A CONTRIBUTION TOWARDS A REVISION OF THE AQUATIC OLIGOCHAETA OF AFRICA

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In this review I have attempted to trace all records of aquatic "microdrile" worms mentioned in the rather small number of papers dealing with the fauna of Africa, including Madagascar. New material has also been studied. A series of small collections have been made available to me by the following donors:—

Dr. J. Rzoska:	Sudan.
Professor H. B. N. Hynes and Mr. T. R. Williams:	E. Africa.
Dr. A. D. Harrison:	Rhodesia, Volta Dam Lake (coll. Dr. T. Petr) Kariba Dam Lake (coll. A. J. MacLachlan).
The University of Vienna Madagascar Expedition 1958 (Dr. F. Starmühlner):	Madagascar.

The majority of the material examined, however, was lent by the National Institute for Water Research of the South African C.S.I.R., Pretoria. This large collection consists of material collected by C.S.I.R. workers during river surveys all over the Republic of South Africa. Many of these surveys have been the subject of a series of publications, which are listed in Appendix 1. In those papers, some of the aquatic Oligochaeta were provisionally identified, usually only to genus. I have not attempted to correlate all these published records with my own findings as it must be recognised that these were provisional names applied in the absence of any review of African Oligochaetae.

Many of the specimens in this extensive collection, as well as in the material collected in the Sudan, had been in preservative (often formalin) for a long period, and only the chaetal characters could be studied in most instances. I was very fortunate to find mature specimens amenable to dissection but not to sectioning amongst the Tubificidae, so that the identity of most species could be fully confirmed from a study of the reproductive organs, and two new species could be attributed to their respective genera. Most of the Phreodrilidae were immature, but two mature worms were sectioned successfully.

The Alluroididae were the subject of a separate publication (Brinkhurst 1964*a*), and the aquatic "megadriles" in the C.S.I.R. collection were sent to Dr. B. Jamieson at the University of Sydney for separate identification. The present paper deals with the Lumbriculidae, Tubificidae, Naididae, Phreodrilidae, Opistocystidae and Aeolosomatidae, although the last two families are practically unknown on the African Continent. A separate revision of the Phreodrilidae will be published elsewhere (Brinkhurst in Press). Clearly, many species remain to be discovered from this relatively unworked area. Types are deposited in the Transvaal Museum along with most of the other material.

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Provisional keys are provided, but not all of the species are illustrated as there are now many sets of illustrations available in the literature. In the Naididae there are those of Sperber (1948, 1950), Naidu (1961 *et seq.*) and Brinkhurst (1964*b*); in the Tubificidae, those of Brinkhurst (1963*a*, 1965). The other families are too poorly represented to require illustration.

Family Aeolosomatidae
Genus *Aeolosoma* Ehrenberg, 1831

1 *Aeolosoma hemprichii* Ehrenberg, 1831

Worms minute. 1–1·8 mm, 12–14 segments. Transparent. Integumental glands deep red, scattered all over the worm but commonest in the prostomial and anal areas. Prostomium wider than the body, with marginal sensory hairs; ventral ciliation and lateral sensory ciliated pits, and a mobile margin. Chaetae 3–5 bayonet-shaped hairs; where 3, central hair longest; when 4, two long and two short; when 5, only two short. Coelomocytes present.

Previously recorded from Africa by Michaelsen (1900—Dongola, Northern Sudan; 1905—East Africa), and van Oye (1927—Congo). A single preserved specimen in the C.S.I.R. collections from South Africa is not identifiable, but it seems to have more chaetae per bundle than *A. hemprichii*. A single specimen was also found in the collections of the University of Vienna Madagascar Expedition. There must be many species of this family of rather obscure worms still to be recorded from the African Continent. Keys to the genera and most species (there were some omissions) were given by Naidu (1961), but it should be noted that his name *Lastockinia* Naidu is a synonym of *Rheomorpha* Ruttner-Kolisko.

Family Opistocystidae
Genus *Opistocysta* Černosvitov, 1936

1 *?Opistocysta funiculus* Cordero, 1948

Long prostomium, no eyes. Chaetae of dorsal bundles 2–4 hairs with fine lateral hairs and 2–4 simple hair-like chaetae. Ventral bundles with 3–5 bifid chaetae with the upper tooth thinner but as long as the lower. Coelomocytes present. Posterior end of body with two lateral and one median appendage.

Cordero (1948) separated *O. flagellum* and *O. funiculus* on the position of the genital segments and on the absence of the hair-like needles in *flagellum*. The peculiar penial structure described in *O. funiculus* by Černosvitov (1936) (under the name *O. flagellum*!) was not found in *O. flagellum* by Cordero (1948).

Two worms were collected in the White Nile (35 Km) by Dr. J. Rzoska, and whilst these are clearly identifiable as belonging to *Opistocysta* by virtue of the prostomium, chaetae, coelomocytes and posterior appendages, it is not possible to identify the species with certainty. Both worms are immature, and very few dorsal chaetae remain. From the broken stumps it would seem that two types of chaetae were present and, hence, they are most likely to belong to *O. funiculus*, if not to an undescribed species.

Family NAIDIDAE

Sub-family CHAETOGASTRINAE

Genus *Chaetogaster* von Baer, 1827

1 *Chaetogaster cristallinus* Vejdovsky, 1883

2·5–7 mm. Prostomium inconspicuous with a median incision. 4–13 chaetae in the ventral bundles of II, only 4–6 in the rest. No dorsal chaetae. Transverse stomachal ducts 20–22.

Distribution: Recorded by Stephenson (1932) from Abyssinia.

2 *Chaetogaster langi* Bretscher, 1896

0·8–2 mm. Anterior end obtuse; chaetae of ventral bundles in II 3–9 per bundle, in other segments 3–6 per bundle. Transverse stomachal ducts 8–10. No dorsal chaetae.

Distribution: Recorded by Černosvitov (1938) from the R. Omo.

3 *Chaetogaster limnaei* von Baer, 1827

1–2·5 mm. Chaetae in semi-circles, those of II 5–20 per bundle, from VI on 4–20 per bundle, teeth very long, strongly curved, the upper teeth being as long as, or shorter than, the lower. No dorsal chaetae. Living commensally on snails.

Distribution: Recorded by Bayer (1955) from the Durban area, South Africa. Some unidentifiable *Chaetogaster* specimens were obtained from the C.S.I.R. Collections from the Klipspruit near Olifantsvlei, south of Johannesburg, 23.5.1955; a pond at the Cydna Disposal Works, Johannesburg, 6.7.1954; and the Swartkops River, Port Elizabeth, 8.9.1958.

Sub-family PARANAIDINAE

Genus *Paranais* Czerniavsky, 1880

1 *Paranais litoralis* (Müller), 1784

9–14 mm 13–46 segments. No eyes. Dorsal chaetae from V onwards, all bifid chaetae. Ventral chaetae of II with upper tooth longer than the lower, 5–7 per bundle. Remaining segments with 2–3 chaetae per bundle with upper tooth as long as, or slightly longer than, the lower. Salt or brackish water.

Distribution: Europe, N. America. Also the Swartkops River, Port Elizabeth, 5.9.1958, and tidal pools in the estuary of Keiskama River, Eastern Cape Province (coll. University of Cape Town), 10.1.1950.

2 *Paranais frici* Hrabě, 1941.

2·7–5·7 mm. 32 segments. No eyes. Dorsal chaetae from V onwards all bifid crotchets. Ventral chaetae of II 2–4 per bundle with distal tooth more than twice the length of the lower. In all other segments dorsally and ventrally 1–2 per bundle with upper tooth longer than lower (sometimes 3 in dorsal bundles of V).

Distribution: Europe, N. America. Also at Unhlatazana Estuary, Durban, 31.7.1954, and a small Natal coastal river, the Sinkwazi, 14.7.1964. Fresh and brackish water localities known.

Sub-family NAIDINAE

Genus *Homochaeta* Bretscher, 1896

A few specimens with simple bifid chaetae in all bundles, somewhat variable in form and number (mostly about 4–5 per bundle with teeth more or less equally long) were found in a few localities. None of them is sexually mature, and they may even be immature *Limnodrilus* specimens. Sperber (1948, p. 93) referred *Paranais multispinus* Michaelsen 1914 (from S.W. Africa) to *H. setosa* (Moszynski), 1933, with some hesitation.

Genus *Nais* Müller, 1773

1 *Nais communis* Piguet, 1906

1·8–12 mm. 12–32 segments. Dorsal chaetae begin in VI, 1–2 needles with short, diverging teeth and 1–2 hairs. Ventral chaetae 2–6 per bundle, those of II–V thinner than the rest, all of similar length and all with teeth more or less equally long. No swimming.

Distribution: Cosmopolitan.

2 *Nais variabilis* Piguet, 1906

3–10 mm. 18–38 segments. Dorsal chaetae begin in VI, 1–2 needles with short teeth, 1–2 hairs. Ventral chaetae 2–7 per bundle, variable in shape but those of II–V a little longer than the rest, often with upper tooth longer than the lower. Swims with spiral movements.

Distribution: Cosmopolitan.

These two entities are particularly difficult to separate in collections of worms that have been preserved for some time. Some authors have been tempted to unite the two as they are so close in several of their characters once dead, but Sperber (1948) retained the two names. As both are cosmopolitan they may be expected to occur in Africa. Many specimens were observed in the C.S.I.R. collections, and one collected by Dr. W. E. Frost from the Naro Moro River, Mt. Kenya, 13,800 feet, 20.8.1948, most of which appeared referable to *N. communis*. A few did resemble *N. variabilis*. Also Volta Dam.

3 *Nais simplex* Piguet, 1906

4–8 mm. 18–37 segments. Dorsal chaetae from V, hairs and needles 1–2 per bundle, needles simple-pointed, fairly obtuse. Ventral chaetae of II–V 2–6 per bundle, straighter and thinner than the rest with upper tooth almost twice as long as the lower. In other segments, ventral chaetae 2–5 per bundle with teeth equally long. Swims with spiral movements.

Distribution: Europe, N. America, ?Tibet. University of Vienna Madagascar collection, at Ambohijanaka, south of Tananarive, 8.7.1958, and Andrambovato, 15 km east of Ampamaherana, 5.8.1958 (not identified with certainty). C.S.I.R. collection at Cydna Disposal Works, Johannesburg, in Vlei, 6.7.1954, and Pretoria Sewage Works, below outfall, 27.10.1954. Volta Dam.

4 *Nais elinguis* Müller, 1773

2·2–12 mm. 15–37 segments. Dorsal chaetae from V, 1–3 hairs and 1–3 needles with long parallel teeth, the upper longer than the lower. Ventral chaetae of II–V slightly straighter and thinner than the rest, all bundles with 2–5 chaetae with the upper tooth twice as

long as the lower. Swims with lateral movements. Common in organically polluted water.
Distribution: Cosmopolitan. Found in several localities in South Africa, including Komati River, Eastern Transvaal, 7.7.1959; in the Great Berg River, Western Cape Province at Hermon, 29.4.1952, Piquetberg, 28.5.1952 and Wellington, 11.3.1952, 21.1.1953; Little Bushmans River at Estcourt, Natal, below an effluent, 15.4.1954; In two small Natal coastal rivers, the Sinkwazi, 14.7.1964, and the Little Amanzimtoti River, 15.6.1964; Vaal River system, Suikerbosrand River, 5.3.1953, the Barrage, 7.9.1955, 8 km below Barrage near Lindeque's Drift 29.7.1958.

5 *Nais raviensis* Stephenson, 1914

3 mm. Dorsal chaetae from VI, 1 short hair and 1–2 double pronged needles with short diverging teeth. Ventral chaetae 3–4 per bundle, those of II–V twice as long and slightly thinner than the rest with the upper tooth much longer than the lower, posterior ventral chaetae with upper tooth thicker and slightly longer than the lower.
Distribution: Asia. Recorded by Stephenson (1931*a*) from Kenya, under the name *N. communis*, referred to *N. raviensis?* by Sperber (1948, p. 130). Found in the Nunwahuku stream, Chindomora Reserve near Salisbury, Rhodesia, 23.5.1963, coll. A. D. Harrison.

6 *Nais pseudobtusa* Piguet, 1906

1·7–6 mm. 12–28 segments. Dorsal chaetae from V, hairs and needles 1–3 per bundle, needles with long pointed tips. Ventral chaetae of II–V 2–5 per bundle longer, straighter and thinner than the rest with the upper tooth 1½ times longer than the lower, the rest 2–6 per bundle with the upper tooth thinner and longer than the lower. Swims with spiral movements.
Distribution: Recorded by Michaelsen (1914) from South West Africa, otherwise known from Europe and N. America.

7 *Nais africana* sp. nov.

2–6 mm. Up to about 50 segments. Eyes usually present. Dorsal chaetae from VI mostly 1 hair and 1 needle, sometimes 2. Needles with short, wide teeth and at least one intermediate tooth (Fig. 1*A*) Ventral chaetae 3–4 per bundle, those of II–V thin, with the upper tooth thinner than, but as long as, the lower, the rest thicker with the upper tooth often very slightly shorter than the lower (Fig. 1*B, C*). Penial chaetae in VI. Coelomocytes present.
Distribution: Type locality: Skoonspruit, near Kkerksdorp, Transvaal, August 1954. Also Komati River, Eastern Transvaal, 7.7.1959; Potchefstroom, Transvaal, sewage effluent into Mooi River, 9.12.1959; The Vaal Dam catchment area and Vaal Barrage, 7.9.1955, 15.10.1958, 21.10.1959, 9.2.1960; Crocodile River, west of Pretoria, 19.2.1964; Swartkops River, Port Elizabeth, 5.9.1958.

Holotype: T.M.9321
Paratypes: T.M.9322–9331

Remarks: This entity is distinct from all other *Nais* species in the form of the pectinate needle chaetae, and without detailed examination of live worms and sectioned material its position in the genus must be regarded as uncertain. The needle chaetae somewhat

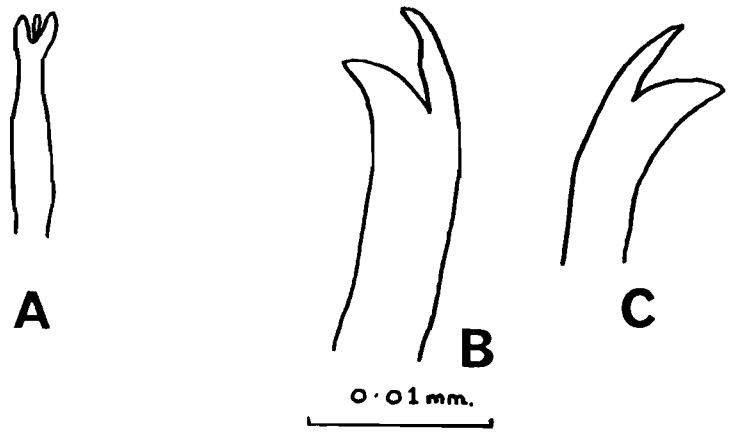

Figure 1. The chaetae of *Nais africana*.
A. Needle chaetae.
B and C. Anterior and posterior ventral chaetae.

resemble those of *Allonais* species, but in that genus (formerly part of *Nais*), no species with eyes have been described to date.

Genus *Slavina* Vejdovsky, 1883

1 *Slavina appendiculata* (Udekem), 1855
2–20 mm. 23–46 segments. Eyes present. Body-wall with rows of sensory papillae and a crust of foreign matter. Dorsal chaetae begin in VI, hair chaetae of VI very long, hairs and needles 1–2 per bundle, needles fine and drawn-out distally, ending in a slightly expanded tip. Ventral chaetae 2–5 per bundle, with upper tooth thinner and slightly longer than the lower.
Distribution: Cosmopolitan, but the only African records from many localities in the Great Berg River, Western Cape Province.

Genus *Vejdovskeylla* Michaelsen, 1903

1 *Vejdovskyella comata* (Vejdovsky), 1883
2–8 mm. 24–34 segments. Eyes present. Body-wall with scattered papillae. Dorsal bundles from V, 4–8 hairs with a double row of lateral hairs, and 1–8 needles with sharp-pointed tips. Ventral bundles with 3–6 chaetae with the upper tooth longer than the lower.
Distribution: Europe; N. America; Great Berg River, Wellington, W. Cape Province, 20.11.1952.

Genus *Stylaria* Lamarck, 1816

1 *Stylaria fossularis* Leidy, 1852
Up to 15 mm. 18–36 segments. Eyes normally present. Proboscis projecting from the tip of the pointed prostomium. Dorsal chaetae from II, 2 hairs and 1–3 short, single-pointed needles per bundle. Ventral chaetae 5–14 per bundle, with a double bend proximally.

Distribution: Asia; N. America; Great Berg River, Western Cape Province, at Kersfontein, 25.6.1951, Piquetberg, 28.4.1952, 9.9.1952, and Sanddrift 28.3.1952.

Genus *Haemonais* Bretscher, 1900

A single fragment of a naidid worm from Upper Vaal Dam catchment area in the south-eastern Transvaal, 21.10.1959, resembles *Haemonais waldvogeli* Bretscher, 1900. The anterior end of the worm is missing so that a full identification cannot be made. The dorsal bundles have 1–2 hairs and 1–2 bifid needles, the needles with the upper tooth thinner and a little longer than the lower. The ventral chaetae at the anterior end of the fragment had the upper teeth thinner and a little longer than the lower, but posteriorly the upper tooth is the shorter.

Distribution: The species is known from Europe, N. America and India, and is almost certain to be present in Africa.

Genus *Branchiodrilus* Michaelsen, 1900

1 *Branchiodrilus hortensis* (Stephenson), 1910

Up to 50 mm. 35–120 segments. Gills present on most segments from VI. Dorsal chaetae 2–5 per bundle, enclosed within gills anteriorly, posteriorly 1 hair projecting freely. In the latter 1–2 needles with a straight tip. Ventral chaetae 2–3 per bundle, the upper tooth thinner than the lower, but longer anteriorly, shorter posteriorly.

Distribution: Asia. Bahr el Gebel, Sudd Region, Upper Nile, Sudan 1947. (J. Rzoska coll.).

Stephenson (1923, p. 78) cited 4–5 ventral chaetae with the upper tooth slightly longer than the lower "no difference of type between those of the first few and the remaining segments". Sperber (1948, p. 157) described the ventral chaetae as being "all of one type with distal nodulus and teeth equally long". The differences between the majority of the chaetae and those of the posterior segments described above are not very marked and I have not, therefore, attempted to separate this entity from *B. hortenis.*

Material from the Kariba and Volta dam lakes resembled this species, except that one or two needles that were clearly bifid could be seen where the gills had been broken off. These bifid chaetae may well have been overlooked in earlier work, as needles within the gills are difficult to see. I do not propose to separate these specimens from those named *B. hortensis* until many more have been studied.

2 *Branchiodrilus cleistochaeta* Dahl, 1957—9·5 mm. c. 100 segments. Gills one pair per segment from IV to LXXX. Anterior gills (IV–VI) contain 3 hair chaetae each, the rest 2 of unequal length. Needle chaetae one per bundle, short, simple-pointed(?). Posterior gill-less segments with 1 hair and 1 needle. Ventral chaetae 3–4 per bundle, those of the anterior half with teeth thinner and longer than those of posterior bundles, the upper tooth relatively longer anteriorly (not posteriorly—Naidu 1962*b*).

Distribution: 1 specimen, Nyong, Cameroons, 5.2.1950 (Zoology Museum, Copenhagen). Dahl 1957.

The third species in the genus (*B. semperi*) is known only from India. The gills are restricted to the anterior half of the body.

Genus *Dero* Oken, 1815

Subgenus *Allodero* Sperber, 1948

1 *Allodero bauchiensis* (Stephenson), 1930

?Parasitic on eyes and in Harderian glands of frogs (*Phrynomerus* spp.).

3·5–11 mm. 26–93 segments. Dorsal chaetae from IV, 1–2 hairs and 1–2 bifid needles with short, equally long teeth. Ventral chaetae 4–7 per bundle, anteriorly with teeth equally long, posteriorly the upper tooth may be shorter than the lower.

Distribution: Bauchi, Nigeria and Beira, Mozambique (Stephenson 1930).

Subgenus *Dero* Oken, 1815

1 *Dero digitata* (Müller), 1773

6–32 mm. 20–105 segments. Dorsal chaetae from VI on, 1 hair chaeta and one needle with upper tooth about 1–2 times as long as lower. Ventral chaetae of II–V 3–6 per bundle, upper tooth 1½–2 times longer than the lower, posteriorly 2–5 per bundle and upper tooth a little longer than the lower. Usually 4 pairs of gills posteriorly, or some missing.

Distribution: Cosmopolitan. Sudd Region, Upper Nile, Sudan, 1947 (J. Rzoska coll.), and many localities in South Africa. Volta and Kariba Dams.

2 *Dero cooperi* Stephenson, 1932

3·4–4·3 mm. 33–46 segments. Dorsal chaetae from VI on, 1 hair and 1 bifid needle with short, equal teeth. Ventral chaetae of II–V 3–5 per bundle, upper tooth longer than lower, the rest 3–5 per bundle with teeth much shorter, upper tooth thinner and shorter than the lower. Branchial fossa with a spout-like prolongation, anterior portion with 4 pairs of gills.

Distribution: Abyssinia (Stephenson 1932), ?Asia, ?West-Indies, ?Europe. Naidu (1962*b*, p. 540) claimed a set of synonyms for *D. cooperi*, most of which were recognised as synonyms of *D. digitata* by Sperber (1948), who claimed that *D. digitata* (including *D. incisa*) was recorded at the same place as *D. cooperi* by Stephenson (1932). Hence the distribution of the species is questionable.

3 *Dero nivea* Aiyer, 1930

2·5–10 mm. 23–45 segments. Dorsal chaetae from VI on, 1 hair and 1 bifid needle with short equal teeth. Ventral chaetae about 4 per bundle, in II–V with upper tooth nearly twice as long as the lower, in the rest teeth about equally long. Branchial fossa slightly projecting backwards, with 3 pairs of gills.

Distribution: Europe. Asia. Also from the Vaal River headwaters, 21.3.1960, and below Allemanskraal Dam, Orange Free State, 15.4.1964.

4 *Dero obtusa* d'Udekem, 1855

5–17 mm. 21–35 segments. Dorsal chaetae from VI on, 1 hair and 1 finely bifid needle with equal teeth. Ventral chaetae of II–V 2–4 per bundle with the upper tooth twice as long as the lower, the rest 3–6 per bundle with teeth equally long. Branchial fossa normally

with 3 pairs of gills, one pair possibly only dorsal ciliated swellings.
Distribution: Cosmopolitan. Swartkops River, Port Elizabeth 8.9.1958; Wilge River, between Witbank and Groblersdal, Transvaal, 23.2.1960.

Subgenus *Aulophorus* Schmarda, 1861

1 *?Aulophorus furcatus* (Müller), 1773
Dorsal chaetae from V onwards, 1 hair and 1 needle. Needles with upper tooth thinner and a little shorter than the lower. Some needles of V, VI or VII with the upper tooth at least equal to the lower, with one or, more rarely, a few, intermediate teeth (opposite bundles often with different needles). Ventral chaetae of II–IV or VI 2–5 per bundle, with the upper tooth longer than the lower, those of VI or VII onwards shorter and straighter, with the upper tooth longer or shorter than the lower (depending on the position in the bundle). Palp thin, long; gills, short and broad in preserved specimens.

Distribution: Common and widespread in South Africa—C.S.I.R. Collections; Volta and Kariba Dams.

The systematics of this subgenus seem to be confused. Sperber (1948) listed many synonyms of *A. furcatus*, but Naidu (1962*c*) did not accept some of them. He recognised six species which have the dorsal chaetae beginning in segment V. Two species have pectinate chaetae, *A. pectinatus* Stephenson with several intermediate teeth (Stephenson 1931*b*) and *A. indicus* Naidu, in which there is a single intermediate tooth. The other species have simple bifid needles with the teeth arranged as follows:—

Teeth equally long = *A. borellii* Michaelsen.
Upper tooth thinner and shorter than lower = *A. furcatus*.
Upper tooth thinner and longer than lower = *A. michaelseni* Stephenson and *A. hymanae* Naidu.

In *A. borellii* the ventral chaetae of segment V have upper teeth only slightly longer than the lower, whereas in the other taxa, the upper teeth of the anteriormost chaetae are distinctly longer than the lower (up to twice as long in some instances). There is some variation in the number of gills recorded, depending on the degree of development of the fourth pair. Sperber (1948) considerd *A. michaelseni* to be a synonym of *A. furcatus*, but Naidu (1962*c*) claimed that it was a recognisable species. The material available to me has confused the situation somewhat, as most of the dorsal bundles are clearly of the *A. furcatus* type, as are the ventral chaetae, but the occasional anterior chaetae are more or less pectinate, and some of the median dorsal chaetae have the upper tooth at least as long as the lower. As the material has been preserved for some time, it was impossible to study the gill arrangement and other features used in systematics of the Naididae. In view of the long list of synonyms cited in Sperber (1948), it seems that there is probably a good deal of variation in the characters of this species; and I have tentatively ascribed my material to it.

2 *Aulophorus tonkinensis* (Vejdovsky), 1894
2–5 mm. 13–18 segments. Dorsal chaetae from VI onwards, 1 hair and 1–2 narrowly

palmate needles. Ventral chaetae of II–V 3–9 per bundle, longer than the rest, with distal tooth longer than the proximal, the rest 3-7 per bundle with upper tooth shorter and thinner than the lower. Branchial fossa funnel-like, normally with 2 pairs of long cylindrical gills.

Distribution: Kenya (Stephenson 1931*a*), Madagascar (Sperber 1958).

3 *Aulophorus flabelliger* Stephenson, 1931

2–75 mm. 17 segments. In tubes of foreign matter. Dorsal chaetae from segment VI on, 1 hair and 1 broadly palmate needle. Ventral chaetae of II–V 5–7 per bundle, more than twice the length of the rest, with the upper tooth longer than the lower. The rest with the upper tooth shorter and thinner than the rest. Branchial fossa with 3 pairs of long cylindrical gills and long parallel palps.

Distribution: Kenya (Stephenson 1931*a*), Volta Dam Lake.

4 *?Aulophorus pectinatus* Stephenson, 1931

Material from Kariba and Volta Lake dams frequently have needles with a single intermediate tooth, some with several intermediate teeth. The hair chaetae bear lateral hairs in at least some instances. As noted above, the distinctions between some of the species of *Aulophorus* are far from clear. Some of the differences noted here may be due to the use of superior mounting media and microscopes, giving a greater degree of resolution at high magnifications. New species cannot be established without detailed study of authenticated specimens of the known species using these new methods.

Distribution: ?Lake Kariba, coll. A. J. MacLachlan. ?Volta Dam, coll. T. Petr.

Genus *Allonais* Sperber, 1948

1 *Allonais inaequalis* (Stephenson), 1911

8–18 mm. 40–95 segments. Dorsal chaetae from VI 1–2 hairs, and 1–2 needles. The needles are pectinate, with a short but distinct upper tooth and from 1–4 intermediate teeth (Fig. 2*A*). Ventral chaetae 4–8 per bundle, in II–V somewhat thinner and straighter than the rest, upper slightly longer than the lower; from VI on with teeth equally long, or upper slightly the shorter.

Distribution: S. Asia, S. America, Africa (?locality for record in Sperber 1948). Two small coastal rivers north of Durban, the Umhlali 31.3.1964, 1.8.1964, and the Sinkwazi, 14.7.1964; Crocodile River near Nelspruit, 20.11.1959, Dorpspruit at Nelspruit, eastern Transvaal, 20.11.1959.

2 *Allonais pectinata* (Stephenson), 1910

1·5–8 mm. 15–65 segments. Dorsal chaetae from VI, 1–2 hairs and 1–2 needles. The needles pectinate with 1–5 intermediate teeth, all teeth short (Fig. 2*B*). Ventral chaetae of II–V 3–5 per bundle, with upper tooth slightly longer than the lower, the rest 2–7 per bundle, thicker with the teeth equally long.

Distribution: India, China, Abyssinia (Stephenson 1932), Madagascar (University of Vienna collection), small stream at Baraketa, Ihosy-Ambovombe Str.—identified as *inaequalis* by the author, corrected by Sperber (pers. comm.). Swartkops River, Port

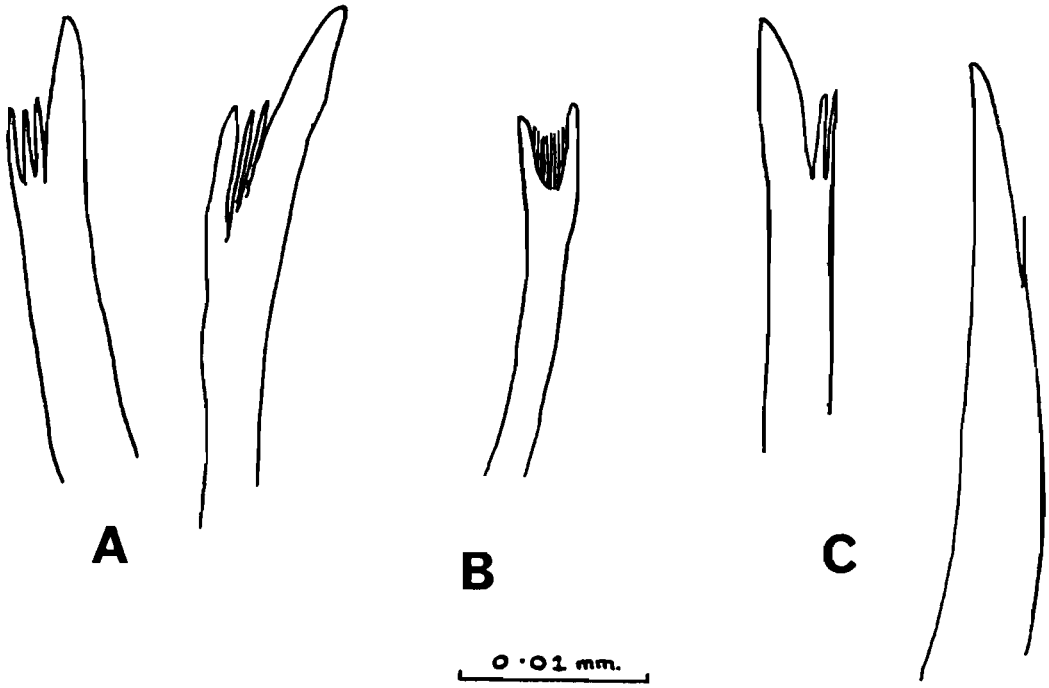

Figure 2. The needle chaetae of *Allonais* species.
A. *A.inaequalis.*
B. *A.pectinata.*
C. *A.paraguayensis.*

Elizabeth, 25.2.1959; Vaal Dam catchment area, many sampling points. Sudan, J. Rzoska collection.

3 *Allonais paraguayensis* (Michaelsen), 1905

4–60 mm. 15–200 segments. Dorsal chaetae start in VI, 1–2 hairs and 1–2 needles, needles varying from simple-pointed to bifid with a minute upper tooth much shorter and thinner than the lower, or with a distinct upper tooth which may be bifid (Fig. 2*C*). Anterior ventral chaetae with the upper tooth longer than the lower, posterior with the upper tooth equal to, or shorter than, the lower.

Distribution: S. and E. Asia; N. and S. America; Kenya (Cernosvitov 1938); S. Manafwa, 4,600–3,950 ft. Mount Elgon, December 1960 (coll. H. B. N. Hynes); Rhodesia, localities near Salisbury, Lundi River, S. E. Rhodesia, Zambezi above Mpata Gorge, 1961–62 (coll. A. D. Harrison); R. Nyamagasani 4,000 ft., 3,050 ft. nr. Katwe N. of Lake Edward, Uganda, 13.4.1962 (coll. T. R. Williams); Madagascar, I. Nossi-Bé, 16–22.8.1958, a small stream at Beraketa, Ihosy-Ambovombe Str. 12.9.1958 (coll. University of Vienna Expedition); Upper Nile Swamps, Sudan, 1947 (J. Rzoska collection); Swartkops River, Port Elizabeth, 18.2.1959, 25.2.1959; Great Berg River at Groot Drakenstein, 18.9.1951,

26.8.1952; Crocodile River, west of Pretoria, 19.2.1957; Nonoti River, 14.7.1964; Umlaas River, 11.4.1963, Natal; Volta and Kariba Dams.

Specimens attributed to this species closely resembled those identified as *A. inaequalis* in all but the degree of development of the upper teeth of the dorsal chaetae, as shown in the figures. Many of them were intermediate in nature between var *aequatorialis* and the typical form, as noted by Sperber (pers. comm.).

4 *?Allonais gwalioriensis* (Stephenson), 1920

2·5–3·3 mm. 26–31 segments, Dorsal chaetae from VI, mostly 1 hair and 2 needles per bundle, needles with unequal diverging teeth. Ventral chaetae of II–V 3–4 per bundle with the upper tooth much longer than the lower, the rest 4–6 per bundle, teeth equally long.

Distribution: Madagascar—Sperber 1958.

Genus *Stephensoniana* Černosvitov, 1938

1 *Stephensoniana trivandrana* (Aiyer), 1926

2–6 mm. 21–43 segments. No eyes. Body-wall with cutaneous glands, foreign matter adhering. Dorsal chaetae from II onwards, 3–5 hairs and 3–5 sharply tapering simple-pointed needles. Anterior ventral chaetae 4 per bundle, decreasing to 1 posteriorly, all with the upper tooth longer than the lower, becoming more so posteriorly.

Distribution: India; Palestine; in two small coastal rivers south of Durban, the Ingane, 15.6.1964, and the Umgababa, 15.6.1964, and in the Umvoti River, north of Durban, 31.7.1964.

Sub-family PRISTININAE Lastočkin, 1924

Genus *Pristina* Ehrenberg, 1828

1 *Pristina minuta* (Stephenson), 1914

2 mm. No proboscis. I non-serrated hair chaeta and 1 needle per bundle from segment II. Needles with short, equal teeth diverging at a wide angle. Ventral chaetae 3–5 per bundle anteriorly, fewer posteriorly, with the upper tooth longer than the proximal anteriorly, becoming equally long posteriorly.

Distribution: India; Brazil; ?N. America. Vaal River upstream and downstream from Vereeniging, 11.9.1957 and 14.8.1957 respectively, 8 km. below the Barrage, near Lindeque's Drift, 30.10.1957, and near Standerton, 20.4.1960; in rivers north of Durban, the Umhlali, 1.8.1964, Umhloti, 4.8.1964, and the Umvoti, 31.7.1964, 1.8.1964, and south of Durban in the Umlaas, 27.8.1964, the Isipingo, 6.8.1964, Illovo, 26.8.1964, and the Umhlatazana, 17.8.1964.

2 *Pristina jenkinae* (Stephenson), 1931

2·5–3·0 mm. No proboscis. Dorsal bundles from II, 1 non-serrated hair, 1 fairly stout needle with long teeth, the upper shorter and thinner than the lower. Ventral chaetae 4–6 per bundle anteriorly, 2–3 posteriorly, all with teeth equally long.

Distribution: S. America; ?Sumatra; ?Japan; Kenya (Stephenson 1931*a*), Abyssinia (Stephenson 1931).

3 *Pristina synclites* Stephenson, 1925

5–7 mm. 35–61 segments. Short proboscis. Dorsal chaetae from II, hair chaetae 1–2 per bundle, non-serrated, 1–2 needles, with long teeth, the lower stouter and a little longer than the upper. Ventral chaetae 4 per bundle anteriorly, fewer posteriorly, teeth equally long.

Distribution: S. Asia; in rivers north of Durban, in the Nonoti, 14.7.1964, Umhlanga, 5.8.1964, Sinkwazi, 14.7.1964, Umvoti, 1.8.1964; and south of Durban in the Umlaas, 27.8.1964, Illovo, 26.8.1964, Umbilo, 17.8.1964, Umhlanga, 5.8.1964, Ingane, 15.6.1964, and Umbimbazi, 15.6.1964; Umhlatuzi River near Empangeni, northern Natal, 3.7.1962; also Volta and Kariba Dams.

In the original description the teeth of the needles are shown distinctly unequal in thickness, but this feature has received less emphasis in more recent descriptions (e.g. Naidu 1963). The above African material shows the difference in the width of the teeth.

4 *Pristina foreli* (Piguet), 1906

2–6·5 mm. 20–26 segments. Proboscis present. Dorsal chaetae from II, 1–4 finely serrated needles, 1–4 finely bifid needles with diverging teeth. Ventral chaetae 2–8 per bundle, in II, slightly longer than the rest. In II–VII, upper tooth longer than the lower. Behind VII, teeth equally long but growing shorter posteriorly.

Distribution: Europe; Turkestan; ?Japan. Jukskei River, near Johannesburg, 5.1.1956; Umbilo River, Durban, 17.8.1964; Krom River, Western Cape Province, 22.8.1952.

Specimens attributed to this species seem little different from those of *P. aequiseta*, apart from the absence of giant ventral chaetae. Sperber (1948) noted that all the specimens of *P. aequiseta* she examined had these giant chaetae, although specimens lacking them had been observed by previous authors. There are slight differences in the form of the ventral chaetae as described.

5 *Pristina aequiseta* Bourne, 1891

2–8 mm. 18–23 segments. Proboscis present. Dorsal chaetae from II, 1–2 finely serrated hair chaetae, and 1–2 finely bifid needles. Ventral chaetae 5–8 per bundle, those of II longer and thinner than the rest, with upper tooth twice as long as the lower. In III–VII, shorter and thicker with upper tooth slightly longer than the lower, or, some chaetae replaced by giant chaetae with very long upper teeth in bundles IV–V and VI. Behind VII, chaetae with needles equally long.

Distribution: Cosmopolitan. Several localities in the Jukskei-Crocodile River system between Johannesburg and Pretoria, 1955–1956; Swartkops River, Port Elizabeth 5.9.1958, 20.2.1959; Vaal Dam catchment area 8.2.1960, Vaal River at Standerton, 2.6.1960; Umbilo River, Durban, 17.8.1964; Great Berg River, Western Cape Province, at Simondium, 19.10.1951; Madagascar, I. Nossi-Bé by Airport Road, 18.8.1958 (University of Vienna coll.).

6 *Pristina longiseta longiseta* Ehrenberg, 1828
3·5–5·5 mm. 20–33 segments. Proboscis present. Dorsal chaetae from II, hair chaetae 1–4 per bundle, with close, fine serrations, needles 2–5 per bundle, simple-pointed. Ventral chaetae 3–9 per bundle, in II slightly longer and thinner than the rest, in III slightly longer and thicker than the rest, with upper tooth twice as long as the lower. Other ventral chaetae with the upper tooth 1⅓–1½ times the lower.
Distribution: Europe, India, ?Australia. Great Berg River at its confluence with the Franschhoek Stream, Western Cape Province, 26.8.1952; Umbilo River, Durban, 17.8.1964; Madagascar—I. Nossi-Bé, by road to Airport, 18.8.1958.

7 *Pristina longiseta sinensis* Sperber, 1948
5 mm. 15–19 segments. Proboscis present. Serrations of hair chaetae close and fine, needles simple-pointed. Ventral chaetae 5–8 per bundle, in II slightly, and in III, much thicker than the rest. In III also fewer, with upper tooth about three times as long as lower.
Distribution: China, E. Africa (Michaelsen 1905, Cunnington 1920, Stephenson 1931*a*).

8 *Pristina proboscidea* Beddard, 1896
2–5 mm. 18–36 segments. Prostomium present. Dorsal chaetae from II, 1–4 serrated hair chaetae, 1–4 simple-pointed needles. Ventral chaetae 2–4 anteriorly, up to 9 posteriorly, all with the upper tooth longer than the lower, those of II longer and thicker than the rest.
Distribution: S. America, Asia, Zanzibar (Michaelsen 1905).

9 *Pristina bilobata* (Bretscher), 1903
1–4 mm. 20–34 segments. No proboscis. 1 hair and 1 needle per bundle. Hairs serrated, needles with short, equal, parallel teeth. Ventral chaetae 3–8 per bundle, teeth of equal length or upper slightly shorter than the lower, the lower thicker than the upper.
Distribution: Europe, Palestine, Turkestan. 5 immature specimens, Nyong, Mpoumé, Cameroons, 31.1.1950 (Dahl, 1957).

10 *Pristina amphibiotica* Lastočkin, 1927
3–6 mm. 12–23 segments. No proboscis. Hair chaetae non-serrate, 1–2 per bundle. Needles 1–2 per bundle, larger and thicker in IV and V than in other segments, bifid with upper tooth much shorter than lower. Ventral chaetae 3–6 per bundle, anteriorly upper tooth slightly longer than or equal to the lower, posteriorly much shorter. Coelomocytes numerous.
Distribution: Europe. 4 immature specimens, Nyong, Mpoumé, Cameroons, 31.1.1950 (Dahl, 1957).

11 *Pristina menoni* (Aiyer), 1930
7 mm. 28 segments. No proboscis. Hair chaetae 1–2 per bundle, non-serrate and 1–2 stout simple-pointed needles (or with small upper tooth), bayonet-shaped distally. Ventral chaetae 2–5 per bundle, becoming longer posteriad at first. Upper tooth longer than lower anteriorly, equal posteriorly.
Distribution: India, Europe. 1 immature specimen, Nyong, Mpoumé, Cameroons, 31.1.1950 (Dahl, 1957).

Family TUBIFICIDAE

Genus *Tubifex* Lamarck, 1816

1 *Tubifex tubifex* (Müller), 1774

20–100 mm. 34–120 segments. Anterior dorsal bundles with 3–5 pectinate chaetae and 1–4 or 6 hair chaetae with fine lateral hairs. Ventral bundles with 3–6 chaetae anteriorly falling to 2 posteriorly. Anterior ventral chaetae bifid with the upper tooth thinner and somewhat longer than, or equal to, the lower in length. No modified genital chaetae. Vas deferens long, entering the rather comma-shaped atrium on the concave side adjacent to the entry of the massive prostate gland. No ejaculatory duct. Penes with tub-shaped thin cuticular sheaths. Spermathecae sometimes absent. Spermatophores elongate with a triangular head.

Distribution: Cosmopolitan, frequent in occurrence and often abundant in waters grossly polluted by organic matter. Occurs widely in South Africa, in the Crocodile River, west of Pretoria, Vaal River system, Pretoria sewage works, Tugela and Bushmans Rivers, Umhlatazana River (Natal), and other localities. Previously recorded from Africa by Černosvitov (1938) and Vedjovsky (1891) as *T. tubifex* var. *blanchardi*, in which all the chaetae are bifid crotchets.

2 *?Tubifex templetoni* Southern, 1909

10–14 mm. c. 120 segments. 3–4 pectinate chaetae. 1–4 hair chaetae anteriorly. Anterior ventral bundles with 3–4 chaetae, in the first few segments with the upper tooth much longer than the lower. No genital chaetae. Vas deferens short, joining the atrium apically. Atrium relatively straight and narrow. Prostate gland large. No ejaculatory duct. Penes with broadly conical cuticular sheaths.

Distribution: Europe, Asia, N. America; not recorded from Africa. A few specimens from South African localities are probably referable to this species, but no matured specimens were obtained and so the identification cannot be regarded as absolutely certain. Great Berg River, Western Cape Province, at Wellington, 20.11.1952; Jukskei River near. Johannesburg, 7.11.1955, 13.3.1956; Vaal River between Amersfoort and Morgenzon, 19.8.1959.

3 *Tubifex ignotus* (Štolc), 1886

Up to 80 mm, c.200 segments. Only 0·3 mm broad medially and 0·18 mm broad posteriorly. Anteriorly 1–3 pectinate chaetae, U-shaped with few intermediate teeth, and 1–3 hair chaetae. The hair chaetae of most median segments are exceptionally long, and are covered with prominent lateral hairs. Ventral chaetae 3–5 per bundle, with the upper tooth noticeably longer than the lower except where worn down, falling to 2 per bundle posteriorly where the upper tooth is thinner, but no longer, than the lower. No genital chaetae. Vas deferens long, atrium probably rather small, prostate gland large. Penes with cuticular sheaths.

Distribution: Europe, Asia, North America. One specimen recorded from South Africa, Umhlanga River, north of Durban, 5.8.1964.

The species was recently re-described by Hrabě (1962), where the male ducts are sketched. I have never found a mature specimen of the species which is rare and scarce.

It is immediately recognisable from its long, attenuated appearance, the very elongate hairchaetae and characteristic pectinate chaetae.

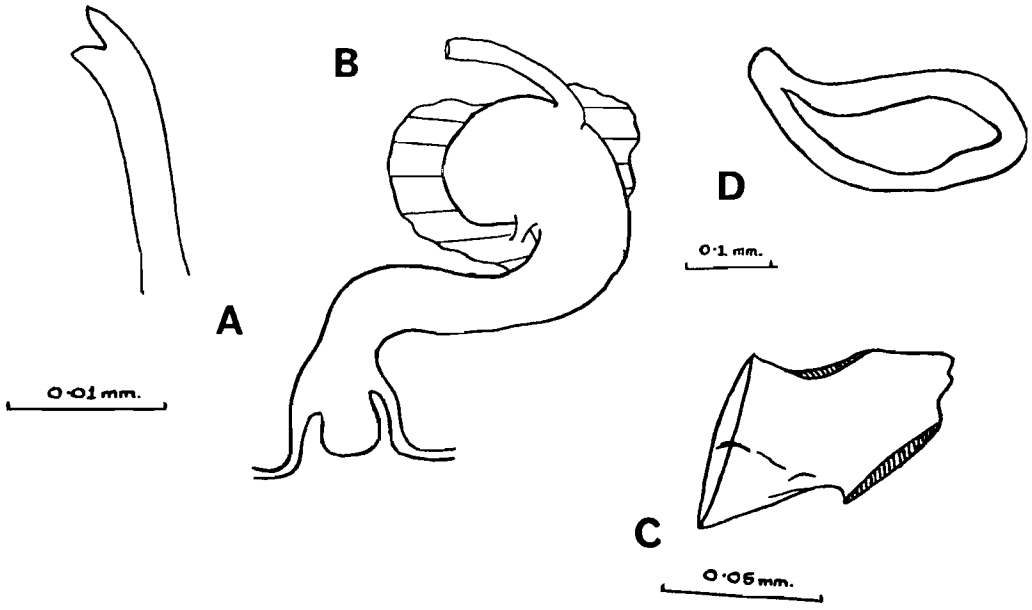

Figure 3. *Tubifex natalensis.*
A. Chaeta.
B. Atrium, prostate gland and vas deferens of one side.
C. Penis sheath.
D. Spermatophore.

4 *Tubifex natalensis* sp. nov.

Dimensions unknown, but c.10 mm long. Dorsal anterior bundles with 2 bifid crotchets, and 1–2 short hair chaetae bearing lateral hairs. The teeth of the bifid crotchets are short, rather broad, and about equally long (Fig. 3*A*). Posteriorly only 1 hair and 1 bifid chaetae. Ventral chaetae 1–3 per bundle anteriorly, 1 posteriorly, resembling the dorsal chaetae, but the shaft beyond the nodulus is straight so that the chaetae project. Vas deferens short, atrium wide and comma-shaped. Vas deferens entering the atrium on the convex side opposite to the large prostate gland (Fig. 3*B*). Penes with broadly conical cuticular sheaths (Fig. 3*C*). Spermatophores short and broad (Fig. 3*D*).

Distribution: Umhloti River, north of Durban, Natal, 4.8.1964.

Holotype: T.M.9318

Paratype: T.M.9319

The form of the atrium resembles that of *T. newaensis* (Michaelsen), which also has short-toothed chaetae. The new species not only has hair chaetae, however, but the shape of the cuticular penis is different from that found in *newaensis*.

Genus *Limnodrilus* Claparède, 1862

1 *Limnodrilus hoffmeisteri* Claparède, 1862

20–35 mm. 55–95 segments, or more. Anterior chaetal bundles with 3–10 (mostly 7) chaetae, all bifid crotchets with a great deal of variation in the relative length of the teeth. Fewer chaetae posteriorly. Vas deferens long, atria short, ejaculatory duct present, atria with a massive prostate gland. Penis sheath from 1–14 times longer than the breadth at the base. The sheaths may be straight or curved, the distal hood may be set at an angle to the shaft or simply form a flat circular plate (with or without scalloped margins). Spermathecae present, with short broad spermatophores. No coelomocytes.

Distribution: Cosmopolitan. One of the commonest oligochaetes all over the world. Common and abundant in many localities in South Africa also in Madagascar (coll. University of Vienna).

2 *Limnodrilus udekemianus* Claparède, 1862

20–90 mm c.160 segments. Anterior bundles with 3–8 crotchets, decreasing to 2 posteriorly. Chaetae of anterior bundles with the upper tooth pronouncedly thicker and longer than the lower. Atria short, with a distal ejaculatory duct, prostate gland large. Penis sheaths short (mostly 1–4 times longer than broad), with a simple plate-like hood. Spermathecae present, with spermatophores. No coelomocytes.

Distribution: Cosmopolitan. Recorded from about twenty localities all over South Africa. As in other parts of the world, the species is not encountered as frequently as *L. hoffmeisteri*. A dubious specimen was found in a collection from Madagascar, collected by the University of Vienna expedition.

3 *Limnodrilus claparedeanus* Ratzel, 1868

30–60 mm. 50–120 segments. Anterior bundles with 4–9 (average 7) chaetae, all bifid crotchets with the upper tooth usually a little longer and thinner than the lower. Atria short, with a large prostate gland, and a long ejaculatory duct. Penis sheaths from 17–43 times longer than broad (average 26 times), with the hood triangular to pear-shaped. Spermathecae present, with spermatophores. No coelomocytes.

Distribution: Cosmopolitan. From several sites in South Africa, including the Tugela River-mouth, Natal, 21.9.1955; Bushmans River at Estcourt, Natal, 22.9.1953; Umbilo River, Durban, 17.8.1964; Vaal River near Vereeniging, 29.7.1958; and from several stations in the Vaal Dam catchment area (1959–1960).

4 Michaelsen (1914) recorded *Limnodrilus alpestris* Eisen at Grootfontein, but the description does not permit of certain identification. The species is probably either *L. udekemianus* or *L. profundicola* (Verrill) (= *L. alpestris* Eisen and *L. helveticus* Piguet).

Genus *Euilyodrilus* Brinkhurst, 1963

1 *?Euilyodrilus hammoniensis* (Michaelsen), 1901

15–40 mm. Dorsal bundles with 1–5 hair chaetae, 3–5 pectinate chaetae. Ventral bundles

with 3–5 or 6 chaetae, with the upper tooth longer than the lower. Spermathecal chaetae large, spatulate, replacing the ventral chaetae of X (rarely on IX or both IX and X). Vas deferens very short, prostate glands small, atria long and tubular. No cuticular penis sheaths. Spermatophores short and broad.

Distribution: Europe, Asia. Twelve specimens were obtained from the Vaal River system, one from the Kafferspruit, near Ermelo, 12.8.1960, and the rest from above the confluence of the Vaal and Klip Rivers in the Barrage-Vereeniging area. The former specimen had a single modified spermathecal chaeta in each ventral bundle of IX, and two of the others also had modified chaetae, one with one modified, one partially modified and one normal chaetae on the left side of IX, but normal chaetae on the right; the other with 3 modified and two normal on the right, 4 normal chaetae on the left of X and a single modified cheatae on the left side of IX, together with normal chaetae. The specimens were otherwise immature.

Specimens of *E. hammoniensis* with developing spermathecal chaetae closely resemble those now recorded in South Africa. Variations in the position of the genitalia in *Euilyodrilus* are rare, but have been recorded in the literature and have been observed in undescribed material in my possession. It seems quite likely that the species will be included in future lists of African species.

Genus *Rhyacodrilus* Bretscher, 1901

1 *Rhyacodrilus stephensoni* Černosvitov, 1942

8–20 mm. 40–64 segments. Dorsal and ventral chaetae thin, with indistinct nodulus, teeth about equally long, 4–6 or 7 per bundle anteriorly. Penial chaetae replace the normal ventral chaetae of XI. They are straight, slightly bifid or with knobbed tips gathered close together. Vas deferens short, entering atrium laterally. Diffuse prostate gland covering the atrium. No penes. Coelomocytes present. Sperm free in spermathecae, no spermatophores.

Distribution: Tibet. Now found in the Sirkelsvlei, Western Cape Province, 9.1.1957 (coll. A. D. Harrison). The presence of mature specimens confirms the identification.

2 *Rhyacodrilus* sp.?

Two immature tubificids with hair chaetae and pectinate chaetae dorsally, and coelomocytes in the coelom, were found in the Vaal River at Standerton, 20.10.1959. It is possible that these represent a second species of the genus.

Genus *Branchiura* Beddard, 1892

1 *Branchiura sowerbyi* Beddard, 1892

38–100 mm or even 185 mm. 78–270 segments. Dorsal anterior bundles with 1–5, or more, short hair chaetae and up to 12 chaetae which vary from almost simple-pointed chaetae to bifids with teeth about equally long and occasionally a few small intermediate teeth. Ventral bundles with about the same number of similar chaetae. No genital chaetae. Vas deferens short, atrium tubular with a parallel, tubular paratrium, both of which are covered by prostate cells. An eversible pseudo-penis is present on each side. The posterior

extremity of the body is clothed with a series of gill-filaments, one dorsal and one ventral filament per segment.

Distribution: Europe, Asia, North America, Egypt (NB. Gold Coast record in Brinkhurst 1963*a* is an error for Cote d'Or, France). Recorded from Cairo and the R. Nile by Khalaj (1945). Kariba Dam. Common in almost all parts of S. Africa. Tugela River below Ngobevu, Natal, 30.12.53; Sabie River at Skukuza Bridge, Kruger National Park, 27.6.60.

Genus *Monopylephorus* Levinsen, 1883

1 *Monopylephorus parvus* Ditlevsen, 1904

8–15 mm. 38–64 segments. Chaetae all bifid crotchets with the upper tooth a little longer but thinner than the lower, 3–5 per bundle anteriorly, fewer posteriorly. Spermathecal pore almost median ventral, a single, elongate spermatheca on the left side. No spermatophores. The vas deferens short, the atrium tubular and covered in prostate cells. The two atria discharge via a common ventral male pore by way of an inverted genital bursa. Coelomocytes present.

Distribution: Europe, Asia, N. America, brackish water and marine. Recorded from Swartkops River, Port Elizabeth, 5.9.1958.

2 *Monopylephorus africanus* Michaelsen, 1913 (?=*M. lacteus* (Smith 1900)).

16 mm long, 84 segments. All chaetae bifid crotchets, 4–6 per bundle, except for the penial chaetae which lie in the median male bursa and are modified. Spermathecal chaetae ?unmodified, spermathecae in IX, spermathecal pores in 9–10, no spermatophores; vas deferens fairly short, atrium tubular, with a diffuse prostate. Male pores open into a median bursa. Coelomocytes present.

Distribution: Recorded from Witpoort, Transvaal by Michaelsen (1913).

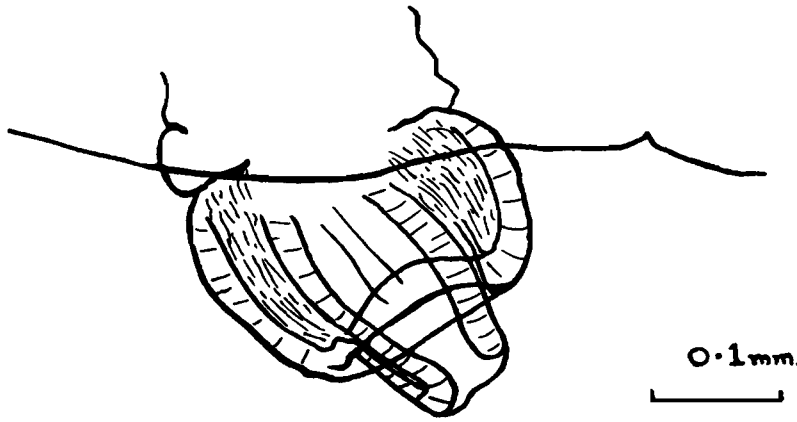

Figure 4. Pseudopenis of *Monopylephorus irroratus*, everted.

3 *Monopylephorus irroratus* (Verrill), 1873

15–17 (—30) mm. 70–90 segments. 1–2 (3) hair chaetae, 2–3 (4) bifid crotchets in anterior

dorsal bundles, 1 hair and 2 crotchets in mid body, one of each posteriorly. The hair chaetae with characteristically twisted ends. Ventral chaetae 3 per bundle anteriorly, fewer posteriorly, each with the upper tooth longer and thinner than the lower. Spermathecal pores just behind 9–10, male pores on XI, both in line with the (missing) ventral chaetae. Pseudopenes present, as in Fig. 4. Coelomocytes in the coelom.
Distribution: Estuary of Bou Regreg, Rabat, Morocco. Coll. B. Elkaim.

The pseudopenes are everted in these specimens, and show little or no sign of the short, thin, cuticular sheath observed in specimens described from the U.S.A. (Brinkhurst 1965). More mature specimens of the American form must be examined in order to compare the pseudopenes of this and the old-world species *sonderi*.

Genus *Bothrioneurum* Štolc, 1888

1 *Bothrioneurum vejdovskyanum* Štolc, 1888
15–20 mm x c.1 mm. Up to 125 segments. Prostomium with a median dorsal pit. Chaetae 2–4 in anterior bundles, 2 posteriorly, with the upper tooth up to twice as long as the lower in anterior chaetae, but teeth equally long posteriorly. Penial chaetae present, 2–4 per bundle. Male efferent ducts complex. A single median male pore with both sets of male ducts opening into a median-bursa. Solid "paratria" with prostate cells present. Spermathecae absent, spermatophores being found attached to the body-wall in the genital region after copulation. Exact location of genital pores variable. Coelomocytes present.
Distribution: Cosmopolitan. Streams on Mount Elgon (Kenya-Uganda) at 4,800 ft.–6,200 ft., December 1960–January 1961. H. B. N. Hynes coll. Common in streams in South Africa as recorded from almost forty sites. Mature specimens were examined to confirm the identification.

2 *Bothrioneurum aequatorialis* (Michaelsen), 1935, sp. dub.
Limnodrilus(?) aequatorialis Michaelsen 1935.
Bothrioneurum aequatorialis (Michaelsen): Černosvitov 1938, p. 265; Brinkhurst 1963, p. 64.

The description indicates that a species of *Bothrioneurum* was recorded in the Congo by Michaelsen (1935), but its identity cannot be ascertained from the inadequate unillustrated original account.

Genus *Aulodrilus* Bretscher, 1899

1 *Aulodrilus limnobius* Bretscher, 1899
12–15 mm. 80 segments. Up to 10 chaetae per bundle anteriorly, all simple bifid crotchets with the upper tooth shorter and thinner than the lower. Those of II shorter, more curved and thicker than the rest. Those of mid and posterior segments with lateral wings at right angles to the teeth (Fig. 5*A*). This modification has not been recognised previously, but is present in material from Africa, North and South America. No European material is available for comparison, but all earlier accounts lack detail. Vas deferens fairly long, atria widely tubular with a massive prostate gland. A large eversible pseudo-penis at each male opening. Spermathecae present. Sperm in free masses, not spermatophores.

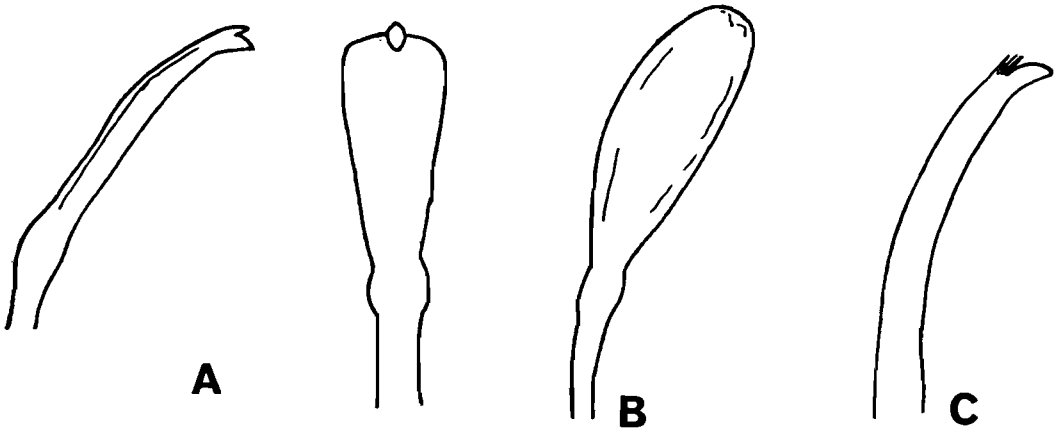

Figure 5. Chaetae of *Aulodrilus* species—diagrammatic.
A. *A.limnobius* (side and face views).
B. *A.pigueti*, side view.
C. *A.pluriseta*, side view.

Genital pores often more anterior in position than is characteristic for the family (i.e. male pores on VII, not XI, etc), and may be median. Coelomocytes absent.

Distribution: Cosmopolitan. Now recorded from several localities from coastal rivers in Natal, the Umhloti, 4.8.1964; Umvoti, 31.7.1964, Umhlatazana, 17.8.1964, and Little Umhlatazana, 15.6.1964.

2 *Aulodrilus pigueti* Kowalewski, 1914

10 mm. 44–75 segments. Dorsal anterior bundles with 4–5 bifid crotchets with the upper tooth thinner and shorter than the lower, after the first few with hair chaetae in addition. Beyond segment VII, or soon thereafter the bifid crotchets are replaced by 2–4 oar-chaetae (Fig. 5*B*), the blade of the "oar" being in the axis of the teeth, together with about 5 hair chaetae. Ventral bundles with 4–7 bifid crotchets like those of the anterior-most dorsal bundles. Vas deferens short, atria broadly bean-shaped with a small solid prostate gland. Eversible pseudo-penes present. Spermathecae with free sperm masses. Genital pores may vary in position. No coelomocytes.

Distribution: Cosmopolitan. Recorded from Stanger Lagoon, Natal, 11.3.1954; Ingane River, south of Durban, 15.6.1964; Upper Vaal River, 4.5.1960. Also Upper Nile Swamps, Sudan, 1947, J. Rzoska coll. Also Kariba Dam.

3 *Aulodrilus sp.*

Černosvitov (1938) recorded an unidentified specimen attributed to this genus in French Equatorial Africa (sic).

4 *Aulodrilus pluriseta* (Piguet), 1906

This common species has not so far been recorded from Africa. It is distinguished from the above by the presence of bifid chaetae of the form characteristic for the genus (Fig. 5*C*), together with hair-chaetae in the dorsal bundles. The atria are globular, the vasa deferentia moderately long.

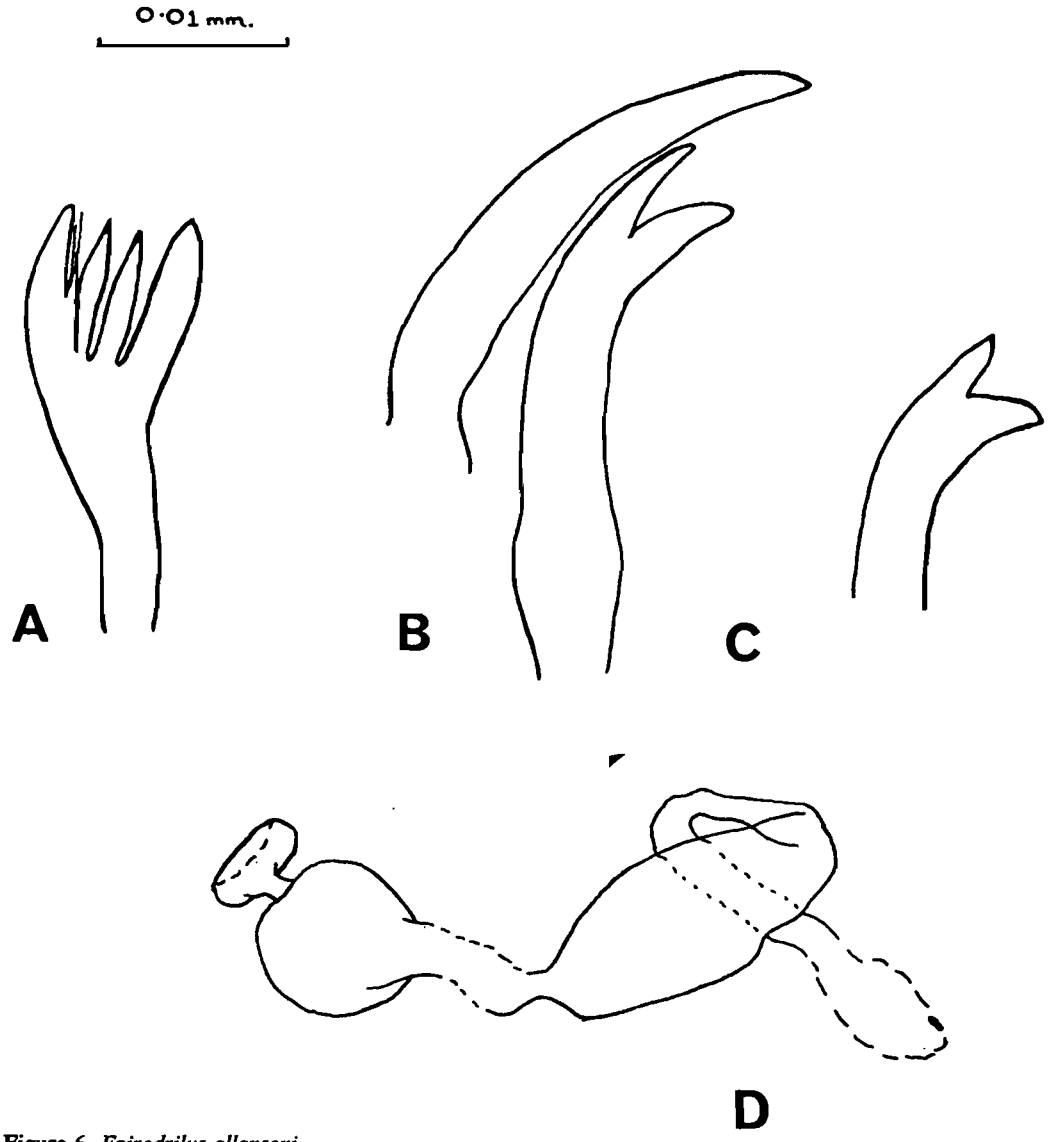

Figure 6. *Epirodrilus allansoni*.

A. Pectinate chaeta.
B. Anterior ventral chaetae.
C. Posterior ventral chaeta.
D. Atria, reconstructed from a dissection.

Genus *Epirodrilus* Hrabě, 1930

1 *Epirodrilus allansoni* sp. nov.
As only a single mature specimen was obtained the description of this entity may be subject to later amendment.

Dimensions unknown, the single specimen being about 10 mm long with c. 50 segments. The dorsal bundles contain stout hairchaetae with lateral hairs and at least 3 pectinate chaetae with a few distinct teeth between the curved outer teeth (Fig. 6*A*). The anterior ventral bundles contain 2–4 chaetae, an equal mixture of broadly simple-pointed chaetae and bifid chaetae with teeth of equal length but the uppermost thinner than the lower (Fig. 6*B*). Posterior dorsal bundles as anterior ones with fewer chaetae, posterior ventral bundles apparently with one (or two at most) simple bifid crotchet (Fig. 6*C*). Vas deferens short, ?atria large, thick-walled, in two halves, joined by a narrow duct (Fig. 6*D*). No prostate gland. No penes. Spermathecae present, with free sperm masses. Coelomocytes present.

Distribution: Vaal River at Warrenton, 8.5.1963.

Holotype: T.M. 9320

Genus *Clitellio* Savigny, 1820 emm. Brinkhurst, 1963

1 *Clitellio winckelmanni* (Michaelsen), 1914 sp. dub.

Limnodriloides winckelmanni Michaelsen, 1914: Boldt 1928

Clitellio winckelmanni (Michaelsen): Brinkhurst 1963

This species was poorly described and remains a species dubium, as decided by Boldt (1928). It was recorded from Swakopmund, Luderitzbucht, S.W. Africa (not S.E. Africa—Brinkhurst 1963*a*). The genus consists of species from brackish or marine habitats, from which very few samples have been made available to me. Collections from such sites would add many species to the list of African oligochaetes (Brinkhurst 1963*c*).

Family LUMBRICULIDAE

Genus *Lumbriculus* Grube, 1844

1 *Lumbriculus variegatus* (Müller), 1774

Fragmenting readily, so dimensions variable. Prostomium an elongate cone (or rounded when fixed). Frequently regenerating new segments posteriorly which are narrower than the rest. Anterior end in life frequently green. Chaetae two per bundle, broad and somewhat S shaped; usually bifid with rudimentary upper tooth, rarely all chaetae bluntly simple-pointed. Posterior dorsal median blood vessel with blind lateral caecae covered with chlorogogen cells, each with a series of digitform blind appendages, and perhaps an anterior pair of shorter, simple caecae, which become ordinary commissural vessels in more anterior segments. Position of genitalia very variable, in this material on any segment from VII–IX or two of these. Spermathecae opening lateral to the ventral chaetae, three to five or more pairs, or assymmetrical, posterior to the segments containing atria.

Distribution: Holarctic, Tibet. First record for the Southern Hemisphere; Swartkops River, Port Elizabeth, 18.2.1959, 25.2.1959; Krom River, Western Cape Province, 22.8.1952, 8.10.1952, 7.11.1952, 5.3.1953, and 8.7.1953. Crocodile River, west of Pretoria, 7.11.1955, and from the Jukskei River near Johannesburg, 7.2.1956.

An unusually high proportion of these worms was mature or semi-mature, especially

those from the Eerste River system (Krom River), which were collected in August and October 1952. Mature specimens have recently been collected in Britain in the winter months, and mature specimens were also reported in Lake Maggiore by Brinkhurst (1963*b*). About half of the worms in the large sample collected in October in South Africa were mature, and the distribution of the genitalia may be indicated by referring to the position of the atria:—

Segments with atria	*Number of worms*
VII	1
VII and VIII	5
VIII	16
VIII and IX	3
IX	1

A comparison of this frequency distribution with that reported in European and American *L. variegatus* (and other taxa currently referred to several other species in the genus) will form the basis of a separate publication.

Family PHREODRILIDAE

Genus *Phreodrilus* Beddard, 1891 emm. Michaelsen, 1903, emm. mihi

In a forthcoming revision of this family I intend to show that all of the known species are referable to a single genus. The following account deals only with the two African species.

1 *Phreodrilus niger* (Beddard), 1894 emm. Michaelsen 1924.

Hesperodrilus niger Beddard, 1894, p. 208; 1895, p. 257; 1896, p. 16: Michaelsen, 1900, p. 38.

Phreodrilus niger (Beddard): Michaelsen, 1903, p. 136; 1924, p. 207.

Hesperodrilus albus Beddard, 1894, p. 209–10; 1895, p. 256; 1896, p. 11, Fig. 17–19: Michaelsen, 1900, p. 39.

Hesperodrilus pellucidus Beddard, 1894, p. 210; 1895, p. 256; 1896, p. 14: Michaelsen, 1900, p. 39.

Phreodrilus pellucidus (Beddard); Michaelsen, 1903, p. 136.

Phreodrilus albus var *pellucidus* (Beddard); Michaelsen, 1916, p. 5–7; 1924, p. 207.

Phreodrilus africanus Goddard and Malan, 1913*b*, p. 242–247, pl. 14, Fig. 1, 2, 4: Michaelsen, 1924, p. 207.

15–30 mm. Dorsal chaetae from III, 1–3 hair-like chaetae, not always equally long, plus 1–2 short chaetae which do not emerge from the chaetal sacs. Ventral chaetae from II, each bundle with one simple-pointed sigmoid chaeta, longer and thinner than the single bifid chaeta which has a rudimentary upper tooth. Replacement chaetae sometimes increase the number of chaetae per bundle. Spermathecal pores in the line of the dorsal chaetae anteriorly on XIII, each with an inversion of the body-wall forming a vestibule. Male pores on XII, in line of the ventral chaetae, at the posterior end of the segment. Female openings small, in 12–13. Male ducts with more or less straight vas deferens opening into a glandular atrium basally. Just beyond the point of union the common duct opens into a long penis in a penis sac. Male funnels in XI, basally, with testes. Sperm

in VIII–XI, and in XII–XIII. Ovaries in XII, egg-sac in XII–XIV with ova and small spherical bodies. Spermathecal ampullae in XV. Spermathecal ampulla protrudes through 14–15 into XIV, forming a small swollen chamber from which leads the spermathecal duct, the lumen of which is almost occluded. The duct traverses XIV ventrally, penetrating 13–14 to run obliquely dorsalwards through XIII to the anterior dorsal pore almost in 12–13. A groove joins the spermathecal and male pores (?12–13 furrow).

The atrium in the single mature specimen, which was sectioned longitudinally, is quite short, just as in *P. albus* (Beddard 1896), and not bent into a V shape as in *P. africanus* (Goddard and Malan 1913*b*). The spermatheca is not quite so elongate as in the original description of *P. africanus*, where the ampulae reach XVIII or XIX, and the swelling on the junction of the ampulla and the duct (?produced by the penetration of the septum and hence more apparent than real) lies anterior to 14–15 not 16–17. The penis in the present material is a simple structure, two to three times longer than its breadth. It is not divided by a waist in the middle as in the original account of *P. africanus*.

These differences are thought to represent quite simple variations between individuals. The shortness of the spermathecae in my sections is probably due to the fact that the worm is in an early stage of maturation, with the sperm sacs the most obvious feature. It is supposed that elongation of the spermathecae occurs after copulation.

Distribution: Tierra del Fuego; Falkland Islands; Table Mountain, Western Cape Province, South Africa; Palmiet River, Elgin, Western Cape Province, 20.10.1952; Dorps River near Prince Albert, Cape Province, 11.3.1960; Great Berg River, First Bridge, 23.6.1950, Lower Forest Reserve, Driefontein Bridge, 13.9.1950, 18.9.1951 and Assegaaibos Stream, 2.8.1950; Vaal Dam catchment area, 15.10.1958 (mature specimens present).

2 *Phreodrilus africanus* (Goddard and Malan), 1913 n. comb.

Gondwanaedrilus africanus Goddard and Malan, 1913*a*, p. 232–9, pl. 11–13, Fig. 1–9; Michaelsen, 1924, p. 208; Stephenson, 1930, p. 759.

non *Phreodrilus africanus* Goddard and Malan, 1913*b*, p. 242–247.

20–22 mm. Dorsal chaetae from III, up to 3 hairs often broken (?short chaetae). Ventrals one simple-pointed chaeta and one bifid chaeta with a rudimentary upper tooth. Male pores on XII, postero-ventrally, leading to a large genital bursa lying in XII–XIII. Spermathecal ampullae in XIV, ducts opening into the genital bursa in XIII (?by fusion of the ampulla of the sperm-duct pore and the penis-sac, both inversions of the body-wall). Male efferent ducts as in the above.

Distribution: Stellenbosch Mountain, Western Cape Province.

The large penis-sacs and the ampullae of the spermathecal pores lie very close to each other in *P. niger* and *P. branchiatus*, and are linked by a groove on the surface of the clitellum. It is quite possible that the pores are, in fact, separate in *P. africanus*, but even if they have become confluent this represents a very small departure from the plan observed in *P. niger*. The species is placed in the subgenus *Gondwanaedrilus* (Brinkhurst in Press).

ZOOGEOGRAPHY

1 NAIDIDAE

A great many African species are cosmopolitan, or probably so, and most of those known to be cosmopolitan have now been recorded from Africa. Those which undoubtedly remain to be discovered include *Chaetogaster diastrophus*, *C. diaphanus*, *Ophidonais serpentina*, *Nais barbata*, *N. pardalis*, *Stylaria lacustris*, *Dero dorsalis*, and *Pristina breviseta*. Many of the remaining African species are also known from Asia (*N. raviensis*, *B. hortensis*, *D. tonkiensis*, *Allonais* species, *S. trivandrana*, *P. minuta*, *P. jenkinae*, *P. synclites*, *P. longiseta sinensis*). Of these, *Allonais paraguayensis* has recently been found in North America, and *P. minuta* is probably also known from there; *Aulophorus tonkinensis* may well be present in the West Indies.

Several Asian *Dero* species, together with *Branchiodrilus semperi* and possibly *Homochaeta naidina*, have yet to be recorded from elsewhere, and a series of species were recently described from S. India. Long lists of European species and South American species may not be expected in Africa. *Specaria josinae* and *Uncinais uncinata* have a holarctic distribution.

2 TUBIFICIDAE

As in the Naididae, most species found in Africa are cosmopolitan, or likely to prove so. *Rhyacodrilus stephensoni* differs in that it was formerly known only from Tibet. *Monopylephorus africanus* is unknown outside Africa, and this is, of course, true of the species described above.

3 OTHER FAMILIES

The Opistocystidae are very poorly known, and different entities have been recorded from North and South America. The geographical distribution of the Aeolosomatidae is somewhat better known, but there is only one African species. Many more species can be expected from Africa. The Lumbriculidae have never before been recorded from the southern hemisphere, and may well have been introduced to Africa.

The Alluroididae were thought to be an African family until the presence of a South American species was confirmed (Brinkhurst 1964*a*). The Phreodrilidae are an interesting group, known from the southern hemisphere and Ceylon (Brinkhurst—in Press) in a way that strongly supports the Continental Drift theory of the origin of continents.

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APPENDIX 1

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APPENDIX 2

Keys to the species of African Naididae and Tubificidae

1. *Naididae*

A. Key to Genera

1	No dorsal chaetae present	*Chaetogaster*	
	Dorsal chaetae present		2
2	Hair chaetae absent		3
	Hair chaetae present		4
3	Dorsal chaetae beginning in II	*Homochaeta*	
	(only *?H. setosa* recorded)		
	Dorsal chaetae beginning in V	*Paranais*	
	(two species, *P. litoralis* and *P. frici*)		
4	Dorsal chaetae beginning in II		5
	Dorsal chaetae beginning in IV, V, or VI		6
	(Dorsal chaetae in full-grown animals beginning behind VI, often in XVIII, XIX or XX	*Haemonais*	
	H. waldvogeli only dubiously recorded)		
5	Body-wall covered with foreign matter due to secretion of cutaneous glands. Coelomocytes absent	*Stephensoniana*	
	(a single species, *S. trivandrana*)		
	Body-wall without foreign matter. Coelomocytes present	*Pristina*	
	(eight species—see separate Key 1)		

6	Gills present (or absent in a species parasitic in frogs' eyes)		7
	Gills absent		8
7	Anal gills present (or absent in parasitic form).. .. (three subgenera, eight species—see separate Key 2)	*Dero*	
	Gill filaments on most segments from VI, enclosing dorsal chaetae anteriorly .. .. (two species—see separate Key 5)	*Branchiodrilus*	
8	Long proboscis present .. .. (only *S. fossularis* recorded. The closely similar *S. lacustris* remains to be found)	*Stylaria*	
	Proboscis absent		9
9	Hair chaetae of VI very long. Body covered with a crust of foreign matter .. .. (a single species *S. appendiculata;* three other species known only from S. America)	*Slavina*	
	No elongate hair chaetae; no crust of foreign matter..		10
10	Hair chaetae stout, rigid, and strongly serrated .. (*V. comata* recorded. Two other entities European only)	*Vejdovskyella*	
	Hair chaetae smooth		11
11	Eyes usually present. Anterior ventral chaetae of II–V often very different from the rest (see separate Key 3)..	*Nais*	
	Eyes absent. Anterior ventral chaetae differ little from the rest (see separate Key 4)	*Allonais*	

(The last two genera not easy to separate on superficial characters—see *Nais africana*).

B. Key to species

1. *Pristina*

1	Proboscis present..	2
	Proboscis absent	7
2	Needles bifid (teeth sometimes minute)	3
	Needles simple-pointed	5

3	Needles distinctly bifid with upper tooth shorter and thinner than lower. Ventral chaetae with all teeth of equal length	*P. synclites*
	Needles finely bifid. Anterior ventral chaetae with upper teeth longer than the lower	4
4	Giant chaetae with very long upper teeth replace some normal chaetae of segments IV, V and VI	*P. aequiseta*
	No giant chaetae	*P. foreli*
5	Hair chaetae of III of average length	*P. proboscida*
	Hair chaetae of III elongate	6
6	Upper tooth of ventral chaetae of III twice as long as the lower	*P. longiseta longiseta*
	Upper tooth of ventral chaeta of III thrice as long as the lower	*P. longiseta sinensis*
7	Needles simple-pointed (or with very small upper tooth), bayonet-shaped distally	*P. menoni*
	Needles clearly bifid	8
8	Needle teeth short and about equal	9
	Needle teeth long, upper tooth shorter than lower ..	10
9	Needle teeth parallel. Hair chaetae serrate	*P. bidlobata*
	Needle teeth diverging at a wide angle. Hair chaetae not serrate..	*P. minuta*
10	Upper tooth of needles much shorter than lower. Needles of IV and V thicker than the rest	*P. amphibiotica*
	Upper tooth of needles half as long as the lower. Needles of IV and V the same as the rest	*P. jenkinae*

A more complete key to the genus can be found in Naidu (1963).

2. *Dero*

1	Parasitic in eyes of frogs of the genus *Phrynomerus* ..	*Allodero bauchiensis*
	Free-living	2
2	Anal gills with long, non-ciliated backward projections (palps)	*Aulophorus* 3
	Palps absent, only sometimes very short projections..	*Dero* 5

3	Dorsal chaetae from V on. Needles bifid or, at most, a few pectinate	*D.* (*A.*) *furcatus*
	Dorsal chaetae from VI on. Needles palmate.. ..	4
	Dorsal chaetae from V on. Needles more or less pectinate	*D.* (*A.*) *pectinatus*(*?*)
4	Needles narrowly palmate. Not in tubes	*D.* (*A.*) *tonkinensis*
	Needles broadly palmate, worms in tubes of foreign matter	*D.* (*A.*) *flabelliger*
5	Upper tooth of needle chaetae 1–2 times longer than lower (usually 4 pairs of gills)	*D.* (*D.*) *digitata*
	Needle teeth short and equal	6
6	Gills enclosed in branchial fossa with a spout-like prolongation. 4 pairs of gills	*D.* (*D.*) *cooperi*
	Branchial fossa not, or only slightly, projecting, 2–3 pairs of gills	7
7	Branchial fossa slightly projecting. Ventral gills short and stumpy	*D.* (*D.*) *nivea*
	Branchial fossa not prolonged. Ventral gills finger-shaped	*D.* (*D.*) *obtusa*

3. *Nais*

1	Needles bifid or pectinate	2
	Needles simple-pointed	6
2	Needle-teeth long and parallel. All ventral chaetae with the upper tooth twice as long as the lower	*N. elinguis*
	Chaetae not of this form	3
3	Needle-teeth with short, wide teeth, often with an intermediate tooth (Fig. 1*A*). Ventral chaetae of II–V with the upper tooth as long as, but thinner than, the lower, the rest with the upper tooth slightly shorter than the lower	*N. africana*
	Chaetae not of this form	4
4	Ventral chaetae of II–V twice as long as the rest ..	*N. raviensis*
	Ventral chaetae of II–V slightly longer than the rest, or about equally long	5

5 Ventral chaetae all about equally long, with teeth equally long .. .. *N. communis*
Ventral chaetae of II–V slightly longer than the rest with the upper tooth slightly longer than the lower .. *N. variabilis*

6 Needles chaetae more or less hair-like with long sharp tips. All ventral chaetae with upper tooth 1½ times the lower in length .. .. *N. pseudobtusa*
Needle chaetae with short, somewhat obtuse tips. Anterior ventral chaetae with upper tooth almost twice as long as the lower, posterior ventral chaetae with teeth equally long .. .. *N. simplex*

4. *Allonais*

1 Needle teeth pectinate with broad, equal lateral teeth and several intermediate teeth (Fig. 2*B*) .. .. *A. pectinata*
Needle-teeth simple-pointed or bifid, or pectinate, but lower tooth always thicker and longer than the upper tooth and intermediate teeth 2

2 Upper tooth of needle chaetae absent, or very fine, or even bifid (Fig. 2*C*) .. .. *A. paraguayensis*
Upper tooth of needle distinct, with intermediate teeth between it and long, thick, lower tooth .. .. *A. inaequalis*

5. *Branchiodrilus*

1 Gills on most of the body 2
Gills restricted to the anterior half of the body .. *B. semperi*
(not known from Africa)

2 Length of gills decreases posteriorly, allowing one or more of the hair chaetae to lose connection with the gills distally (some needles bifid) .. .. .. *B. hortensis*
Abrupt transition between segments with long gills and short posterior region lacking gills .. .. *B. cleistochaeta*

II. *Tubificidae*

1 Hair chaetae present 2
Hair chaetae absent 11

2 A fan of dorsal and ventral gill filaments on posterior segments (Hair chaetae short, all other chaetae varying from simple-pointed to bifid, or even slightly pectinate dorsally) .. .. *Branchiura sowerbyi*
No gill filaments 3

3	Posterior dorsal chaetae between the short hairs are paddle-shaped, the distal ends being flattened in the plane of the teeth	*Aulodrilus pigueti*
	No paddle-shaped chaetae	4
4	Dorsal chaetae with short, thin, sometimes rudimentary upper teeth, sometimes duplicated (Ventral chaetae with similar reduced upper teeth)	*Aulodrilus pluriseta*
	Dorsal chaetae either clearly pectinate or simply bifid	5
5	Dorsal chaetae simply bifid	6
	Dorsal chaetae clearly pectinate	7
6	Hair chaetae characteristically twisted distally. Coelomocytes present in the coelom. In brackish water ..	*Monopylephorus irroratus*
	Hair chaetae straight. No coelomocytes. In freshwater	*Tubifex natalensis*
7	Worms exceptionally thin with long hair chaetae. Pectinate chaetae with small U-shaped tips with only one or two intermediate teeth	*Tubifex ignotus*
	Worms broader, hair chaetae not exceptionally elongate. Pectinate chaetae not of this form	8
8	Anterior ventral chaetae a mixture of simple-pointed and bifid chaetae. Pectinate chaetae distinctive (Fig. 6*A*)	*Epirodrilus allansoni*
	Anterior ventral chaetae all bifid. Pectinate chaetae not distinctive	9
9	Anterior ventral chaetae frequently with upper tooth thinner, but much longer than the lower (cuticular penis sheaths conical)	*Tubifex templetoni*
	Anterior ventral chaetae with the upper tooth thinner and a little longer than the lower (Cuticular penis sheaths short and tub-shaped, or absent)	10
10*	Spermathecal chaetae broad, hollow-ended. No cuticular sheaths on penis	*Euilyodrilus hammoniensis*
	Spermathecal chaetae unmodified. Cuticular penis sheaths thin, tub-shaped..	*Tubifex tubifex*

*From this point on mature specimens must be examined.

11	Penes absent	12
	Penes present, with cuticular penis sheaths	16
12	Penial chaetae absent	13
	Penial chaetae present	14
13	Chaetae with upper tooth shorter than the lower. Posterior chaetae with the shaft flattened laterally, forming wings at right-angles to the (reduced) teeth. Spermathecae paired. No coelomocytes. In freshwater	*Aulodrilus limnobius*
	Chaetae with the upper tooth longer than the lower. No wings on the posterior chaetae. Left-hand spermatheca present, right-hand not. Coelomocytes present. In brackish water	*Monopylephorus parvus*
14	Prostomium with a dorsal pit opening to the exterior by a median dorsal pore. Spermathecae absent, spermatophores attached to the body-wall externally ..	*Bothrioneurum vejdovskyanum*
	No prostomial pit. Spermathecae present, with free sperm-masses	15
15	Freshwater species. Penial chaetae with knobbed tips grouped closely together. Each vas deferens short, entering atrium laterally. Atrium broadly pear-shaped with a covering of prostate cells	*Rhyacodrilus stephensoni*
	Brackish-water species. Penial chaetae not well-known. Vas deferens short, atrium tubular beset with prostate cells	*Monopylephorus africanus*
16	Chaetae with upper tooth very long and broad. Penis sheaths short, 1–4 times longer than broad, with simple flange at the distal end	*Limnodrilus udekemianus*
	Chaetae with upper-tooth longer or shorter than the lower, but as broad or narrower than the lower. Penis sheath longer	17
17	Penis sheaths 1–14 times longer than broad, hood variable but commonly with the distal apperture at right-angles to the shaft	*Limnodrilus hoffmeisteri*

Penis sheaths 17–43 times longer than broad, hood basically triangular, with the distal apperture in line with the shaft .. .. *Limnodrilus claparedeanus*

Penis sheaths 2–7 times longer than broad, hood commonly reflected back over the shaft in life (or forced forward, trumpet-like, by flattening) .. .. .. *Limnodrilus profundicola*
?recorded from Africa

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