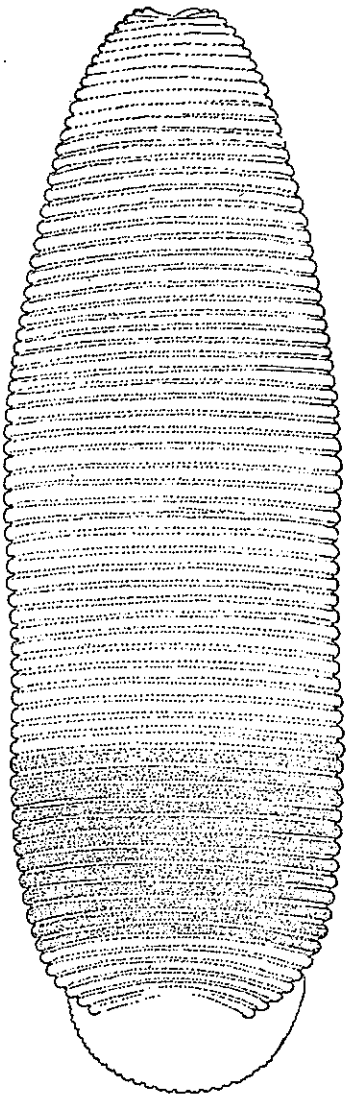

Fig. 4

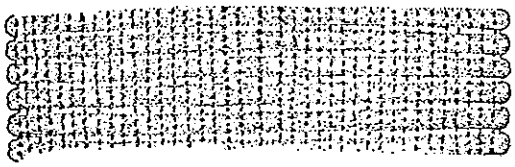

Fig. 3

Fig. 1. *Theromyzon lineatum* sp.nov. Type. Dorsal view. × *ca.* 30.

Fig. 2. *T. lineatum* sp.nov. Type. Ventral view. × *ca.* 30.

Fig. 3. *T. lineatum.* sp.nov. Type. A few annuli in dorsal view to show distribution of black pigment. × *ca.* 30.

Fig. 4. *T. lineatum* sp.nov. Type. Dorsal view enlarged to show the distribution of black pigment granules at a smaller magnification and a much enlarged magnification in the last posterior annuli. × 60 and more.

pairs, are in annuli 2, 3, 5 and 8; the eyes of the third and the fourth pairs are the largest and in reality occupy annuli *a*1 and *a*2 of somites IV and V, but this is only noticeable under considerable enlargement. The first and second pairs of eyes are situated on two consecutive annuli; between the second and third pair there is an annulus without eyes and between the third and the fourth pair there are two. The round posterior sucker is not as wide as the body and ventrally reaches somites XXIV–XXV (Fig. 2).

The background coloration is yellowish, but the whole body appears black, due to small brown evenly distributed chromatophores. A brown median line, looking like one single line, and eighteen black longitudinal striae on the right and eighteen on the left, are present on the back (dorsum). With considerable enlargement, however, it is possible to see that the median line is double and there are therefore 38 striae altogether (Figs. 1, 3).

The annuli, which in Fig. 1 appear clearly separated from one another by a continuous black transverse line, appear, on very great enlargement (Fig. 4) and when the leech is expanded by pressure, to be separated from one another by a double row of black dots arranged transversely.

Actually each annulus covered with chromatophores has a raised appearance and between the annuli one finds depressions which look like clear lines. Each annulus bears three or four rows of black chromatophores arranged transversely (Fig. 4, posterior annuli). The posterior sucker is lighter in colour than the body because the black chromatophores are less abundant and arranged irregularly.

The papillae are not very apparent; there are three pairs of them, the paramedian, intermediary and marginal.

The ventral coloration is lighter than that dorsally, while the black chromatophores are fewer and arranged irregularly (Fig. 2).

Segmentation. The first annulus is divided by a small slit into two small lobes (Figs. 1, 2 and 4):

$$I_1, II_1, III_2, IV\text{–}XXV_3, XXV\text{–}XXVII_2.$$

Anus in XXVII ($a1$–$a2$)/$a3$ but somite XXVII is poorly visible.

Unfortunately the integument proved to be so opaque and the internal organs so obscure that several efforts at clearing proved futile in yielding any anatomical information.

In the genus *Theromyzon*, according to Ringuelet (1947), the oral orifice is nearly in the centre of the anterior sucker, but in the species *T. occidentale* (Verril) and *T. propinquus* Ringuelet this orifice is moved forward to II; in *T. lineatum* this orifice is in III.

Hitherto ten species of the genus *Theromyzon* have been reported, but all larger in size and with various dorsal ornamentations. In 1952 I reported *T. rigatum* in the Congo; this species is small (size 4 mm.), but is not otherwise remarkable.

In the genus *Theromyzon* the gonopores are separated by four annuli in one species, five in two species, three in two species and two in four species (Ringuelet, 1947). *T. lineatum* presents the more frequent combination; gonopores separated by two annuli.

Genus **Batracobdella** Viguier, 1879

2. *Batracobdella tricarinata* (Blanch.)

Val 1075A. Klein Vaal River, near confluence with Vaal River. Marginal vegetation. 22. iii. 60. One specimen, 3·5 × 1·5 mm.

Val 946A. Vaal River, where crossed by the road from Amersfoort to Morgenzon. Under stones on the bottom of a pool. 20. xii. 59. One specimen, 8 × 4 mm., and several embryos, 1 × 0·5 mm.

M.P. 15. Collected by Mr P. B. Botha from a pond near the Voortrekker Monument, Pretoria. 4. ii. 60. Two specimens, 3 × 1·5 mm. and 5 × 3 mm.

This species has been collected in the following areas: Uganda, Kenya, Congo, S.W. Africa (Sciacchitano, 1959), Angola (Sciacchitano, 1961*a*). Moore (1958) reported this species in South Africa.

3. *Batracobdella nilotica* (Johansson)

Val 616A (13. ii. 59), Val 988C (19. i. 60), Val 1030C (8. ii. 60), Val 1052B (24. iii. 60), Val 1105A (5. vi. 60). A total of eleven specimens all collected from the marginal vegetation of the Waterval River, where it is crossed by the road from Standerton to Leslie.

Val 1004D. Waterval River, where crossed by the road from Standerton to Leslie. Bottom mud. 19. i. 60. One specimen.

Val 1048C. Reed-filled pond, between Breyten and Lake Chrissie. From Lagarosiphon and Potamogeton. 10. ii. 60. Eleven specimens.

Val 1051C. Ibid. Bottom mud. 10. ii. 60. Eleven specimens.

Val 1140B (4. v. 60), Val 1150B (4. v. 60). Ibid. Bottom mud. Two specimens.

Val 909A. Vaal River at Standerton, below the creamery effluent. Marginal vegetation. 11. xi. 59. Two specimens.

Val 1003A. Ibid. Stones in very slow current and out of current. 19. i. 60. Two specimens.

Val. 998E (19. i. 60), Val 895F (20. x. 59). Ibid. Bottom mud. Seven specimens.

Val 1104A. Vaal River at Standerton, below the entry of the sewage works effluent. Marginal vegetation. 20. iv. 60. Three specimens.

Val 346B–C. Vaal Barrage, above confluence of Suikerbosrand River. Marginal vegetation. 12. iii. 58. Two specimens.

Val 378A. Ibid. Bottom mud. 12. ii. 58. One specimen.

Val 23B. Vaal Barrage, where crossed by the road from Vereeniging to Sasolburg. Marginal vegetation. 31. x. 55. One specimen.

Val 169A. Vaal Barrage, above the Suikerbosrand pumping station of the Rand Water Board. Marginal vegetation. 24. x. 56. One specimen.

There are fifty-nine specimens altogether. The size of these specimens varies: minimum length 2 mm.; maximum length 7 mm.; intermediary lengths 2·5, 3, 4, 4·5, 5 mm.; width 0·5 to 1, 1·5 and 2 mm. According to Johansson, the coloration of this species is greyish white in the preserved specimens, while the living specimens show green pigmentation. The specimens from the Congo, that I examined (1952), showed numerous red granules, both on the dorsal and the ventral surfaces. The Basutoland specimens, examined by me (1959), also showed red granules. One specimen from the Cape Province, examined by me (1959), showed a light greenish colour and many dark spots. In the above-mentioned fifty-nine specimens the green pigment is dense, both dorsally and ventrally.

The eyes of this species are normally four in number; the eyes of the first pair are smaller and nearer each other than those of the second pair. But this species very often presents variation in the eyes. As far back as 1954 I found, on some specimens from the Congo, three apparent eyes, arranged in a triangle. As regards the Basutoland specimens examined by me in 1959 I wrote on page 9: '...some have three eyes placed in a triangle because of the fusion of the first pair'. A large number of the above-mentioned fifty-nine specimens show fusion of the first pair of eyes; this fusion is sometimes perfect but sometimes, with considerable enlargement, two separate eyes could still be distinguished.

This species has been recorded from the Soudan, Kenya, Uganda, Congo (Sciacchitano, 1952), Natal (Moore, 1958), Basutoland and the Cape Province (Sciacchitano, 1959), S.W. Africa (Augener, 1936).

Genus **Placobdella** Blanchard, 1893

4. ? *Placobdella pulchra* (Moore)

Val 132E. Vaal Barrage, just below the confluence of the Taaibosspruit. Bottom mud. 18. vii. 56. One specimen, 5 × 1·5 mm.

It is with reserve that I consider this very opaque specimen belongs to this species, which for the moment is confined to the following regions: Tanganyika, Northern Rhodesia and the Congo (Sciacchitano, 1952).

Genus **Helobdella** Blanchard, 1896

5. *Helobdella conifera* (Moore)

Val 1052B. Waterval River, where crossed by the road from Standerton to Leslie. Marginal vegetation. 24. iii. 60. One specimen, 3 × 1 mm.

Val 1062A. Klein Vaal River, near confluence with Vaal River. Stones in current. 22. iii. 60. One specimen, 5 × 1 mm.

Val 1080A. Ibid. Potamogeton in current. 22. iii. 60. One specimen, 2 × 0·5 mm.

Val 1028G. Ibid. Aquatic vegetation in standing water. 9. ii. 60. One specimen, 3 × 1 mm. This specimen has a third eye placed in front of the two normal eyes.

Val 998E. Vaal River at Standerton, below the creamery effluent. Bottom mud. 10. i. 60. One specimen, 5 × 1·5 mm.

Val 671A. Headwaters of the Vaal River, between Ermelo and Lake Chrissie. Marginal vegetation. 10. xii. 58. One specimen, 1 × 0·25 mm.

This species has been recorded from Abyssinia, Uganda, Congo (Sciacchitano, 1952) and Natal (Moore, 1958).

6. *Helobdella scutifera* Blanchard

Val 1048C. Reed-filled pond between Breyten and Lake Chrissie. From Lagarosiphon and Potamogeton. 10. ii. 60. Two specimens, 5 × 2 mm. and 4 × 1·5 mm.

This species, which was found in America (Mexico, Brazil, Argentina, Uruguay), was also reported in the Congo (Sciacchitano, 1960).

The two above-mentioned specimens show the anus moved slightly forward (XXVI–XXVII); the same arrangement was found in the Congo specimens.

It is interesting to note that another leech, *Mesobdella lineata* Sciacchitano, belonging to the genus *Mesobdella*, hitherto confined to South America, has also been recorded from the Transvaal (Sciacchitano, 1959).

Genus **Parabdella** Autrum, 1936

7. *Parabdella stuhlmanni* (Blanchard)

Val 1048C. Reed-filled pond between Breyten and Lake Chrissie. From Lagarosiphon and Potamogeton. 10. ii. 60. Three specimens, 6 × 2 mm., 4 × 2 mm. and 2 × 1 mm.

M.P. 15. Collected by Mr P. B. Botha from a pond near the Voortrekker Monument, Pretoria. 4. ii. 60. Two specimens, 10 × 4 mm. and 6 × 4 mm.

This species has been recorded from Abyssinia, Kenya, Tanganyika, Northern Rhodesia, Congo, Angola (Sciacchitano, 1961*a*), Transvaal (Sciacchitano, 1961*b*) and S.W. Africa (Augener, 1936).

Family PISCICOLIDAE Johnston, 1865

Genus **Cystobranchus** Diesing, 1859

8. *Cystobranchus* spec. ?

Val 1002A. Lake Chrissie. Bottom sediment. 21. i. 60. One specimen, 4·5 × 0·25 mm.

This specimen is in a bad state of preservation and is broken into two parts. The head is not distinctly separated from the body; the first pair of eyes is visible, but the second pair cannot be distinguished. Dorsally eleven black, transverse striae can be seen. The front sucker is smaller than the back one and both are narrower than the body; the coloration is greenish. The contractile vesicles can be readily seen. Due to transparency it is possible to see that the two horns of the atrium, from which the two deferents emerge, first ascending and then descending, are fairly long. No other features were observed.

The presence of the genus *Cystobranchus* in Africa is noteworthy. I have found it in the Congo (Sciacchitano, 1960) and now in South Africa. Unfortunately in both cases the specimens concerned are small and in bad condition.

Order GNATHOBDELLIFORMES Caballero, 1952

Family HIRUDIDAE Pinto, 1921

Genus **Hirudo** L., 1758

9. *Hirudo michaelseni* Augener

Val 714B. Oxbow, next to the Wilge River, where crossed by the road from Harrismith to Collings Pass. Marginal vegetation. 18. xi. 58. Two specimens, 12 × 4 mm. and 15 × 5 mm.

In these specimens the five light bands are discoloured and of the five black longitudinal lines described by Augener (1936) only the middle one remains. But on account of the number of teeth and the anatomy of the genital organs these specimens must be considered as belonging to the above-named species.

This species has been collected in the following areas: Transvaal, Kenya, S.W. Africa, Republic of Tchad (Sciacchitano, 1961*b*).

Order PHARYNGOBDELLIFORMES Caballero, 1952

Family ERPOBDELLIDAE Moore, 1924

Genus **Salifa** Blanchard, 1897

10. *Salifa perspicax* Blanchard

Val 681B. Oxbow, next to the Wilge River, where crossed by the road from Harrismith to Collings Pass. Marginal vegetation. 9. xii. 58. Two specimens, 4 × 1 mm. and 5 × 0·5 mm.

Val 269A. Vaal River, just below the Vaal Barrage. Stones in current. 27. vi. 57. One specimen, 15 × 4 mm.

Val 412Y. Vaal River at Lindeques Drift. Roots of aquatic vegetation. 29. vii. 58. Two specimens, 7 × 1 mm. and 10 × 1 mm.

Val 342A. Ibid. Stones in current. 27. ii. 58. Two specimens, 10 × 1 mm. and 12 × 2 mm.

Val 30C. Vaal River at Standerton, below the creamery effluent. Stones in current. 7. xii. 55. Four specimens, 11 × 3 mm., 12 × 3·5 mm., 13 × 3·5 mm. and 15 × 3 mm.
Val 934A. Ibid. 22. vii. 59. Four specimens, 20 × 5 mm., 20 × 5 mm., 22 × 5 mm. and 25 × 5 mm.
Val 769A. Ibid. 22. ix. 59. Three specimens, 35 × 3 mm., 40 × 3 mm. and 40 × 3 mm.
Val 1093. Ibid. 8. viii. 60. Three specimens, 28 × 2 mm., 30 × 2 mm. and 35 × 2 mm.
Val 1003A. Ibid. Stones in very slow current and out of current. 19. i. 60. Twelve specimens, 4 × 1 mm. to 13 × 3 mm.
Val 1016 C. Ibid. Stones in fast current. 24. iii. 60. Nine specimens, 5 × 1 mm. to 10 × 3 mm.
Total forty-two specimens.

This species has been recorded from Abyscinia, Tanganyika, Kenya, Uganda (Moore, 1939), Natal, Southern Rhodesia (Meyer, 1951), S.W. Africa (Augener, 1936), Congo, Urundi (Sciacchitano, 1960).

CONCLUSIONS

In the collection of Hirudinea submitted by F. M. Chutter I found the following species:

1. *Theromyzon lineatum* sp. nov.
2. *Batracobdella tricarinata* (Blanchard)
3. *B. nilotica* (Johansson)
4. ? *Placobdella pulchra* (Moore)
5. *Helobdella conifera* (Moore)
6. *H. scutifera* Blanchard
7. *Parabdella stuhlmanni* (Blanchard)
8. *Cystobranchus* spec.?
9. *Hirudo michaelseni* Augener
10. *Salifa perspicax* Blanchard

Species no. 1 is a new species; species nos. 6, 7 and 10 are recorded for the first time in the Republic of South Africa. In the scientific literature I have found very little information on the geographical distribution of the Hirudinea in South Africa. After the description of the first species by Grube (1868), there appeared a note by Goddard & Malan (1912) and, in 1959 and 1961, short notes were published by Sciacchitano. Finally in 1958 there appeared the note by Moore on the Hirudinea which are in the possession of the Natal Museum.

From all these works it appears that in South Africa the following species of Hirudinea have so far been reported:

1. *Glossiphonia disjuncta* Moore, Cape Province
2. *Theromyzon lineatum* Sciacchitano, Transvaal
3. *Batracobdella tricarinata* (Blanchard), Cape Province, Transvaal
4. *B. nilotica* (Johansson), Cape Province, Transvaal, Natal
5. *B. amnicola* Moore, Natal
6. *Placobdella multistriata* (Johansson), Transvaal
7. *P. jaegerskioeldi* (Johansson), Natal
8. *P. unita* Moore, Natal
9. *Helobdella conifera* (Moore), Transvaal, Natal
10. *H. scutifera* Blanchard, Transvaal
11. *Marsupiobdella africana* Goddard & Malan, Cape Province, Natal
12. *Parabdella stuhlmanni* (Blanchard), Transvaal
13. *P. garoui* (Harding), Natal
14. *P. aspera* (Moore), Transvaal
15. *Cystobranchus* spec. ?, Transvaal
16. *Pontobdella macrothela* Schmarda, Natal

17. *Branchellion angeli* Sigalas, Natal
18. *Ottoniobdella stellata* Moore, Natal
19. *Myxobdella africana* Moore, Natal
20. *Praobdella radiata* Moore, Natal
21. *Hirudo intermedia* Goddard & Malan, Orange Free State
22. *H. capensis* Grube, Cape Town.
23. *H. notabilis* Goddard & Malan, Cape Province
24. *H. morrisii* Goddard & Malan, Cape Province
25. *H. michaelseni* Augener, Transvaal, Orange Free State
26. *Limnatis fenestrata* Moore, Transvaal
27. *L. oligodonta* (Johansson), Natal
28. *Mesobdella lineata* Sciacchitano, Transvaal
29. *Salifa perspicax* Blanchard, Transvaal, Orange Free State

Of these twenty-nine species eleven are new species, viz. numbers 2, 5, 8, 11, 18, 20–24 and 28.

From the publications of Augener (1936), Moore (1939, 1958) and Sciacchitano (1959) the following species of Hirudinea have so far been recorded in S.W. Africa:

1. *Glossiphonia disjuncta* Moore
2. *Batracobdella tricarinata* (Johansson)
3. *B. nilotica* (Johansson)
4. *Placobdella multistriata* (Johansson)
5. *P. unita* Moore
6. *Parabdella stuhlmanni* (Blanchard)
7. *Hirudo michaelseni* Augener
8. *Limnatis obscura* Moore
9. *Salifa perspicax* Blanchard

Moore (1939) reported *Limnatis fenestrata* Moore from Bechuanaland. Sciacchitano (1959) reported *Batracobdella nilotica* (Johansson) from Basutoland.

Altogether thirty species of Hirudinea have been found in South Africa, S.W. Africa, Bechuanaland and Basutoland.

APPENDIX

The systematics of leeches of South Africa, S.W. Africa, Bechuanaland and Basutoland.

SECTION 1. *Key to families*

1. Mouth a small pore on the oral sucker from which a proboscis may be protruded, no jaws present, blood colourless. (Order Rhynchobdelliformes Caballero, 1952.) 3

— Mouth large, occupying entire cavity of the oral sucker, no proboscis, blood red. 2

2. Eyes, 5 pairs, 3 or 5 annuli per segment in the mid-body region, mouth armed with toothed jaws, testes in large sacs arranged segmentally in pairs. (Order Gnathobdelliformes Caballero, 1952.) 4

— Eyes variable in number and position; 5 annuli per segment or number increased by subdivision of annuli; pharynx long; mouth with muscular ridges but with no jaws, testes in small, numerous bunched sacs. (Order Pharyngobdelliformes Caballero, 1952; family Erpobdellidae Moore, 1924 (subfamily Salifinae Johansson, 1910).) 36

3. Body at rest depressed, not divided into distinct anterior and posterior regions, head with anterior sucker not, or only slightly distinct from the body, usually 3 annuli per segment in the mid-body; eyes variable in number. (Family Glossiphoniidae Vaillant, 1890.) 5

— Body at rest cylindrical and (especially when contracted) usually divided at segment XIV into distinct anterior and posterior regions, head sucker

usually distinctly marked off from the body, usually more than 3 annuli per segment, simple eyes present on head, neck and posterior sucker. (Family Piscicolidae Johnston, 1865.) 19

4. Five annuli per segment in the mid-body. (Family Hirudidae Pinto, 1921.) 26

— Three annuli per segment in the mid-body. (Family Haemadipsidae Blanchard, 1893.) 35

SECTION 2. *Key to the family Glossiphoniidae*

5. Trunk portion of body greatly thickened, and containing a large brood pouch (marsupium) which opens to the exterior on the ventral surface through an elongate aperture, eyes two. (Gen. *Marsupiobdella* Goddard & Malan, 1912.)
From South Africa **Marsupiobdella africana** Goddard & Malan.

— No marsupium present. 6

6. Mouth within the anterior sucker cavity, on segments II–IV. 7

— Mouth on anterior rim of sucker. 14

7. Eyes 4 pairs, crop with more than 7 pairs of lateral diverticula. (Gen. *Theromyzon* Philippi, 1867.)
From South Africa **Theromyzon lineatum** sp.nov.

Eyes fewer than 4 pairs, normally 6 pairs of crop caeca but these may collapse. 8

8. Eyes 1 pair, simple, well separated. (Gen. *Helobdella* Blanchard, 1896.) 9

— Eyes more than one pair. 10

9. A horny scute present on VIII ($a1/a2$) = 14–15. **H. scutifera** Blanchard

— No dorsal scute present. **H. conifera** (Moore)

10. Crop with 6 pairs of lateral diverticula (the anterior ones may collapse when empty); eyes normally 3 pairs but some fusion may take place. (Gen. *Glossiphonia* Johnson, 1816.) 11

— Crop with 7 pairs of lateral diverticula; eyes 3, 2 or 1 pairs. (Gen. *Batracobdella* Viguier, 1879.) 12

11. From South Africa **Glossiphonia disjuncta** Moore.

12. Eyes 1 pair. **Batracobdella tricarinata** (Blanchard)

— Eyes 2 pairs (but some fusion may take place). 13

13. Tubercles conspicuous. **B. nilotica** (Johansson)

— Tubercles very small. **B. amnicola** Moore

14. The sperm duct forms a long posterior loop or spermatic vesicle reaching to about XVI. (Gen. *Parabdella* Autrum, 1936.) 15

— No long posterior loop in the sperm duct. (Gen. *Placobdella* Blanchard, 1895.) 17

15. Eyes 3 pairs, salivary glands 1 pair. **Parabdella stuhlmanni** (Blanchard)

— Eyes 1 or 2 pairs. 16

16. Salivary glands 2 pairs. **P. aspera** (Moore)

— Salivary glands 1 pair. **P. garoui** (Harding)

17. Tubercles absent. **Placobdella multistriata** (Johansson)

— Tubercles present. 18

18. Tubercles alternately larger and smaller; salivary glands 1 pair. **P. jaegerskioeldi** (Johansson)

— Tubercles smooth, low, conical; salivary glands 2 pairs. **P. unita** Moore

SECTION 3. *Key to the family Piscicolidae*

The majority of the members of this family are marine leeches but a few are found in fresh water.

19. Freshwater leeches. **20**

— Marine leeches. **21**

20. Pulsatile vesicles large, clearly seen after preservation; 7 annuli per segment; body clearly divided into anterior and posterior regions. (Gen. *Cystobranchus* Diesing, 1859.) From South Africa **Cystobranchus** spec.?

21. Body with many conspicuous branchiae or tubercles. **22**

— Body smooth. **25**

22. Body with lateral branchiae. **23**

— Body with numerous tubercles. **24**

23. Branchiae leaf-shaped and unbranched. (Gen. *Branchellion* Savigny, 1822.) From South Africa **Branchellion angeli** Sigalas

24. 3, 4 or 5 very distinct annuli per somite; body rounded with regions ill defined. (Gen. *Pontobdella* Leach, 1815.) From South Africa **Pontobdella macrothela** Schmarda

25. Anterior sucker discoid; abdomen rounded and not very distinct from trachelosoma; skin opaque and pigmented. From South Africa **Ottoniobdella stellata** Moore

SECTION 4. *Key to the family Hirudidae*

26. Jaws well developed, with 1 row of sharp teeth; crop with many large, lobed caeca. **27**

— Jaws reduced, with 2 rows of blunt teeth; crop with 2 pairs of caeca per somite in the genital region. **28**

27. Jaws with salivary gland papillae, upper lip with median ventral groove; diameter of caudal sucker about the same as maximum width of body. (Gen. *Limnatis* Moquin Tandon, 1827.) **29**

— Jaws lacking salivary gland papillae, upper lip lacking median ventral groove; diameter of caudal sucker about ¾ maximum width of body. (Gen. *Hirudo* L., 1758.) **31**

28. In the buccal chamber the solid velum projecting forward as a low papilla perforated at the centre and apex by the minute pore-like mouth; external division into vagina and common oviduct present. (Gen. *Myxobdella* Oka, 1917.) From South Africa **Myxobdella africana** Moore

— No velar papilla in the buccal chamber present; external division into vagina proper and common oviduct absent. (Gen. *Praobdella* Blanchard, 1896.) From South Africa **Praobdella radiata** Moore

29. Papillae visible. **30**

— Papillae non visible, the skin quite smooth and marked only by many very fine longitudinal wrinkles on each annulus. **Limnatis obscura** Moore

30. Dorsum roughened by 20–25 small non metameric papillae on each annulus, 72–78 teeth on each jaw. **L. fenestrata** Moore

— Dorsum roughened by 16–18 large papillae and 25 small papillae on each annulus, 50–77 teeth on each jaw. **L. oligodonta** (Johansson)

31. Five dorsal bands. **32**

— Seven dorsal bands. **33**

32. Fine dorsal dark bands discontinuous (two intermediate bands continuous.) **Hirudo capensis** Grube

— Fine dorsal yellow bands continuous. **H. michaelseni** Augener

33. Dorsal surface greenish brown with seven dark bands continuous, the outermost on each side broader than the other. **H. morrisii** Goddard & Malan

— Dorsal surface yellowish brown. **34**

34. Dorsal surface yellowish brown with seven very prominent dark bands. On either side of the median band in the middle and posterior region of the body is a discontinuous faint dark band. **H. notabilis** Goddard & Malan

— Dorsal surface yellowish brown with series of dark pigment bands consisting of a double band in the middle line, with three bands on either side of this, of which the innermost two of each side may be double in nature and may be more important than the outermost. **H. intermedia** Goddard & Malan

SECTION 5. *Key to the family Haemadipsidae*

35. Only one genus in the area. (Gen. *Mesobdella* Blanchard, 1893.) From South Africa **Mesobdella lineata** Sciacchitano

SECTION 6. *Key to the family Erpobdellidae*

36. Only one genus in the area. (Gen. *Salifa* Blanchard, 1897.) From South Africa **Salifa perspicax** Blanchard.

N.B. The drawings were made by the draftsman of the Institute of Zoology of the University of Florence, Mr M. Manzani, whom I cordially thank.

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