Contributions to the Helminth-Fauna of South Africa.

By JEAN G. BAER, D.Sc. (Neuchatel).

CONTENTS.

Contributions to the Helminth-Fauna of South Africa.

Mammalian Cestodes.

By Jean G. Baer, D.Sc. (Neuchatel).

I. INTRODUCTION.

Whereas the South American and Australian helminth-fauna is comparatively well known, that of South Africa has been sadly neglected until recent years. The probable reason of this is that scientific explorers do not generally trouble to collect intestinal parasites either because of the extra trouble incurred, or else underestimating the importance of this factor for faunistic studies.

It was with this fact in mind that Sir Arnold Theiler, K.C.M.G., Director of the Veterinary Research Laboratory, Onderstepoort, Pretoria, had collected all the intestinal parasites from the animals shot for museum purposes in the districts outlying Pretoria.

This valuable collection, which was presented to Prof. O. Fuhrmann a few years ago, consists chiefly of nematodes and of avian cestodes, the mammalian cestodes studied in this paper representing about one-quarter of the whole collection.

As was to be expected, of the twenty-two species examined, nine are new to science, including two new genera and one new family. Of the nineteen hosts, fifteen have to our knowledge never been recorded before as harbouring cestode parasites.

Whilst working through this collection, we have incurred a heavy debt towards our devoted teacher, Prof. Dr. O. Fuhrmann, whose vast experience and knowledge of the subject, coupled with his unfailing aid and encouragement, have been as invaluable to us as his personal library and collections, placed entirely at our disposal. We express our most heartfelt thanks to Prof. O. Fuhrmann, and hope that all the time and trouble spent in initiating us into the fascinating mysteries of helminthology may not have been spent in vain.

We also express our sincerest thanks to the following:—

To Prof. R. T. Leiper, F.R.S., Professor of Helminthology in the University of London, for having placed at our disposal slides and material of cestodes from the hyrax.

To Dr. A. Collin, of the Zoological Museum, Berlin, for sending us the types, and also type material, of several South African species.

To Dr. H. A. Baylis, Curator of Worms of the British Museum (Natural History), for facilities to examine types, and also for the loan of type material.

To Dr. T. Southwell, of the Liverpool School of Tropical Medicine, for material from the pouched rat.

To Dr. G. M. Vevers, Superintendent of the Gardens of the Zoological Society, London, for obtaining facilities to examine slides, and for information regarding hosts.

To Dr. F. E. Beddard, F.R.S., for placing his collection of slides at our disposal.

To Prof. F. J. Meggitt, University College, Rangoon, India, for placing his types of *Inermicapsifer zanizibarensis* Meggitt, 1921, at our disposal.

To Dr. Ch. Joyeux, Laboratoire de Parasitologie, Paris, for kindly sending us a translation of a Russian paper.

To Dr. Gertrud Theiler, for undertaking the correction of the proofs of this paper.

And finally to our friend M. Th. Delachaux, Assistant in the Zoological Department of the University of Neuchâtel, for his help in executing certain of the drawings illustrating this paper.

Thanks to the disinterested collaboration of the above, we have been able to clear up certain points of systematic interest. This represents, however, an infinitesimal portion of the work left to be done with regard to mammalian cestodes. Certain genera are in much need of revision: the genus *Taenia s. str.* is an example. To our mind, only good results are to be obtained from the study of the original species, and any species insufficiently described of which no types or cotypes exist should be suppressed. This seems to be the only way of straightening out the synonomy of certain groups, in which much confusion has been caused of late by "occasional helminthologists," whose only aim seems to be to place their name behind a species. The results of our studies have shown us that authors do not generally take into consideration the individual variation of a species, variation which, as we will show, may be very great in certain cases. The role of the host should also be considered, and would prevent authors committing such absurdities as the recording of species of *Anoplocephala*, *Davainea*, and *Hymenolepis* from marine fishes!

JEAN G. BAER.

Neuchâtel, May, 1924.

SPECIES ARRANGED ACCORDING TO THEIR SYSTEMATIC ORDER.

PSEUDOPHYLLIDEA.

A. *Lüheellidae*, n.fam.
I. *Lüheella*, n.g.
1. *L. pretoriensis*, n.sp.

B. *Diphyllobothriidae* Lühe, 1899, e.p.
Diphyllobothriinae Lühe, 1899, e.p.
II. *Diphyllobothrium* Cobbold, 1858.
2. *D. theileri*, n.sp.

CYCLOPHYLLIDEA.

C. *Anoplocephalidae* E. Blanchard, 1848.
(a) *Anoplocephalinae* Fuhrmann, 1907.
III. *Anoplocephala* R. Blanchard, 1848, e.p.
3. *A. magna* (Abilgaard, 1789).
4. *A. rhodesiensis* Yorke and Southwell, 1921.
5. *A. spatula* (v. Linstow, 1901).

IV. *Paranoplocephala* Lühe, 1910.
6. *P. acanthocirrosa*, n.sp.
V. *Fuhrmannella*, n.g.
7. *F. transvaalensis*, n.sp.
VI. *Moniezia* R. Blanchard, 1891.
8. *M. trigonophora* Stiles and Hassall, 1892.

(b) *Linstowinae* Fuhrmann, 1907.
VII. *Oochoristica* Lühe, 1898.
9. *O. ichneumontis*, n.sp.
VIII. *Inermicapsifer* Janicki, 1910.
10. *I. aberratus*, n.sp.
11. *I. arvicanthidis* (Kofend, 1917).
12. *I. hyracis* (Rudolphi, 1810).
13. *I. interpositus* Janicki, 1910.
14. *I. norhalli* Baer, 1924.
15. *I. pagenstecheri* (Setti, 1897).

(c) *Avitellininae* Gough, 1911.
IX. *Avitellina* Gough, 1911.
16. *A. centripunctata* (Rivolta, 1874).

D. *Dilepinidae* Fuhrmann, 1907.
Dipylidiinae Stiles, 1896.
X. *Dipylidium* Leuckart, 1863.
17. *D. caninum* (Linneus, 1758).
18. *D. fuhrmanni*, n.sp.

E. *Hymenolepinidae* Fuhrmann, 1907.
XI. *Hymenolepis* Weinland, 1858.
19. *H. macroscelidarum*, n.sp.
20. *H.* sp.

F. *Taeniidae* Perrier, 1897, e.p.
XII. *Taenia* Linneus, 1758.
21. *T. hyaenae*, n.sp.
22. *T. parva*, n.sp.

SPECIES ARRANGED ACCORDING TO THEIR HOSTS.

INSECTIVORA.

Macroscelidae.
* *Macroscelides brachyrhynchus* A. Smith.
Hymenolepis macroscelidarum, n.sp.

CARNIVORA.

Canidae.
* *Otocyon megalotis* Desm.
Lüheella pretoriensis, n.g., n.sp.,
Dipylidium caninum Linn.

Hyaenidae.
* *Proteles cristatus* Sparrm.
Dipylidium canium (Linneus).
* *Hyaena brunea* Thunb.
Taenia hyaenae, n.sp.

Viverridae.

* *Genetta ludia.*
Taenia parva, n.sp.

* *Herpestes gracilis* Rüpp.
Oochoristica ichneumontis, n.sp.

Felidae.

* *Zibethailurus serval* (Schreb).
Diphyllobothrium theileri, n.sp.
Dipylidium fuhrmanni, n.sp.

* *Felis caffra* Desm.
Diphyllobothrium theileri, n.sp.
Dipylidium fuhrmanni, n.sp.

RODENTIA.

Muridae.

* *Tatera lobengulae* De Winton.
Hymenolepis sp.

* *Otomys irroratus* Brants.
Paranoplocephala acanthocirrosa, n.sp.
Inermicapsifer arvicanthidis (Kofend).

* *Mus moggi.*
Inermicapsifer aberratus, n.sp.
Inermicapsifer arvicanthidis (Kofend).

Octodontidae.

* *Thryonomys swinderenianus* Temm.
Fuhrmannella transvaalensis, n.g., n.sp.

UNGULATA.

Procaviidae.

Procavia capensis Pall.
Anoplocephala spatula (v. Linstow).
Inermicapsifer hyracis (Rudolphi).
Inermicapsifer interpositus Janicki.
Inermicapsifer norhalli Baer.
Inermicapsifer pagenstecheri (Setti).

Equidae.

Equus caballus Linn.
Anoplocephala magna (Abilgaard).

Hippotigris zebra (Linn.).
Anoplocephala magna (Abilgaard).
Anoplocephala rhodesiensis Yorke and Southwell.

Bovidae.

* *Cephalophus grimmia* Linn.
Moniezia trigonophora Stiles and Hassall.
Avitellina centripunctata (Rivolta).

* *Oreotragus oreotragus* Zimm.
Avitellina centripunctata (Rivolta).

* *Pediotragus sharpei* Thomas.
Avitellina centripunctata (Rivolta).

* *Pediotragus horstocki* Thunb.
Avitellina centripunctata (Rivolta).

The names of the hosts throughout this paper are according to Trouessart's Catalogue (1899 and 1905); those marked with an asterisk are new to science.

II. DESCRIPTION OF SPECIES.

Pseudophyllidea.

A. Lüheellidae, n.fam.

I. *Lüheella*, n.g.

1. *Lüheella pretoriensis*, n.sp.

(Figs. 1, 2, 3, 4, 5.)

Host: *Otocyon megalotis* Desm.
Locality: Rooipoort No. 325, Rustenburg.
Coll. No. P. 685.

A single specimen of this very interesting worm was obtained from a small lalande's fox. Unfortunately, the scolex is missing; however, the strobila is very well preserved, though much contracted. There are about 350 segments, all broader than long. The total length is 300 mm. The greatest width of 10 mm. is reached at about half the length of the strobila. Segments 10 mm. wide are 0·7 mm. in length, the ratio being about 1·14.

The cuticula is 11μ thick, and is quite smooth; the subcuticular cell layer is very distinct, the spindle-shaped cells being about 0·08 mm. in length. In between these subcuticular cells there is a single layer of external longitudinal muscles, made up of stout, isolated fibres. The internal longitudinal muscles are very powerful, and form a layer 0·1 mm. thick. This layer, or series of layers, is made up of stout, isolated fibres, showing a tendency to concentrate into bundles of two to four fibres towards the periphery. The transverse muscles are represented by five to seven layers of thick fibres passing in between the longitudinal muscle fibres. The dorso-ventral muscles are numerous and well developed. Calcareous corpuscles are to be found in small numbers throughout the entire parenchyma; they are spherical and about 23μ in diameter.

The two longitudinal nerve stems are very much displaced towards the centre of the segment. These nerves are very stout, 53μ in diameter, and are situated at a distance of 2·7 mm. from either edge, in segments 9 mm. wide.

The excretory system presents certain interesting peculiarities. It is possible to distinguish two main longitudinal vessels 56μ in diameter and situated outside the nerve stems. These two vessels are lined with a 0·8μ thick cuticula, and are situated at a distance of 0·5 mm. from either edge, in segments 3 mm. wide. As the segments grow older, the diameter of these two vessels tends to diminish and to become equal to that of the secondary vessels. The latter, situated entirely in the medullary parenchyma, form two groups, there being two vessels on either side of the nerve stem. (See diagram.) These ten vessels communicate with one another through numerous secondary anastomoses. We have been unable to detect any excretory vessels in the cortical parenchyma. The testes are oval in shape, the greatest diameter of 0·12 mm. being situated in the dorso-ventral plane. They occupy a single layer situated in the two lateral fields of the medullary parenchyma, and the latter are not united by a bridge of testes in the anterior portion of the segment. On a single transverse section there are usually thirty to thirty-two testes, there being eleven to twelve situated laterally to the nerve stems. The vas deferens is extremely coiled, and lies in

the dorsal region of the segment; it enters the cirrus pouch subterminally. The latter measures 0·5 mm. in length and 0·3 mm. in diameter, and is very powerfully built. The muscular wall is very thick, and is chiefly constituted of two internal layers of longitudinal muscles and by one external layer of circular muscles. Near the proximal end of the pouch the muscles form a kind of thickening, acting functionally as a sphincter muscle. The distal portion of the cirrus pouch contains a large vesicula seminis of variable shape and size owing to its possessing very muscular walls. There is a fairly long ductus ejaculatorius opening into the powerfully built cirrus. The latter is 0·4 mm. long and 0·05 mm. in diameter, and has a very thick muscular wall. The cuticula lining the cirrus is finely cleft, giving the appearance of cuticular spinelets.

The vagina opens at the side of a fairly deep atrium, and has the appearance of a thick-walled tube, passing on the ventral surface of the segment and forming in its distal portion a fairly muscular receptaculum seminis. The ovary is confined entirely to the posterior region of the segment, and is situated ventrally to the uterus. The shell-gland is very well developed. The uterus presents an interesting feature. It first describes a few short and narrow loops, and then forms a single very large loop on either side. These large loops are distended with ova, and present the characteristic appearance as shown in fig. 2. It will be noticed that one loop is always more distended than the other, and this without any regularity whatsoever. The proximal portion of the uterus is highly differentiated, and forms a thick-walled muscular tube surrounded by numerous deep staining glands. [" Uterinaldrüsen," Nybelin (1922), p. 64.] The uterine pore is situated posteriorly to the genital pores, and irregularly to the right or to the left of the mid-line. The yolk-glands occupy the usual position surrounding the genitalia, and are only interrupted dorsally and ventrally of the latter. The ova measure 61·34μ, and are thick shelled and operculated.

The recent reclassification of the *Pseudophyllidea* by Nybelin (1922) has led to the order being divided into six families, of which we will only consider the first three as having superficial genital pores. We may at once set aside the *Ptychobothriidae* Lühe, e.p., as having the uterine pore on the surface opposite to the genital pores; there now remain the *Diphyllobothriidae* Lühe, e.p., and the *Cyathocephalidae* Nybelin. Of these two families, let us first examine the latter, which is considered by Nybelin as containing the most primitive forms.

The salient characters of this family are, briefly, as follows:—

The vagina is posterior to the uterus, both opening in certain cases into a common genital atrium. The uterus is partly surrounded by uterine glands, and the eggs are thick-shelled and operculated. A character of great importance is the structure of the proximal portion of the uterus, a tubular uterus and a distinct preformed uterine pore being considered with analogy to the digenetic trematodes as a primitive character.

For the *Diphyllobothriidae* Lühe, e.p., we find by far the most important character in the presence of a muscular vesicula seminis externa. Uterine glands may be found, although never so well developed as in the preceding family. The uterus opens separately behind the genital pores, all the three genital openings being

constantly on the ventral surface. From the enumeration of the above characters it will be seen that neither of these families can accommodate our genus, which presents characters intermediate between the *Cyathocephalidae* and the *Diphyllobothriidae*. The presence of well-developed uterine glands shows a relationship to the first mentioned of the above families: however, the structure of the cirrus pouch tends distinctly towards the type met with in the second family, although not attaining the higher differentiation met with in the latter. The inclusion of our new genus in one of the above families would destroy the homogeneity of the latter; we are, therefore, faced with the alternative of creating a new family intermediate between the *Cyathocephalidae* and the *Diphyllobothriidae*. For this new family we propose the name *Lüheellidae*, with the following diagnosis:—

Pseudophyllidea of moderate size, with a very well-developed muscular system; genital openings three in number; the vagina and cirrus pouch opening into a common atrium situated on the ventral surface; ovary ventral, in posterior region of segment, and formed by two fairly long lobes united in their middle by a narrow bridge; shell-gland well developed; receptaculum seminis present; uterus a winding tube of which the proximal portion is surrounded with well-developed uterine glands; uterine pore distinctly preformed; ova large, thick-shelled, and operculated.

Adult in mammals. Type: genus *Lüheella*, n.g.

The diagnosis of the genus *Lüheella* will be as follows:—

Lüheellidae, with a well-developed excretory system contained entirely in the medullary parenchyma, and consisting of ten longitudinal vessels connected with one another through anastomoses; longitudinal nerves much displaced towards centre of segment; testes numerous, forming two lateral fields.

Adult in *Canidae*. Type: *Lüheella pretoriensis*, n.sp.

We dedicate this new genus to the memory of the late Dr. M. Lühe, whose work has laid the foundations of a rational classification of the *Pseudophyllidea*.

B. Diphyllobothriidae, Lühe, 1899, e.p.
Diphyllobothriinae Lühe, 1899, e.p.

II. *Diphyllobothrium* Cobbold, 1858.

2. *Diphyllobothrium theileri*, n.sp.
(Figs. 6, 7, 8.)

Hosts: *Zibethailurus serval* (Schreb). *Felis caffra* Desm.
Localities: Fairfield No. 918, Mooivlei, and
Bridgewater No. 766, Rustenburg.

Coll. Nos. P. 10, 16, 18, 22, 25, 100, 479.

Several specimens of this new worm were collected from bush cats and from tiger cats shot in the neighbourhood of Pretoria. The general aspect is that of a typical member of this genus. The average length is 350 to 400 mm., and the greatest width 3·3 mm. On the ventral surface there is a slight depression along the median line forming a characteristic vallecule along the whole strobila. The scolex presents no remarkable features, being of the typical

shape; its dimensions are very variable, as is the case for most members of this genus (*vide* Fuhrmann, 1922). The length varies from 0·53 to 0·86 mm. and the width from 0·25 to 0·3 mm. Behind the scolex there is a distinct "neck." The first segments are 0·4 mm. wide and 0·02 mm. long, becoming 0·6 mm. long in the widest segment; towards the end of the strobila the segments become somewhat narrower and also longer; in this region they measure 1·9 mm. in length and 2·4 mm. in width.

The cuticula is 4·5μ thick, and immediately beneath the latter there is to be found a single and very distinct layer of longitudinal muscles of which the fibres are 3·8μ in diameter, and do not show any tendency to form bundles, but remain distinctly isolated from one another. Here and there are to be seen attached to the cuticula very fine fibres of dorso-ventral muscles.

The internal longitudinal muscles are very well developed, and form a layer 0·04 mm. thick. These muscles consist of stout isolated fibres 2μ in diameter. We were able to observe on our sections the plasmatic core of the muscle-fibre. The transverse musculature, situated beneath the longitudinal muscle layer, is weakly developed, consisting of about four to five fibres. The dorso-ventral muscles are very sparse. Calcareous corpuscles are to be found in small numbers throughout the entire parenchyma. They are spherical in shape and measure about 8·5μ in diameter.

The two main nerve stems are very much displaced towards the centre of the segment. They are situated at a distance of 0·7 mm. from either edge of the segment in segments 2·8 mm. wide. On transverse sections the nerve stems are about 0·03 mm. in diameter.

The excretory system presents a departure from the type usually met with, and bears certain analogies to that of *D. raillieti* v. Rátz (Kotlán, 1923). There are only four longitudinal excretory vessels, two being situated in each lateral field of the medullary parenchyma and outside of the nerve stems. These vessels decribe a tortuous course, and are connected with one another through fine anastomoses. Their diameter is about 11μ. We have been unable to observe any vessel in the cortical parenchyma.

The testes are very large and about spherical in shape. They measure 0·11 to 0·15 : 0·06 to 0·08 mm., their greatest diameter being dorso-ventral. They are situated in a single layer, and occupy nearly all of the lateral fields of the medullary parenchyma. They form two distinct bands on either side of the genitalia, and are united by a single row of testes immediately anterior to the cirrus pouch. A transverse section in this region shows about 25 testes, there being altogether about 300 to 400 of these gonads. The vas deferens is situated dorsally and is much coiled, entering the vesicula seminis at the side.

The cirrus pouch is aberrant from the type usually met with in this genus, which is characterized, as we have already had occasion to mention, by a distinct vesicula seminis externa. It has, however, a close resemblance to that described by Kotlán (1923) for *D. raillieti* v. Rátz. In both of these species there is no distinct vesicula seminis externa, the latter forming part of the cirrus pouch. In support of this interpretation we have observed that in young segments in which the genital organs are beginning to be differentiated, there appear two distinct primordalia, the one for

the future vesicula seminis and the other for the future cirrus pouch; as the segments become older these two primordalia gradually fuse together, to become finally a very muscular vesicula seminis within the cirrus pouch. This vesicula seminis is lined with a ciliated epithelium, as has also been described by Kotlán (1923). It communicates through a short canal with a second vesicula seminis much smaller, and probably formed by a dilatation of the ductus ejaculatorius. The cirrus is very stout, and is covered with a cleft cuticula. It measures 0·16 mm. in length and 0·06 mm. in diameter. The total length of this muscular cirrus pouch is 0·3 mm., the diameter being about 0·13 mm. There are no " prostate " glands.

The vagina is a thick-walled tube opening behind the cirrus pouch and on the side of a fairly deep atrium; its course is entirely ventral. In its distal portion it forms a fairly large receptaculum seminis about 0·06 mm. in diameter. The ovary is in the posterior region of the segment, and is situated slightly on the dorsal side of the uterus. It is formed by two wings measuring 1 mm. across on horizontal sections. The yolk glands are situated in the cortical parenchyma, and are only interrupted on the dorsal and ventral surfaces in the neighbourhood of the genitalia. The uterus is characterized by the great diameter of its coils, of which there are three on one side and four on the other of the mid-line. The uterine pore is situated posterior to the vagina, sometimes on the mid-line, but usually alternating irregularly either to the right or to the left of the latter. The ova are numerous, thick-shelled, and operculated; they measure 57·34μ.

From the above description it will be seen that *D. theileri* is different from all previously described species of the genus. It comes, however, very close to *D. raillieti* v. Rátz, and presents certain analogies with the latter, as we have already shown. However, we deem the following differences sufficient to justify a new species. The excretory system presents four instead of six longitudinal vessels; the nerve stems are much more displaced towards the mid-line of the strobila; the testes are fewer and smaller; the cuticula of the cirrus is cleft; the uterine loops are three to four in number instead of six or more; finally, the ova are smaller, 57:34μ against 67 to 72:40 to 54μ for *D. raillieti* v. Rátz. One other point might eventually be of importance and that is the difference of host and of locality.

In 1910 Lühe united the two genera *Diphyllobothrium* Cobbold and *Dibothriocephalus* Lühe, the first-named genus having priority. However, in 1922, Cohn published a paper in which he has compared the two type species, i.e. *Diphyllobothrium stemmacephalum* Cobbold and *Dibothriocephalus latus* (Linneus). He comes to the conclusion that these two species represent two distinct genera. We agree, however, with Fuhrmann (1922), and do not accept Cohn's conclusions, these latter being of specific but not of generic importance.

Into the following list we have endeavoured to place all the known species of the genus from mammalian hosts. Several species are still referred to the genus *Bothriocephalus* Rudolphi; these are: *B. marginatus* Krefft, from *Macropus* sp.; *B. folium* Diesing, from *Herpestes albicaudus;* and *B. didelphydis* Ariola, from *Didelphys marsupialis*. The first two species are not well enough known to allow them to be placed in the genus *Diphyllobothrium* or in any other genus. The third species is, however, a true member of the

genus *Bothriocephalus*, at least judging from the description given by Ariola (1900). We wonder, however, if there has not been a confusion of labels, as the genus *Bothriocephalus* is only recorded as inhabiting fishes.

We consider *D. americanum* Hall, from the dog, as an immature specimen of *D. latum* (Linneus), for the following reasons. We find that Hall's (1908) description and figures tally exactly with specimens of *D. latum* that we have ourselves obtained experimentally from a dog. The longest specimen measured, when alive, 500 mm. in length and 4 mm. in width; the smallest specimen measured 330 mm. in length and just shows ova. We believe that these data justify our conclusions. MacCallum (1921) has described under the name of *Dibothrium tangalongi*, n.sp., a typical species of *Diphyllobothrium*. As this description is totally insufficient, we are unable to state whether this is a valid species or not, but for the time being consider it as such.

Botryocefalus longicollis Parodi and Widacowitch (1918) is too badly described to be placed as a valid species in our list, and we will leave it for the present under the above name, although this specific name is already occupied.

It is difficult to state whether *D. taenioides* Leon (1916) should be considered as a distinct species or as a malformation of *D. latum*. The fact that it has been recorded since on two subsequent occasions seems to point in favour of the former idea; that is why we have placed it provisionally on our list until a thorough anatomical study of this worm has been made.

Ward (1923) mentions the presence of a broad tapeworm in the brown and grizzly bears of North-West America. This worm seems to be very similar if not identical with *D. latum*. However, as long as no study of this worm has been undertaken, no opinion may be expressed on the subject, which is of great interest, as *D. latum* has been recorded—from zoological gardens, it is true—from *Ursus arctos* (Landois. 1877) and from *Procyon lotor* (Kotlán, 1923), this last belonging to a family closely related to the *Ursidae*.

List of the Species of *Diphyllobothrium* from Mammals.

Species.	Author.	Year.	Length. mm.	Width. mm.	Scolex. mm.	Ova. μ	Host.	Distribution.
D. stemmacephalum..	Cobbold.....	1858	1,500–2,500	13–15	0·45 : 0·27–0·32	55 : 40	*Phocaena phocaena*.....	Scotland, East Prussia.
D. fuscum.....	(Krabbe).....	1865	800	5	?	55 : 60	*Canis* fam.....	Iceland.
D. hians.....	(Diesing).....	1850	360	?	4·5 : 1·5	59 : 38	*Monacus albiventer, Erignatus barbatus, Pusa hispida, Phoca vitulina*	Iceland, Europe.
D. simile.....	(Krabbe).....	1865	320–370	5	?	?	*Vulpes lagopus*.....	Greenland.
D. polycalceolum.....	(Ariola).....	1896	250–340	2·5–3·5	?	48 : 32	*Phoca vitulina*.....	Arctic.
D. römeri.....	(Zschokke).....	1903	140–150	3	?	62 : 39	*Trichechus römeri*.....	Arctic.
D. variabile.....	(Krabbe).....	1866	135	5	?	40–55	*Erignatus barbatus, Phoca vitulina, Cystophora cristata*	Greenland, Arctic.
D. cordatum.....	(Leuckart).....	1863	130–1,150	7–10	2	52–41	*Homo sapiens, Trichechus rosmarus, Erignatus barbatus, Pagophoca groenlandica, Canis* fam.	Greenland, Arctic.
D. minor.....	Cholodkovsky.....	1916	100	6	?	70 : 40	*Homo sapiens*.....	Siberia.
D. lanceolatum.....	(Krabbe).....	1865	90	4·5	1·3–2·4 : 0·8–1·5	62 : 40	*Erignatus barbatus*.....	Greenland.
D. elegans.....	(Krabbe).....	1865	50–100	?	2 : 1·5	45 : 35	*Eumetopias jubata, Cystophora cristata, Phoca vitulina*	Denmark, Greenland.
D. coniceps.....	(v. Linstow).....	1905	34	5	1·4	58 : 42	*Erignatus barbatus*.....	Siberia.
D. macrophallum.....	(v. Linstow).....	1905	30	2·2	?	62 : 47	*Callotaria ursinus, Erignatus barbatus*	Arctic.
D. schistochilum.....	(Germanos).....	1895	24	—	1·8 : 1·2	50–75 : 20–30	*Erignatua barbatus, Phoca vitulins*	Spitzbergen.
D. latum.....	(Linneus).....	1758	2,000–8,000	5–20	5 : 1·5-2	70 : 45	*Homo sapiens, Canis* fam., *Vulpes alopex, Ursus arctos, Procyon lotor, Felis dom, Uncia tigris, U. leo, Leopardus onca*	Cosmopolitan (sporadic).
D. serratum.....	(Diesing).....	1850	1,900	20	2 : 7	25	*Cerdocyon azarae, Canis* fam.	Brazil.
D. decipiens.....	(Diesing).....	1850	1,600	4–8	3 : 1	50 : 60	*Canis* fam., *C. lupus, Felis dom, Zibethailurus pardalis, Catopuma jaguarandi, Oncoides tigrina, O. mitis, O. weidi, Leopardus pardus, L. onca, Uncia concolor*	Europe, India, South Africa, Australia, South America.
D. sulcatum.....	(Molin).....	1858	1,300	6	?	?	*Leopardus pardus*.....	India.
D. raillieti.....	(v. Rátz).....	1923	520	7	0·9 : 0·5	67–72 : 40–54	*Canis* fam.....	Budapest.
D. theileri.....	n.sp.....	—	340–400	3·3	0·5–0·9 : 0·3–0·4	57 : 34	*Zibethailurus serval, Felis caffra*	South Africa.

LIST OF THE SPECIES OF *Diphyllobothrium* FROM MAMMALS—(*continued*).

Species.	Author.	Year.	Length. mm.	Width. mm.	Scolex. mm.	Ova. μ	Host.	Distribution.
D. bresslavi	Baer	1924	270	8	0·7 : 0·34	65 : 29	*Didelphys marsupialis*	Brazil.
D. mansoni	(Cobbold)	1883	140–350	2·5–3·2	?	63–76 : 31–43	*Thous aureus*	Japan.
D. tangalongi	(MacCallum)	1921	125	5	1 : 0·7	40 : 20	*Viverra tangalunga*	Borneo.
D. gracile	Baer	1924	75–80	0·5	0·5 : 0·2	57 : 27	*Oncoides weidi*	Brazil.
D. taenioides	(Leon)	1916	Fragments.	6	?	?	*Homo sapiens*	Rumania.
D. tectum	(v. Linstow)	1892	220	7	?	64 : 45	*Macrorhinus leoninus*	Antarctic.
D. scoticum	(Rennie and Ried)	1912	130	7	?	70–80 : 43–48	*Ogmorhinus leptonyx*	Antarctic.
D. perfoliatum	(Railliet and Henry)	1912	90–250	5–7	1·25 : 1	56–64 : 43–45	*Leptonychotes weddelli*	Antarctic.
D. quadratum	(v. Linstow)	1892	80-100	3·3	1·2–1·8 : 0·7	50 : 43	*Ogmorhinus leptonyx*	South Georgia, Antarctic.
D. scotti	(Shipley)	1907	80	2	?	40 : 30	*Ommatophoca rossi*	Antarctic.
D. archeri	(Leiper and Atkinson)	1914	60–120	1·5	2 : 2	70	*Leptonychotes weddelli*	Antarctic.
D. rufum	(Leiper and Atkinson)	1914	30–60	5	1·6 : 1·4	—	*Leptonychotes weddelli*	Antarctic.
D. lashleyi	(Leiper and Atkinson)	1912	30–40	1·4	1·2 : 0·8	60	*Leptonychotes weddelli*	Antarctic.
D. mobile	(Rennie and Ried)	1912	12–20	2	0·5	51 : 34	*Leptonychotes weddelli*	Antarctic.
D. wilsoni	(Shipley)	1907	4–10	1	0·5	69 : 37	*Leptonychotes weddelli, Ommatophoca wilsoni*	Antarctic.

CYCLOPHYLLIDEA.

C. ANOPLOCEPHALIDAE E. Blanchard, 1848.

(a) *Anoplocephalinae* Fuhrmann, 1907.

III. *Anoplocephala* E. Blanchard, 1848 e.p.

3. *Anoplocephala magna* (Abilgaard, 1789).

Hosts: *Equus caballus, Hippotigris zebra.*

Localities: Onderstepoort Laboratory, Pretoria Zoo.

Coll. Nos. O L 165, O L 164.

This species seems to be fairly common in South Africa, and has already been recorded, from the above hosts, both by Gough (1908) and by Veglia (1919). It is interesting to note that both of the above authors state that this species appears to be more common in South Africa than in Europe.

4. *Anoplocephala rhodesiensis* Yorke and Southwell, 1921.

Host: *Hippotigris zebra.*

Locality: Bossieshoek No. 906, Rustenburg.

Coll. Nos. P. 641, 642, 643.

In a previous paper (1924, a.) we have considered this species as a variety of *A. perfoliata* (Goeze), from the horse. However, on further consideration, and on comparing it with *A. spatula* (v. Linstow), we have come to the conclusion that we are dealing with a distinct species which is extremely closely related to *A. perfoliata* (Goeze).

Yorke and Southwell (1921) have gone into the details of the synonymy of this worm; we will, therefore, not repeat it here.

We have also found a great tendency to sterility, which in some way does not account for such heavy infections, as many as forty-six specimens being collected from a single zebra. Without doubt, conditions for the development of an intermediate host must be extremely favourable.

5. *Anoplocephala spatula* (v. Linstow, 1901).

Host: *Procavia capensis.*

Locality: Rooikrans No. 760, Rustenburg.

Coll. No. P. 116.

Two specimens of this interesting species were collected from the intestine of a rock-rabbit.

The greatest length given by Bischoff (1913) in his review of this species does not surpass 40 mm., whereas the larger of our two specimens is more than twice that length, attaining 90 mm. There are about 200 segments, all broader than long, the greatest width being 12 mm.

We were able to observe on our sections a point of anatomical detail not mentioned by Bischoff, namely, that the cirrus is covered with a very great number of minute spines.

List of Species of *Anoplocephala* from Mammals.

Species.	Author.	Year.	Length. mm.	Width. mm.	Scolex. mm.	Cirrus.	Ova. μ	Embryo. μ	Horns. μ	Host.	Distribution.
A. magna.....	(Abilgaard).....	1789	350	25	3 : 3	Armed	70–80	8	6–8	*Equus caballus, Asinus asinus, Hippotigris zebra*	Cosmopolitan.
A. magna, var. *gigantea*	(Peters).....	1856	150	40	4 : 3·4	Armed	77–95	19	18	*Rhinoceros unicornis, R. sondaicus, Ceratorhinus bicornis*	Asia, Africa.
A. rhodesiensis.....	Yorke and Southwell	1921	114	22	2 : 3·3	Armed	100–120	16	2	*Hippotigris zebra*.....	South Africa.
A. spatula.....	(v. Linstow).....	1901	90	12	1·1	Armed	45	9	14	*Procavia capensis, Heterohyrax brucei, P.* sp.	East and South Africa.
A. perfoliata.....	(Goeze).....	1782	30–70	10–12	2–3 : 3	Unarmed	65–70	12	16	*Equus caballus, Asinus asinus, Hippotigris burchelli*	Cosmopolitan.
A. manubriata.....	Railliet, Henry, and Bauche	1914	27	16	6–7 : 5–6	Armed	70–80	17–22	?	*Elephas indicus*.....	Asia

IV. *Paranoplocephala* Lühe, 1910.

6. *Paranoplocephala acanthocirrosa*, n.sp.
(Figs. 9, 10, 11.)

Host: *Otomys irroratus* Brants.

Localities: Buffelspruit No. 253, Jericho;
Klipfontein No. 479, Pretoria.

Coll. Nos. P. 145, 182, 393, 394, 398, 399.

Altogether six specimens were collected from water-rats. All except P. 394 were in good condition, the latter tube only containing fragments.

The length of the strobila varies from 45 to 60 mm., there being about 70 to 100 segments, all broader than long. The greatest width is 5 mm. The gravid segments are more quadratic in shape, and are 3 mm. wide, being 1·4 mm. long.

The aspect and size of the scolex may be extremely variable, as can be seen from fig. 9, a and b. The width varies from 0·5 to 1 mm. There is no rostellum, nor are there any hooks. The suckers are comparatively small, 0·2 mm. in diameter, and are situated close together. Behind the scolex there is a distinct but short non-segmented region 0·4 mm. long.

The longitudinal musculature is well developed, and consists of two distinct layers. The outer layer is formed by bundles of six to nine fibres each, and the inner layer by bundles of four to five fibres each. The transverse and dorso-ventral muscles are well developed. The entire parenchyma contains egg-shaped calcareous corpuscles; the latter measure 14 : 8μ.

The excretory system presents the usual four longitudinal vessels, the ventral vessels being joined by a transverse vessel in the posterior region of the segment. The dorsal vessels are situated dorsally and outside of the ventral vessels.

The genital pores are irregularly alternate, and the genital ducts pass dorsally of the excretory vessels and of the nerve.

The cirrus pouch is well developed, reaching beyond the ventral excretory vessel and has a thick muscular wall; it measures 0·8 mm. in length and is 0.2 mm. in diameter. The distal portion of the pouch contains a well-developed vesicula seminis. The cirrus itself is stoutly built, and is 0·4 mm. long and 0·02 mm. in diameter; it is thickly beset with small spines. The vas deferens is hardly coiled, and passes right across the segment, splitting up into vasa efferentia towards the centre of the latter. The testes form a large group of about forty to fifty on the aporal side of the segment. They are spherical in shape, measuring 34μ in diameter.

The vagina opens into the genital atrium posterior to the cirrus pouch. It describes a somewhat vague curve as it goes to join the female genitalia, and forms a distinct receptaculum seminis on reaching the latter. The lumen of vagina is clothed with very fine long hairs. The ovary and yolk-gland are situated to the poral side of the segment. The former is fan-shaped and somewhat lobed, measuring on horizontal sections 0·6 mm. in diameter. The yolk-gland is dorsal to the ovary. The primordalium of the uterus appears as a string of dark-staining cells, stretched transversally across the anterior part of the segment. Later it forms a transverse tube passing dorsally of the excretory vessels and with numerous antero-posterior evaginations. There are from nineteen to twenty of these

evaginations in each segment. The outer shell of the embryophore measures 0·5 mm. in diameter. The latter forms a distinct piriform apparatus 15μ in diameter.

The genus *Paranoplocephala* was erected by Lühe in 1910 to contain a single species *Anoplocephala omphalodes* (Hermann), which differs from all the other species by having irregularly alternating genital pores and by the absence of a vesicula seminis externa. At the time the validity of the genus may have seemed somewhat doubtful; however, the occurrence of another species different from the first, and from a widely separated geographical area, seems to us to establish this genus with certainty.

In the following table we compare the two species, showing the differences that exist between them:—

LIST OF THE SPECIES OF *Paranoplocephala* FROM MAMMALS.

Species.	Author.	Year.	Length. mm.	Width. mm.	No. of Segments.	Cirrus Pouch. mm.	Outer Embryonal Shell.	Host.	Distribution.
P. omphalodes..	(Hermann)	1783	120–215	3·4–5	150–300	0·21	0·3	*Microtus agrestis, Arvicola terrestris*	Europe.
P. acanthocirrosa	N. sp.	—	45–60	5	70–100	0·8	0·5	*Otomys irroratus*	South Africa.

V. *Fuhrmannella*, n.g.

7. *Fuhrmannella transvaalensis*, n.sp.
(Figs. 12, 13, 14, 15, 16, 17.)

Host: *Thryonomys swinderenianus* Temm.
Locality: Olifantshoek No. 691, Rustenburg.
Coll. No. P. 723.

The only specimen in our possession is unfortunately not complete, as the head is missing. The strobila consists of about 200 segments all broader than long. The total length is 90 mm.; the smallest segments are 0·08 mm. long and 2 mm. wide. About the middle of the strobila the segments are 0·4 mm. long and 4·5 mm. wide, the end segments being 0·5 mm. long and attaining the maximum width of 7 mm. The cuticula is 8μ thick, and beneath the latter there is a distinct layer of sub-cuticular cells about 19μ wide.

The longitudinal muscles are extremely well developed and form two distinct layers. The outer layer consists of bundles made up of five to nine fibres each, and the inner layer of bundles contains twenty-two to twenty-five fibres each. The bundles of the outer layer are small and about three times as numerous as those of the inner layer. The transverse and dorso-ventral muscles are very well developed. The entire parenchyma contains very numerous calcareous corpuscles; the latter are egg-shaped and measure 11 : 8μ.

The excretory system is formed by the usual four longitudinal vessels, the two dorsal vessels being situated dorsally and interior to the ventral vessels.

The genital pores are double, and are situated in the middle of the edge of the segment. Each segment contains two complete sets of genital organs, the genital ducts passing dorsally of the excretory vessels and of the nerves.

There are about 200 testes occupying the free space between the two ovaries and situated in two to three dorso-ventral layers. In certain cases there may also be a few testes on the poral side of the ovaries. These testes are spherical and are about 0·08 mm. in diameter. The vas deferens describes several coils before entering the cirrus pouch. These coils are usually much distended with spermatozoa, thus replacing functionally a vesicula seminis externa which is absent. The cirrus pouch is small, not even extending as far as the nerve, and is not very powerfully built. It is 0·23 mm. long and about 0·08 mm. in diameter. The cirrus is inerm and slender, measuring 0·1 mm. in length and 0·02 mm. in diameter.

The vagina is situated posterior to the cirrus pouch in both sides of the segment. We have found no exception whatever to this rule. Just before opening into the common genital atrium the vagina describes a very characteristic curve towards the posterior extremity of the segment. In its distal portion the vagina forms a distinct and fairly large receptaculum seminis. The ovary is fan-shaped and somewhat lobed, and measures on horizontal sections 1 mm. in diameter. The yolk-gland is well developed, and is situated dorsal of the ovary. The uterus, which constitutes the main character of what we consider to be a new genus, presents a structure never hitherto recorded from a Cestode. The young uterus may be compared to a series of archways, such as found in Dutch gardens, for instance, these archways being connected through an intricate network of anastomoses (see diagram). The top of the archway is situated in the anterior part of the segment, and the two sides are the one dorsal and the other ventral to the latter. The genital organs are entirely enclosed by this sort of pergola. At a later stage the uterus sends out branches in all directions. These branches force their way through the longitudinal and transverse muscles fibres, and proceed through the parenchyma as far as the cuticula. The gravid segments present a very characteristic aspect, as can be seen from fig. 17.

The embryo is provided with three shells. The outer shell is spherical, and measures 0·05 mm. in diameter; the middle shell is much shrunken, and appears adherent to the inner shell; the latter forms a distinct piriform apparatus 19μ in diameter, and is provided with two horns 12 to 13μ in length.

We consider the above characters sufficient to establish a new genus, of which the diagnosis would be as follows:—

Anoplocephalinae, with segments broader than long. Two complete sets of reproductive organs in each segment. Genital ducts pass dorsally to the excretory vessels and to the nerves. Interproglottidal glands absent. Vagina posterior to cirrus pouch in both sides of the segment. Testes, two to three layers, occupy entire field between the ovaries, but appear also to the poral sides of the latter. Ovaries situated to poral sides of the segment. Uterus a network, surrounding the genitalia dorsally, anteriorly, and posteriorly only, sending out branches passing between the longitudinal and transverse muscles fibres. Embryophores with a distinct piriform apparatus. Adult in Rodentia. Type: *Fuhrmannella transvaalensis*, n.sp.

We dedicate this new genus to our devoted teacher, Prof. Dr. O. Fuhrmann, whose magnificent work on Cyclophyllidean Cestodes is universally recognized.

The position of this new genus is without doubt in the neighbourhood of the genera *Cittotaenia* and *Moniezia*, and more closely related to the latter than to the former on account of the structure of the uterus.

VI. *Moniezia* R. Blanchard, 1891.

8. *Moniezia trigonophora* Stiles and Hassall, 1892.

Hosts: *Cephalophus grimmia, Pediotragus sharpei, P. horstocki.*

Localities: Fairfield No. 918, Mooivlei No. 144, Hampton No. 768, Rustenburg.

Coll. Nos. P. 4, 84, 448, 461, 462.

This species has already been found in South Africa, Gough (1908) reporting a case from a calf and Veglia (1919) a case from sheep. As far as we can ascertain, the above hosts have not yet been reported before as harbouring this parasite.

The specimens in our possession are extremely contracted, and attain a maximum width of 25 mm.! We believe this width to be among the greatest ever observed in this genus. Another point of interest is the presence of only seven to twelve interproglottidal glands instead of the usual eleven to fourteen, and also confirms the statements of Theiler (1924) with regard to the variability of a single species.

Of late many authors have been adding species to this genus without attempting to distinguish them from those already known. By far the greatest confusion has been caused by Sauter (1917), who has actually succeeded in creating not less than four new species and three new varieties. All his species are based on characters which are subject to much variation, such as size of head, length of strobila, etc., and which are not characters of specific value. On page 49 the author creates a variety *M. crassicollis*, var. *nova*, and on page 64 this "variety" suddenly assumes the name of *M. alba*, var. *nova*, having in the meantime changed its characters! One point, and one point only, is of interest, that is the species *M. conjugens*, n.sp., in which appear interproglottidal glands of both the "linear" and of the "saccular" type, and which seems to denote that the separation of the "planissima group" from the "expansa group" is not so definite as it has been supposed up to now.

In a recent paper Theiler (*loc. cit.*) has reduced the multiple-species of Moniezia from Ruminants to three valid species. However, we do not consider *M. trigonophora* as a synonym of *M. expansa*, as in the former species we *always* find the testes arranged in two triangles, a disposition which may occasionally occur in young segments of *M. expansa*, but which does not justify these two species being united under the same name.

We have ourselves (1924, d.) established the validity of *M. rugosa* from *Brachyteles arachnoides*. There now remains one more species described from a host other than a Ruminant, and that is *M. amphibia* (v. Linstow). We have been fortunate enough to examine the type material from the Berlin Museum, and find this species to be a synonym of *M. alba*, as there are no interproglottidal glands present. The presence of a Moniezia in a hippopotamus seems somewhat abnormal, and we wonder whether this is an occasional host or perhaps a confusion of labels, as two names such as "Hippopotamus" and "Hippotragus" could easily be confused.

What v. Linstow (1907) calls "radiärgeschichte Kalkkörperchen" are nothing more than concretions to be found in the parenchyma and probably derived from the host, as they present a distinct crystalline structure.

List of Species of *Moniezia* from Mammals.

Species.	Author.	Year.	Length. m.	Width. mm.	Interproglottidal Glands.	Ova. μ	Piriform App. μ	Host.	Distribution.	Synonyms.
M. benedeni.....	(Moniez).....	1879	0·3–4	3–16	Linear	60–80	18–22	*Bos taurus, Ovis aries*.....	Europe, Asia, North America, South America	*M. neumanni* Moniez, 1801; *M. planissima* Stiles and Hassall, 1893; *M. triangularis* Marotel, 1913; *M. crassicollis* Sauter, 1917; *M. parva* Sauter, 1917; *M. latifrons* Sauter, 1917; *M. pellucida* Blei, 1920; *M. translucida* Jenkins, 1923.
M. expansa.....	(Rudolphi).....	1805	1–5	7–16	Saccular	50–60	20	*Bos taurus, Ovibos moschatus, Cephalophus monticola, C.* sp., *Blastocerus campestris, Mazama rufus, M. nana, M.* sp.? *Gazella dorcas, Ibex ibex, Capreolus caprea, Ruficapra tragus, Capra hircus, C. pyrenaica, Ovis aries, Coassus nanus*	Europe, Asia, Australia, South America, Africa	*M. oblongiceps* Stiles and Hassall, 1893; *M. minima* Marotel, 1912.
M. trigonophora.....	Stiles and Hassall ..	1893	1·6–2	6	Saccular	52–60	20–24	*Bos taurus, Ovis aries, Antilopa cervicapra, Tetracercus quadricornis, Cephalophus grimmia, Pediotragus sharpei, P. horstocki*	Europe, Asia, North America, Africa	—
M. alba.....	(Perroncito).....	1878	0·4–2·5	8–4	Absent	60–88	16–24	*Bos taurus, Ovis aries, Poephagus grunniens, Hippotragus equinus, Hippopotamus amphibius*	Europe, Asia, Australia, Africa	*M. amphibia* (v. Linstow, 1901); *M. chappuisi* Baer, 1923.
M. conjugens (?)	Sauter.....	1917	1·2	10	Linear and saccular	70	?	*Bos taurus*.....	Germany.....	—
M. rugosa.....	(Diesing).....	1850	0·16	8	Absent	?	?	*Brachytelesarachnoides*, (?) *Cebus fatuellus*	Brazil.....	—

(*b*) *Linstowinae Fuhrmann*, 1907.

VII. *Oochoristica* Lühe, 1898.

9. *Oochoristica ichneumontis*, n.sp.
(Fig. 18.)

Host: *Herpestes gracilis* Rüpp.

Localities: Kwaggasvlakte No. 882, Cumberland, Rustenburg.

Coll. Nos. P. 97, 817.

Unfortunately, we are only in possession of fragments of this species, neither bottle containing a scolex. The greatest width measured is 4 mm. The cuticula is 8μ thick, there being beneath the latter a distinct subcuticular layer 27μ wide.

The longitudinal muscles are distributed without any apparent order throughout the entire cortical parenchyma, and consist of stout isolated fibres 4 to 6μ in diameter. The transverse muscles are somewhat sparsely developed, and pass in certain cases in between the longitudinal muscle fibres. The dorso-ventral fibres are abundant though very fine. Calcareous corpuscles are fairly abundant throughout the entire parenchyma. They are spherical, about 15μ in diameter.

The two lateral nerve stems are very distinct, and measure on transverse sections 95 : 75μ.

We find the usual four longitudinal excretory vessels; the ventral vessels are, however, very much displaced towards the centre of the segment. They are at a distance of 0·8 mm. from either edge in segments 3·7 mm. wide. The diameter of these ventral vessels is 84μ. The dorsal vessels are situated dorsally and laterally of the ventral vessels, and their diameter is about a third of that of the latter.

The genital pores alternate irregularly, and the genital ducts pass dorsally to the excretory vessels and to the nerve. This disposition of the genital ducts has been recorded only once before for this genus, and that is for the closely related species *O. herpestis* Kofend (1917 and 1921).

There are from 90 to 100 testes measuring 133 : 84μ. They occupy a single dorsal layer behind and on either side of the ovary. Owing to the displacement of the excretory vessels, we find a character never yet recorded for this genus, and that is that the testes extend laterally of the ventral and dorsal excretory vessels. A transverse section usually shows four to five testes situated between the ventral excretory vessel and the nerve. The vas deferens is extremely coiled, and is surrounded by so-called "prostate" glands. The cirrus pouch is fairly muscular, and reaches just beyond the nerve stem. It is 0·2 mm. long and about 0·08 mm. in diameter. It contains a few coils of the vas deferens and a fairly long inerm cirrus. The latter is 0·13 mm. long and 0·02 mm. in diameter.

The vagina is situated ventrally and posterior to the cirrus pouch. It appears as a thick-walled, dark-staining tube lined throughout with setae all directed towards the pore. The outer surface of the vagina is surrounded with dark-staining glands, presenting a similar aspect to those surrounding the vas deferens. From the pore, the vagina runs a straight course dorsally to the

ovary. On reaching the centre of the latter organ it suddenly curves back to join the shell and the yolk glands. There is no receptaculum seminis. The ovary forms an irregularly lobed mass situated in the middle of the segment. The yolk-gland is entirely posterior and ventral to the ovary. The uterus appears as a transverse, elongate sack, branching in all directions, and soon breaking up into uterine capsules. The latter, 46μ in diameter, contain a single embryo measuring 30μ in diameter. In gravid segments the capsules occupy the entire medullary parenchyma, and are disposed in two to three layers. Only exceptionally are capsules to be found in the cortical parenchyma.

Of the eleven species of *Oochoristica* known from mammals, this is the third species to be described from a mongoose, the other species being *O. herpestis* Kofend, 1917, from Africa, and *O. amphisbeteta* Meggitt, 1923, from India. Our species can immediately be distinguished from the latter and also from all the other species of the genus by the position of the testes, which pass laterally beyond the excretory vessels.

As Beddard (1914 and 1916) and Baylis (1919) have already pointed out, there do not seem to be characters of sufficient importance to separate the two genera *Oochoristica* Lühe, 1898, and *Linstowia* Zschokke, 1899. In both genera the genital pores are irregularly alternating, and the genital ducts may pass dorsally between or ventrally of the excretory vessels, this disposition being also found in the genus *Taenia*, s.str. The position of the testes is variable. As in the genus *Oochoristica*, they may in certain cases be found also anterior to the female genitalia (*vide* Baylis, 1919). With the actual state of affairs it is impossible to refer with certainty a species to one genus or the other, and we would propose as a temporary measure, and also to facilitate the determination of the species, to maintain the genus *Linstowia* with only two species, namely, *L. echidnae* (Thompson) Zschokke, 1899, and *L. semoni* (Zschokke, 1896). Nybelin (1918) has created a variety, *acanthocirrum*, of the latter species, from which it differs, as its name implies, by having spines on the cirrus. We have examined co-type material of *L. semoni*, and have found that here also the cirrus bears spines. This variety must, therefore, be considered as a synonym of *L. semoni*.

The two Australian forms mentioned above can be immediately distinguished by the very great development of the cirrus pouch, the latter reaching almost to the middle of the segment.

To the genus *Oochoristica* we assign the remaining species of *Linstowia*, viz., *L. jheringi* Zschokke, *L. braziliensis* Janicki, *L. ameivae* Beddard, and *L. lemuris* Beddard. However, as we have already mentioned above, this is only a temporary measure intended to facilitate the determination of these parasites and also to stimulate the study of their anatomical details so that a more natural classification may be obtained.

List of Species of *Oochoristica* from Mammals.

Species.	Author.	Year.	Length. mm.	Width. mm.	Number of Testes.	Receptaculum Seminis.	Host.	Distribution.
Oochoristica megastoma	(Diesing).....	1856	650	5	100	Present	*Ateles vellerosus, Alouta nigra, A. belzebul, Brachyteles arachnoides, Cebus niger, C. fatuellus, C. robustus, Callicebus personata, C. torquata, C. caligata, Callithrix melanurus, Midas bicolor*	South America.
O. tetragonocephala...	(Bremser).....	1856	420	5·2	70–80	Absent	*Myrmecophaga jubata, Tamandua tetradactyla*	South America.
O. surinamensis.....	Cohn.....	1902	160	3·9	100	Present	*Priodontes giganteus, Tatusia novemcincta*	South America.
O. wageneri.....	Janicki.....	1904	150	2·4	70–80	Absent	*Tamandua tetradactyla*.....	South America.
O. marmosae.....	Beddard.....	1914	84	2·8	100	Present	*Marmosa elegans*.....	South America (Lond. Zoo).
O. lemuris.....	(Beddard).....	1916	75	4	40	Present	*Nycticebus tardigradus*.....	India (Lond. Zoo).
O. herpestis.....	Kofend.....	1917	60	3	50–60	Absent	*Herpestis sanguineus*.....	Sudan.
O. bivittata.....	Janicki.....	1904	55	0·9	5	Present	*Marmosa murina, Philander philander, Didelphys paraguayensis, D. marsupialis, Metachirus opossum*	South America.
O. incisa.....	Marotel.....	1899	50–150	1·3	50	Present	*Meles taxus*.....	Europe.
O. braziliensis.....	(Janicki).....	1904	30	3·2	40	Present	*Metachirus opossum, Peramys americana*	South America.
O. jheringi.....	(Zschokke).....	1904	28	4·5–5	60	Present	*Peramys americana*.....	South America.
O. amphisbeteta.....	Meggitt.....	1924	15–40	0·45	22–24	Absent	*Herpestis albopunctatus*.....	India.
**O. didelphydis*.....	(Rudolphi).....	1819	15	0·71	20	Absent	*Marmosa murina*.....	South America.
O. erinacei.....	Meggitt.....	1920	15	1	30–50	Absent	*Erinaceus algirus, E.* sp.....	Arabia, North Africa.
O. ichneumontis.....	N. sp.....	—	Fragments	4	90–100	Absent	*Herpestis gracilis*.....	South Africa.

* This species will, on further study, be doubtlessly found to be a member of a new genus.

We do not agree with Meggitt (1923), who places the species *Anoplotaenia dasyuri* Beddard, 1911, in the above genus. We have examined the co-type material, and for the time being maintain the genus *Anoplotaenia* Beddard.

VIII. *Inermicapsifer* Janicki, 1910.

10. *Inermicapsifer aberratus*, n.sp.
(Figs. 19, 20.)

Host: *Mus moggi.*
Locality: Rooikwill No. 224, Pretoria.
Coll. No. P. 342.

There is only a single specimen of this curious species, which was, unfortunately, too opaque to prepare a whole mount, and has, therefore, been sacrificed to prepare horizontal sections only, so that certain anatomical details will be lacking.

The total length is 13 mm. and the greatest width 0·6 mm.; there are altogether about 125 segments. The scolex is 0·32 mm. wide, and the suckers, situated beneath the surface of the latter, measure 0·14 mm. in diameter.

The most salient point in the anatomy is the entire absence of testes on the pore side of the segment and the presence of six to seven very large testes on the aporal side. The testes are egg-shaped and measure 65 : 30μ. The vas deferens enters the cirrus pouch without forming any coils, and crosses the segment almost in a straight line. Within the cirrus pouch it forms a single loose coil. The former is fairly well developed, and is 0·095 mm. in length and about 0·05 mm. in diameter, opening into a distinct genital atrium.

The vagina, opening posterior to the cirrus pouch, appears as a thick-walled tube lined throughout with setae. The female genitalia are situated to the pore side of the segment, and consist of a small lobed ovary and of a large yolk-gland. As is the case for all the small species of this genus, the uterus is ephemeral, and the ova appear very soon in the parenchyma. Each segment contains only six capsules, 0·114 : 0·095 mm. in size, each capsule containing three to six very large eggs.

As will immediately be seen from the above description, this species is entirely aberrant from the type usually met with in this genus. However, the absence of hooks on the scolex, the unilateral genital pores, and the structure of the egg-capsules lead us to place this species in the genus *Inermicapsifer*, where we consider it as an anomaly.

11. *Inermicapsifer arvicanthidis* (Kofend, 1917).
(Figs. 21, 22, 23, 24.)

Hosts: *Mus moggi, Otomys iroratus.*
Localities: Buffelsdraai No. 48, Elandsfontein, Pretoria.
Coll. No. P. 134, 266.

In a preliminary report, Kofend (1917) described a species from *Arvicanthis testicularis kordofanensis* under the name of *Anoplocephala* (?) *arvicanthidis*, and without being able to assign it to any known genus. A more complete description is given in a subsequent paper (1921), and confirms our first idea, namely, that this species must be placed in the genus *Inermicapsifer*.

We have obtained two specimens from the above hosts which agree very closely with Kofend's description. There are, however, certain points of minor importance, it is true, which induce us to complete the above description.

Only one of our specimens, No. P. 134, was complete, and this measured 43 mm. in length. There appear to be about 130 segments.

These measurements are considerably smaller than those given by Kofend, but, as we will subsequently show, the dimensions of a single species are very variable. The transverse musculature, which is weakly developed, presents an interesting feature in that several of the fibres pass between the longitudinal muscle fibres. A similar disposition has already been figured by Beddard (1912) on page 601 for *Hyracotaenia hyracis* Beddard. Calcareous corpuscles are to be found throughout the entire parenchyma, although they appear to be more numerous in the cortical than in the medullary parenchyma.

With regard to the excretory vessels, we only find eight longitudinal vessels, whereas Kofend describes sixteen. This difference probably arises from the fact that our sections pass through fewer anastomoses, as this excretory system is similar to that described by Baylis (1915) in his description of *Zschokkeella muricola* Baylis.

The genitalia present the same dispositions as described by Kofend, with the slight difference that we find a single row of testes immediately behind the ovary. There are also only thirty to forty testes instead of fifty. The uterus appears as a transverse sack, soon breaking down into egg-capsules; these latter vary in number from ten to forty per segment and contain eight to twelve eggs each.

As we will show later, these slight differences do not constitute specific characters.

12. *Inermicapsifer hyracis* (Rudolphi, 1810).

Host: *Procavia capensis* Pall.

Localities: Fairfield No. 918, Mooivlei No. 144, Rooikrans No. 760, Rustenburg.

Coll. Nos. P. 47, 48, 111, 116, 117, 118, 465, 467, 468, 504, 506.

Several specimens of this species were collected from the Cape Hyrax, the longest of which measured 350 mm., being 4-5 mm. wide. As we will show subsequently, this is by far the most common species of the genus and also the species with the widest distribution.

13. *Inermicapsifer interpositus* Janicki, 1910.

Host: *Procavia capensis*, Pall.

Localities: Mooivlei No. 144, Rooikrans No. 760, Rustenburg.

Coll. Nos. P. 49, 116, 465.

This species, although not so frequent as the preceding one, is none the less well represented in the Transvaal.

14. *Inermicapsifer norhalli* Baer, 1924.

Host: *Procavia capensis* Pall.

Locality: Rooikrans No. 760, Rustenburg.

Coll. No. P. 118.

We have found this interesting species again in the Transvaal, and are able to add the following to our original description (1924, b.). The number of segments is slightly greater. We find twelve to fifteen instead of eight to nine and the number of capsules varies from sixteen to thirty. All the other details are identical.

15. *Inermicapsifer pagenstecheri* (Setti, 1897).

Host: *Procavia capensis*.

Locality: Rooikrans No. 760, Rustenburg.

Coll. Nos. P. 48, 49, 117, 118.

This species has only been collected from a single locality and seems to be much less frequent than either of the two above, i.e. *I. hyracis* and *I. interpositus*.

Critical Considerations on the Genus *Inermicapsifer* Janicki, 1910.

Having at our disposal a large amount of material from the Cape Hyrax, we have undertaken a re-examination of all the species of the genus *Inermicapsifer*. We have been fortunate in obtaining the loan of all the types of the species hitherto described together with more comparative material. This rich material has convinced us that the individual variation of a single species is extraordinarily great—greater, in fact, than it has ever been found in any other known genus of Cestodes—and that this specific variability has been the cause of endless confusion, rendering it almost impossible to distinguish one species from another.

Various attempts have been made to find sufficient characters which would make it possible to distinguish the genus **Zschokkeella* Ransom from the genus *Inermicapsifer* Janicki. Douthitt (1915) is inclined to place the two in one genus, whereas, on the other hand, Beddard (1912) and Meggitt (1921) are inclined to consider them as two separate genera, although the generic differences which they propose are not of much importance.

On examining the types of *Multicapsiferina linstowi* (Parona) we were immediately struck with one character that has already been the cause of much discussion without any definite result being arrived at, and that is the formation of the egg-capsules.

In the genus *Multicapsiferina* we find the following disposition: The uterus first appears as a transverse tube, which soon becomes filled with eggs. As soon as the first eggs begin to arrive within the uterus, the latter branches out in all directions, and this branching out is not caused by the increased pressure on the uterine wall—pressure caused by the increasing number of eggs—but seems to be the normal mode of development of this organ, thus scattering the ova throughout the parenchyma. At this point the uterus "breaks up," that is to say, a division appears between two consecutive eggs within the uterus, thus isolating each egg *singly* and leaving it in the parenchyma surrounded by a membrane derived from the deciduous uterus. This membrane forms the outer envelope of the egg, so that finally we have the same disposition as in the genera *Oochoristica* and *Linstowia*, where we find the ova scattered throughout the parenchyma and surrounded by an envelope derived from the uterus. We draw special attention to this last point, as here resides the difference between *Multicapsiferina* and *Inermicapsifer*. Whereas in the former genus we find the eggs embedded singly in the parenchyma and surrounded by an envelope derived from the uterus, in the latter genus we find the same disposition more highly differentiated. The single eggs collect in groups and are surrounded by a secondary formation derived from the parenchyma and forming a distinctive thick-walled capsule around each group of eggs. The formation of this parenchymatous capsule has been described in detail by Janicki (1910) for *I. hyracis* (Rudolphi).

The egg-capsules in *Inermicapsifer* extend laterally of the excretory vessels and fill the entire segment, whereas, in *Multicapsiferina*, this is not the case, the gravid segments thus presenting a very characteristic aspect (*vide* fig. 26).

---

* The name of this genus is now *Multicapsiferina* Fuhrmann (1921), as the name *Zschokkeella* is already occupied by a *Protozoon*.

It is clear that we are in the presence of two structures, of which we consider the disposition found in *Multicapsiferina* to be the most primitive one, the egg-capsule of *Inermicapsifer* being considered as derived from the former disposition.

From the foregoing it will immediately be seen that the only species presenting the primitive uterine capsules is *M. linstowi* (Parona). all the other species from the Hyrax and from rodents possessing the secondary egg-capsules.

There now arises the point whether this difference is sufficient to separate these two genera, which are otherwise anatomically identical.

A similar case occurs in the genus *Raillietina* Fuhrmann (1920), where we find the two sub-genera *Paroniella* Fuhrmann and *Ransomia* Fuhrmann distinguished from one another by this character. It must be admitted that from a practical standpoint this classification is extremely useful where a large number of species is concerned. However, we do not think it advisable to apply this method to our case, and prefer to unite the two genera rather than split them up into two sub-genera. We propose, therefore, to unite both these genera under the name *Inermicapsifer* Janicki, 1910, as the name of the latter genus has priority, since *Multicapsiferina* Fuhrmann was created as a new name in 1921.

A glance at fig. 25, a-k, will immediately bring out the extraordinary variation in size and shape of a single species. All the worms are from the same host and from the same locality, and are also all at the same stage of development and possess egg-capsules in the end segments. It will be seen that the state of extreme contraction is entirely different in aspect from that of extreme extension.

The size and shape of the scolex is also variable. At one time we may find a perfectly spherical scolex, and at another time we find in the same species a scolex with a rostellar-like structure presenting a totally different aspect. We have met with this variation in shape and size of the scolex in nearly all the species examined, and that is why we do not consider this character of specific value.

Throughout the genus the suckers are located beneath the surface of the scolex, and may, when particularly contracted, present that funnel-like aspect which was considered by Janicki as characteristic of the genus.

From the above, we conclude that size and shape are of no use whatever in distinguishing one species from the other, except, of course, when the length of the worm is considerable, as is the case for *I. hyracis* and for *I. guineensis*, for instance. It is, therefore, necessary to revert to internal anatomical structures to find characters which will permit us to distinguish the species from one another.

Here again considerable variation is met with, which has been the cause of much confusion, rendering it almost impossible to distinguish one species from another. The excretory system consists of the usual four longitudinal vessels, of which the two dorsal ones are much smaller, and are situated dorsally and laterally to the ventral vessels. This system is connected in the lateral fields by a network of fine capillaries (*vide* fig. 27), and in the median field by a system of secondary vessels. This disposition has been well figured by Baylis (1915), and has also been mentioned by Kofend (1921), although the latter author's interpretation of sixteen longitudinal vessels is caused by having mistaken the numerous secondary

anastomoses as passing through the whole length of the strobila. From what we have been able to observe, we conclude that this complicated excretory system is more or less visible or well developed in the different species, and varies slightly from one species to another, just like the variation of the excretory system in the genus *Diphyllobothrium* Cobbold.

The musculature varies very slightly, if at all, from one species to another. The longitudinal muscles hardly ever show any differentiation into distinct layers. The muscle fibres, forming now and again irregular bundles, are distributed throughout the entire cortical parenchyma. The transverse muscles are usually weakly developed, whereas the dorso-ventral fibres are numerous.

Of the genitalia, we will first of all consider the female organs, and of these we will begin with by far the most important organ, namely, the uterus, which has already been the object of much study, and the presence of which has even been contested by certain authors for their species.

Let us first consider the uterus of *I. hyracis*, of which a thorough description has been given by Janicki (1910).

As is usually the case for all Cestodes attaining a certain length and having a large number of segments, the genitalia develop slowly, so that the various stages of development of the uterus from its formation to its dissolution may easily be followed. If, now, we go to the other extreme and consider *I. norhalli*, which, it will be remembered, is the smallest member of the genus, we find no uterus whatever! The ovary seems to dissolve, leaving the ova scattered throughout the parenchyma. Although no uterus is visible, we are justified from the foregoing to conclude that a uterus is present only at a stage in the development of the worm which has escaped our notice, and that is why we term such a uterus as ephemeral.

Between these two extremes are to be found all the intermediate stages, although it must be admitted that in the small species it is sometimes extremely difficult to make out the uterus.

When studying the variation in the number of egg-capsules we were astonished to find that what has been considered as a specific character is of no value whatever. As we will show when discussing each species separately, the maximum variation encountered was in *I. hyracis*, where we have found in a single species a variation of 80 to 300 capsules per segment! We have every reason to believe that this worm was complete and had not lost any of its segments, as the following will bear out. Contrary to what might be expected, when an entire worm is examined under the microscope, the smallest number of egg-capsules is generally found in the *last* segment. In other words, the first gravid segment does not usually contain the greatest number of egg-capsules. It is clear that a later division of these capsules, as has been proposed by Southwell and Maplestone (1921), cannot take place, the structure of the capsule itself rendering such a procedure impossible. What we must admit is, that as the worm grows longer the number of capsules formed increases, and the longer the worm the greater variation in the number of egg-capsules. This is also borne out by *I. guineensis*, where we have found a variation of 30 to 130 capsules per segment.

As we have observed, this variation in the greater part of the species examined, we do not consider this character as possessing any specific value whatever.

The number of embryos per capsule remains fairly constant, the limits observed being seven to twelve, and hardly vary from one species to another. The structure of the ovary and of the yolk-gland does not present any particularities. The latter is always dorsal to the former, which is situated more or less to the pore side of the segment. The ovary is a simple lobed mass, the lobes being more pronounced in certain cases and giving rise to the aspect which has been called " ovary double " (Meggitt, 1921). The vagina is always a thick-walled tube lined with setae, and usually forming at its distal end a fairly distinct receptaculum seminis.

Our material has furnished us with the proof that the most constant characters of specific value are to be found in the male genitalia, although these also are not exempt from variation. The most constant character that we have come across is the position of the genital pore and the position occupied by the cirrus pouch within the segment. We have examined many entire worms of different species, and find that within a very small limit the genital pore always occupies the same position. Certain authors state to have found a distinct genital papilla, which they consider as a specific character. However, this papilla is nothing more than the everted genital atrium, as has already been described by Zschokke (1889) in certain species of *Anoplocephala*.

The cirrus pouch is never well developed, except, perhaps, in *I. norhalli*, and is usually pear-shaped, never reaching as far as the nerve. The position of the pouch in the segment is very characteristic, and does not vary as the latter expands or contracts. The cirrus pouch always contains a small blunt cirrus, the latter never being armed, and also a few loose coils of the vas deferens. These coils may become distended with spermatozoa, and replace functionally a vesicula seminis interna, but this organ is not preformed, and a same individual may present this dilatation of the vas deferens or may show no trace of it whatever. Outside the cirrus pouch the vas deferens usually forms more or less numerous coils before joining the testes.

The testes, although subject to a certain variation, can be grouped according to three distinct types, as has already been proposed by Bischoff (1913). In the first type we find the testes throughout the entire segment and occupying the dorsal surface of the latter, there being no testes immediately above the genital organs. The characteristic of this type, which will in future be referred to as the " pagenstecheri " type, is that we find testes on the pore side anterior to the female genitalia.

In the second type, referred to as the " hyracis " type, the testes extend right across the segment, and are never found anterior to the female genitalia on the pore side. This type contains the majority of the species.

The third type only contains a single species, and is referred to as the " settii " type. The testes form two distinctly separated groups, no testes ever being found between them. We insist on the fact that there are *always* two *distinct* groups.

I. aberratus forms a type by itself, but, as we have already mentioned above, we consider this species as an anomaly.

Having thus briefly summed up the variation of the principal characters, we will apply our conclusions to a discussion of the species.

Inermicapsifer apospasmation Bischoff, 1912.

Synonym: *Inermicapsifer parvulus* Bischoff, 1912.

Hosts: *Heterohyrax brucei, Heterohyrax* sp.
Localities: Abyssinia, Rikwa Lake.
Described and figured by Bischoff (1913).

I. parvulus is supposed to differ from this species in that the testes are not situated as far anterior in the segment as in the latter. We have, however, found both these dispositions in the same individual, showing the inconstancy of such a character. The number of testes varies from twenty to thirty-six per segment.

The egg-capsules vary from twelve to thirty-four per segment.

Inermicapsifer guineensis (Graham, 1908). (Fig. 27.)
Synonyms: *Davainea guineensis* Graham, 1908.
Thysanosoma gambianum Beddard, 1911.
Thysanotaenia gambianum Beddard, 1911.
Zschokkeella gambianum Beddard, 1912.
Zschokkeella muricola Baylis, 1915.
Inermicapsifer zanzibarensis Meggitt, 1921.
Zschokkeella guineensis Southwell and Maplestone, 1921.
Inermicapsifer guineensis mihi.

Hosts: *Cricetomys gambianum, Epimys rattus, Mus damarensis.*
Localities: Gold Coast, Angola, Zanzibar.
Described and figured by Baylis (1915) and by Meggitt (1921).

Southwell and Maplestone (1921) have gone into the synonymy of the above species, and were also the first to draw attention to the fact that this species had already been described by Graham in Simpson's report (1908). We have been able to examine all the types of the above species as well as an abundance of material from Accra. The study of this material brings us to the same conclusions as the above authors. We find a variation of 30 to 130 for the egg-capsules, 70 to 130 for the testes, and 7 to 12 for the number of embryos per capsule.

In his description of *Zschokkeella muricola*, Baylis states that he has found as many as twenty embryo per capsule. We have examined the types, and at the time confirmed this statement. However, on cutting sections of the co-type material, we found that this large number was due to masses of dark-staining nuclei contained within the capsule and presenting the aspect of embryos. We have also found these masses of nuclei in other species, and are at a loss to account for their presence or their utility within the capsule.

Inermicapsifer hyracis (Rudolphi, 1810).

Synonyms: *Taenia hyracis* Rudolphi, 1810.
Arhynchotaenia critica Pagenstecher, 1878 (nec Setti, 1891).
Anoplocephala hyracis Rudolphi (Moniez), e.p., 1891.
Taenia (*Anoplocephala*) *ragazzii* Setti, 1891.

Anoplocephala hyracis Rudolphi, var. *hepatica* Nassonow, 1897, e.p.
Inermicapsifer hyracis Janicki, 1910.
Inermicapsifer capensis Beddard, 1912.
Hyracotaenia hyracis Beddard, 1912.
Zschokkeella hyracis, Beddard, 1912.
Inermicapsifer hyracis Meggitt, 1921.
Zschokkeella capensis Meggitt, 1921.

Hosts: *Procavia capensis*, *Procavia syriacus*, *Procavia* sp.
Localities: Abyssinia, Jequina, Transvaal, Chamis, London Zoo (origin ?).
Described and figured by Janicki (1910).

To the above description we add the following variations:— Testes 90 to 140; egg-capsules 80 to 300.

In a paper of thirty-one pages Beddard (1912) has actually succeeded in placing this species in three different genera, considering it as two different species. In view of such inaccuracies, it would be useless to attempt an analysis of his paper.

We have been able to examine the type material of *I. capensis*, and find on the sections that there is a distinct group of testes forming a bridge uniting the two distinct groups described by Beddard. We have, on the other hand, found in specimens of *I. hyracis* certain segments in which the testes were situated in two groups without any bridge uniting them, and that is why we consider *I. capensis* as a synonym of *I. hyracis*.

The types of *Hyracotaenia hyracis* have, unfortunately, been lost, but from Beddard's description we gather that this species is nothing more than an immature specimen of *I. hyracis*. And this view is confirmed by Beddard himself, who states that he never found embryos in the last segments, but only eggs. As to the other characters, such as a network of vasa efferentia, this can also be observed in *I. hyracis* as well as in other species of this genus. We will not criticize Beddard's lengthy description relating to the formation of the uterus. A glance through the literature will show the confusion which has resulted therefrom, as the last three of the above synonyms bear out.

Inermicapsifer interpositus Janicki, 1910.
Synonyms: *Inermicapsifer abyssinicus* Bischoff, 1912.
Inermicapsifer interpositus Janicki, var. *sinaitica* Bischoff, 1912.

Hosts: *Procavia syriaca*, *Procavia capensis*, *Procavia* sp.
Localities: Sinai, Erythrea, Abyssinia, Transvaal, Chamis.
Described and figured by Janicki (1910).

The specific differences put forward by Bischoff in order to distinguish his species and his variety from the above species are totally insufficient in the present light, these differences consisting in the number of testes and of the egg-capsules.

The greatest variation observed for the egg-capsules is 25-80. The testes vary from 50-80.

Inermicapsifer lopas Bischoff, 1912. (Fig. 25.)
Host: *Procavia brucei*, *Procavia* sp.
Localities: Rikwa Lake, Dodoma.
Described and figured by Bischoff (1913).

This species bears a certain resemblance to *I. settii*, from which it can, however, be immediately distinguished by the disposition of the testes, which are not situated in two distinct groups in this species. The polymorphisim of this species has already been figured above.

The testes vary from 40 to 50 and the egg-capsules from 12 to 23.

Inermicapsifer pagenstecheri (Setti, 1897).

Synonyms: *Anoplocephala pagenstecheri* Setti, 1879.
Inermicapsifer pagenstecheri Janicki, 1910.
Hyracotaenia procaviae Beddard, 1912.
Inermicapsifer paronae Bischoff, 1912.

Hosts: *Procavia capensis*, *Heterohyrax brucei*, *Heterohyrax* sp.
Localities: Erythrea, Jequina, Rikwa Lake, London Zoo (origin ?).
Described by Janicki (1910), figured by Bischoff (1913).

From examination of the types and co-types we find that these three species are identical.

Bischoff (1913) distinguishes his species from *I. pagenstecheri* in that it is somewhat smaller and contains fewer egg-capsules. This we have already seen is not a specific difference.

Beddard (1912), as already stated above, did not have a mature worm with gravid segments before him, and so never could have seen the egg-capsules.

The testes vary from 120 to 180 and the egg-capsules from 30 to 100.

Inermicapsifer prionodes Bischoff, 1912.

Synonym: *Inermicapsifer prionodes*, var. *intermedia* Bischoff, 1912.
Hosts: *Heterohyrax brucei*, *Heterohyrax* sp.
Localities: Rikwa Lake, Msala, Dodoma.
Described and figured by Bischoff (1913).

For the reasons already given above, the variety created by Bischoff is a fairly common variation which comes to light when more material is examined.

The number of egg-capsules varies from 22 to 40 and that of the testes from 40 to 50.

Inermicapsifer settii Janicki, 1910.
Host: *Procavia capensis*.
Locality: Chamis.
Described and figured by Janicki, 1910.

We have nothing to add to the above excellent description except for the number of egg-capsules. We find eight to twenty-five of these as compared to the twenty of Janicki.

Vevers (1922) described this species from the London Zoo. We have, however, examined the slides, and find them to be *I. pagenstecheri*.

This species seems to be extremely localized, and has never yet been recorded from any other locality than the above.

There now remain two species which have been assigned to the genus *Inermicapsifer*, and whose position has never been established, viz., *I.* sp. Janicki, 1910, and *I. gondokorensis* (Klaptocz, 1906).

All that is known about these two species is the size and shape of the head and strobila. It seems little short of absurd to maintain these two names among the species of *Inermicapsifer*, as it is more than probable that their identity will never be known. We therefore propose to strike these two names off the list of species hitherto described.

Until the material of *Zschokkea remota* v. Linstow, 1905, has been examined, this species must be considered as a *Taenia* s.l. From the description no information of any importance can be gathered. However, from the general anatomy and disposition of the longitudinal musculature as drawn by v. Linstow one fact may be gathered, and that is, that this species has nothing in common with the genus *Inermicapsifer*.

The genus *Thysanotaenia* Beddard, 1911, should be maintained for the time being with the single species *Th. lemuris* Beddard, 1911. The anatomy of this species is sufficient to distinguish the genus from *Inermicapsifer*. The study of more material will show if this genus is valid or not.

If we take into consideration the foregoing, the following will be the diagnosis of the genus *Inermicapsifer*:—

Linstowinae of variable size and shape; the suckers are situated beneath the surface of the scolex; segments wider than long, the last segments may be square or trapezoidal in shape; excretory system consisting of four longitudinal vessels connected with one another through a more or less well-developed system of ramified secondary vessels; dorsal vessels, dorsal and lateral of ventral; genital pores unilateral; genital ducts pass between the excretory vessels and dorsal of the nerve; testes numerous, exceptionally less than ten; ovary lobed to pore side of segment; uterus a transverse sack soon breaking up into egg-capsules containing several eggs, or into uterine capsules containing a single egg. Adult in *Rodentia*, *Hyracoidea*, and *Galliformes*.

Type: *I. hyracis* Janicki, 1910.

The geographical distribution of the genus is extremely interesting, as it shows us that we are in the presence of a typical African parasite and also what we might call a specialized parasite—specialized with regard to its host.

Fuhrmann (1908) has shown that it is possible to establish the relationship between two groups of birds by their Cestode parasites. This has to our knowledge never been known to occur for Mammalian Cestodes, and in most cases does probably not exist. However, the genus *Inermicapsifer* may one day be shown to establish a certain relationship between the hyrax and rodents, and this fact is supported by the conclusion of Preiswerck (1895), who has studied the teeth of various mammals, and concludes that the Hyracoidea should, according to the structure of their teeth, be placed between the Rodentia and the Ungulata.

We find the genus *Inermicapsifer* in the hyrax and in rodents, and we find on the other hand the genus *Anoplocephala* in the hyrax and in ungulates. Time and further study will show if this is a coincidence or if this is a true case where the relationship of the mammalian hosts is established by their Cestode parasites.

KEY TO THE GENUS INERMICAPSIFER.

1.	Capsules in gravid segments contain a single egg	*I. linstowi* (Parona).
	Capsules in gravid segments contain several eggs	2
2.	Genital pores in anterior half of segment	*I. guineensis* (Graham).
	Genital pores in middle of segment	3
	Genital pores in posterior half of segment	7
3.	Testes on aporal side only	*I. aberratus* Baer.
	Testes extending throughout entire segment	4
4.	Worms exceeding 100 mm. in length, testes very numerous	*I. hyracis* (Rudolphi).
	Worms not exceeding 100 mm. in length, testes not very numerous	5
5.	Worms exceeding 40 mm. in length, about 40–50 testes	*I. arvicanthidis* (Kofend).
	Worms not exceeding 40 mm. in length	6
6.	About 20–36 testes per segment	*I. apospasmation* Bischoff.
	About 50–80 testes per segment	*I. interpositus* Janicki.
7.	Testes in two perfectly distinct groups	*I. settii* Janicki.
	Testes extending right across segment, and anterior of genitalia	8
	Testes extending right across segment, and not anterior of genitalia	9
8.	Very small worms, 27–30 testes	*I. norhalli* Baer.
	Moderate size worms, 120–180 testes	*I. pagenstecheri* (Setti).
9.	Testes extending in two to three rows right across segment	*I. prionodes* Bischoff.
	Testes extending across segment, forming two indistinct groups	*I. lopas* Bischoff.

List of the Species *Inermicapsifer* from Mammals.

Species.	Author.	Year.	Length. mm.	Width. mm.	Number of Testes.	Number of Capsules.	Number of Eggs per Capsule.	Host.	Distribution.
I. aberratus	N. sp.	—	13	0·6	6–7	6	3–6	*Mus moggi*	South Africa.
I. apospasmation	Bischoff	1912	7–18	1–3	20–36	12–34	5–10	*Heterohyrax brucei, H.* sp.	East Africa.
I. arvicanthidis	(Kofend)	1917	>70	2	30–50	10–50	11–13	*Arvicanthis testicularis, Mus moggi, Otomys irroratus*	Sudan, South Africa.
I. guineensis	(Graham)	1908	90–150	3·5–6	70–130	30–130	7–12	*Cricetomys gambianum, Mus damarensis, Epimys rattus*	East, South, and West Africa.
I. hyracis	(Rudolphi)	1810	350	2·4–3·5	90–140	80–300	4–6	*Procavia syriacus, P. capensis, P.* sp.	East, South, and West Africa.
I. interpositus	Janicki	1910	17–33	2·4–5	50–80	25–80	5–7	*Procavia syriacus, P.* sp.	East, South, and West Africa.
I. norhalli	Baer	1924	4–6	0·95	27–30	16–30	5–10	*Procavia capensis, P.* sp.	East and South Africa.
I. lopas	Bischoff	1912	10	1	40–50	12–23	5–10	*Heterohyrax brucei, P.* sp.	East Africa.
I. pagenstecheri	(Setti)	1897	15–70	3–4·5	120–180	30–100	5–10	*Procavia capensis, Heterohyrax brucei, P.* sp.	East Africa.
I. prionodes	Bischoff	1912	20	2·5	40–50	22–40	5–6	*Heterohyrax brucei, P.* sp.	East Africa.
I. settii	Janicki	1910	13–23	1·5–2	55	8–25	15	*Procavia capensis*	West Africa.

(*c*) *Avitellininae* Gough, 1911.

IX. *Avitellina* Gough, 1911.

16. *Avitellina centripunctata* (Rivolta, 1874).

Hosts: *Cephalophus grimmia* L., *Pediotragus sharpei* Thomas, *Oreotragus oreotragus* Bodd.

Localities: Fairfield No. 918, Hampton No. 768, Rooibok Kraal No. 739, Bridgewater No. 766, Rustenburg.

Coll. Nos. P. 4, 51, 83, 84, 102, 451, 857.

According to Gough (1908 and 1911) and to Veglia (1919), this species is one of the most common in sheep from South Africa. All the above hosts are new, this species having been recorded only once before to our knowledge from a wild animal (*vide* Baer, 1923).

Blei (1920) has described a new species of this genus to which he has given the name *A. laciniosa* Blei. This species, although much macerated, presents several differences with *A. centripunctata*; such as the presence of numerous calcareous corpuscles, the different shape of the par-uterine organ, and the fact that the end of the strobila is devoid of sexual organs. It seems to us that these differences denote that we are in the presence of a young individual, perhaps of *A. centripunctata*. However, as long as the material has not been re-examined, nothing definite can be said.

The geographical distribution of this genus is interesting. It has been found only once in India (imported ?), once in Italy (imported ?), and frequently in the whole of Africa. This distribution is almost identical with that of the closely allied genus *Stilesia*. We are, therefore, inclined to consider the sub-family *Avitellininae* as a typical group of the African helminth fauna. We are at a loss to explain the occurrence of *A. laciniosa* in Hungary. However, as long as we do not know anything about the origin of the sheep, it would be useless to speculate on the occurrence of this parasite.

Blei (1920) has also created a new genus, *Hexastiorchis* Blei, which he places in the above sub-family. It is, however, with the greatest caution that we accept this genus, which is not at all clearly defined from the genus *Avitellina*. We ourselves have found in specimens of *A. centripunctata* that the testes were sometimes arranged in six instead of four fields. The abnormal disposition of the excretory vessels may be due to an error of observation. However, no conclusions may be drawn from the description given by Blei as long as the type material has not been re-examined.

Species.	Author.	Year.	Length. m.	Width. mm	Scolex. mm.	Calcareous Corpuscles.	Host.	Distribution.
A. centripunctata	(Rivolta)	1874	2–3	1–5	1·5-2·8:1·5-3·1	Scarce	*Ovis aries*, *Bos* sp., *Capra hircus*, *Hippotragus equinus*, *Cephalophus grimmia*, *Pediotragus sharpei*, *Oreotragus oreotragus*	Algeria, Sudan, South Africa, India (?), Italy (?).
A. laciniosa...	Blei	1920	1–2	1	0·8 : 0·6	Abundant	*Ovis aries*.....	Hungary.

D. Dilepinidae Fuhrmann, 1907.

Dipylidiinae Stiles, 1896.

X. *Dipylidium* Leukart, 1863.

17. *Dipylidium caninum* (Linneus, 1758).

Hosts: *Proteles cristatus, Otocyon megalotis.*
Localities: Buffelspruit No. 253, Pretoria;
Rooipoort No. 325. Rustenburg.
Coll. Nos. P. 370, 685.

This species has already been reported from South Africa from dogs by Gough (1908) and by Veglia (1919), and also from a saddle-backed jackal (*Canis mesomelas*), not, however, without a certain doubt by the former author.

* * * * *

18. *Dipylidium fuhrmanni* n.sp.

(See page 100.)

* * * * *

In the following list *D. trinchesii* Railliet does not figure, as that species has been chosen as the type of a new genus by Skrjabin. (Private correspondence with Prof. Fuhrmann.)

Dypidilium genettae (Gervais), from *Genetta ludia,* is too badly known to be placed in the following list:—

List of the Species of *Dipylidium* from Mammals.

Species.	Author.	Year.	Length. mm.	Width. mm.	Number of Circlets on Rostellum.	Number of Testes.	Number of Embryo per Capsule.	Host.	Distribution.
D. zschokkei.....	Hungerbühler.....	1910	120	0·75	3	30	1	*Cynictis pencillata*.....	South Africa.
D. triseriale.....	Lühe.....	1898	25	1	3	?	1	*Viverra civetta, Genetta genetta*...	Tunis, India.
D. monoophorum.....	Lühe.....	1898	10	0·4	3	?	1	*Viverra civetta, Genetta genetta*...	Tunis, Algeria.
D. caninum.....	(Linneus).....	1758	150–400	1·5–4	3–4	100–200	5–20	*Homo sapiens, Canis* fam., *Thous aureus, T. mesomelas* (?), *Megalotis zerda, Otocyon megalotis, Proteles cristatus, Felis dom, F. maniculata*	Cosmopolitan.
D. dongolense...	Beddard.....	1913	5	1	4	?	1	*Genetta dongolana*.....	Dongola (London Zoo).
D. oerleyi.....	v. Rátz.....	1900	50–110	2	5	90–100	Several	*Felis dom*.....	Hungary, Spain, East Africa, India.
D. quinquecoronatum.	Rodriquez y Mûnoz.	1921	32–65	0·75	5	46–58	1	*Felis dom*.....	Spain.
D. sexcoronatum.....	v. Rátz.....	1900	100–235	1–1·5	6	130–140	2–15	*Canis* fam.....	Hungary, United States of America, South America.
D. walkeri.....	Sondhi.....	1923	100–280	1·5–2·5	6–7	225	1–15	*Canis* fam.....	Punjab.
D. gervaisii.....	Setti.....	1895	10–40	1	8–12	60–70	1	*Paradoxurus hermaphrodyta, Zibethailurus viverrina, Genetta tigrina, G. genetta*	North Africa, India.
D. rossicum.....	Skrjabin.....	1923	168	1·06	12–13	115	Several	*Canis* fam., *Felis dom*.....	Russia (Don district).
D. chyzeri.....	v. Rátz.....	1897	120–200	1·4–1·6	13–14	45–50	1	*Felis dom*.....	Hungary, Spain, Algeria, East Africa.
D. echinorhynchoides.	(Sonsino).....	1889	25	1	13–16	50	1	*Megalotis zerda, Vulpes alopex, Felis dom* (?)	North Africa.
D. fuhrmanni...	N. sp.....	—	30	1·6	14–16	40–50	1	*Zibethailurus serval, Felis caffra, Canis lupus*	South Africa.
D. pasqualei.....	Diamare.....	1893	200–300	2–3·1	16	50	1	*Felis dom*.....	Egypt, Spain.

18. *Dipylidium fuhrmanni*, n.sp.
(Figs. 28, 29.)

Hosts: *Zibethailurus serval*, Schreb., *Felis caffra* A. Smith.
Localities: Fairfield No. 918, Mooivlei, Rustenburg; Blokspruit No. 451, Pretoria.

Coll. Nos. P. 10, 16, 22, 25, 276.

Several specimens were obtained from the above hosts, and do not at first sight present the typical aspect of this genus as the greater part of the segments are broader than long.

The greatest length is 30 mm. and the maximum width of 1·6 mm. is attained at about half the length of the strobila. There are altogether from 180 to 200 segments, of which the widest measure 0·3 mm. in length. Only the last ten segments are longer than broad, and measure 2·1 mm. in length and 0·9 mm. in width.

The scolex is 0·24 mm. wide, the four prominent suckers being 0·2 mm. in diameter. The rostellum is 0·23 mm. long and 0·1 mm. in diameter; it is armed with fourteen to sixteen alternating circlets of rosethorn-shaped hooks. The hooks of the most anterior circlet are provided with a basal plate 13μ long and 6μ wide; the hook itself is 8μ high. The hooks become gradually smaller as they near the base of the rostellum.

The scolex presents an interesting feature, which we have seen figured, although never described, in certain other species. When fully protruded the rostellum has an acorn-like aspect due to the presence of a kind of secondary rostellum, larger than the rostellum proper, and surrounding the latter, thus forming the cup of the acorn (fig. 28c). As the rostellum recedes it first withdraws inside the cup of the acorn (fig. 28b), and finally the cup also withdraws closing hermetically the opening (fig. 28a), as it were, to protect the rostellum.

Behind the scolex there is a short "neck" 0·3 mm. in length. The cuticula is 8μ thick, and immediately beneath the latter is a layer of longitudinal muscles consisting of stout isolated fibres. The sub-cuticular cell layer is very distinct.

In the parenchyma we find the usual disposition of the muscles. The longitudinal muscles form a layer 0·2 mm. thick, consisting of irregular bundles of fifteen to twenty fibres each; towards the periphery isolated fibres are to be found. The transverse muscles appear as three to four stout fibres. The dorso-ventral muscles are barely visible. Calcareous corpuscles are scarce, and are inclined to concentrate in the lateral fields of the medullary parenchyma; they are egg-shaped and measure 8 : 5μ.

The excretory system presents the usual disposition. The ventral vessels are 0·05 mm. in diameter and the dorsal vessels 0·01 mm. in diameter; these latter are very soon obliterated by the growing genitalia. The primordalia of the latter appear in about the twenty-sixth segment, and very soon attain their sexual maturity. The testes are very large. They are spherical and measure 0·07 mm. in diameter. They are situated in two to three layers, chiefly in the posterior region of the medullary parenchyma, and never extend anteriorly beyond the coils of the vasa deferentia. In certain cases there may be one or two testes immediately dorsal to the ovary and yolk-gland. There are altogether forty to fifty testes. The vasa

deferentia are extremely coiled, and form two masses of coils in the anterior part of the segment. The whole course of the vas deferens is surrounded with so-called "prostate" glands. Within the cirrus pouch the vas deferens describes several coils opening finally into an extraordinarily long thin cirrus. The latter is 0·3 mm. in length and 0·02 mm. in diameter. The cirrus pouch is fairly muscular, the wall being about 4μ thick, and is only 0·25 mm. in length and 0·05 mm. in diameter. As will at once be seen from the above measurements, the cirrus is longer than the cirrus pouch, and that is why it is pleated like a concertina, so as to be able to fit inside the pouch. The cirrus pouch is situated in rather a peculiar position, its distal portion being in the anterior part of the segment; the genital pores are situated in the anterior third of the border of the segment.

The vagina opens posteriorly to the cirrus pouch, and is a fairly thin walled tube forming a well-developed receptaculum seminis in its distal portion, and situated deep in the lobes of the ovary. The latter, fan-shaped and irregularly lobed, is situated immediately behind the cirrus pouch and touching the latter. On transverse sections the ovary is seen to occupy nearly all the dorso-ventral space of the medullary parenchyma. The yolk-gland forms a compact mass immediately behind the ovary, and is situated somewhat asymmetrically to the latter. The uterine capsules are 42 to 46μ in diameter, and contain a single embryo. They are situated entirely within the limits of the excretory vessels, and are inclined to concentrate in the posterior region of the segment.

This species is probably identical with *Dipylidium* sp. Kofend, 1917, and also bears certain analogies to *D. echinorhyncoides* (Sonsino), although it differs from the latter in several anatomical details, as we have been able to observe when comparing the two species. There are also certain affinities with *D. gervaisii* Setti. In this species the ovaries and yolk-glands are of a different structure, and also the uterine capsules pass into the cortical parenchyma beyond the longitudinal excretory vessels. Beddard (1913) has described a species, *D. dongolense*, from a Dongolan genett. His description is, however, insufficient to permit us to compare that species with ours.

E. Hymenolepinidae Fuhrmann, 1907.

XI. *Hymenolepis* Weinland, 1858.

19. *Hymenolepis macroscelidarum*, n.sp.

(Figs. 30, 31, 32.)

Host: *Macroscelides brachyrhynchus* A. Smith.
Locality: Buffelspruit No. 253, Jericho, Pretoria.
Coll. No. P. 377.

A single specimen of this worm was obtained from an elephant shrew. The length is 34 mm., and the greatest width 1·7 mm.; there are about 600 segments, all being wider than long.

The scolex is 0·23 mm. in diameter, and bears a well-developed rostellum 0·05 mm. in diameter. The latter is armed with a single circlet of twenty hooks. These hooks are characterized by having a very long handle and a long guard. The base of the hooks, measured in a straight line from the tip of the handle to the tip of the guard,

is 21μ long. The blade is short, with a fairly long, narrow point, the latter being almost parallel to the guard. As it curves towards its base it widens out, attaining its greatest width at the juncture of the handle with the guard. The length of the hook, measured from the tip of the blade to the tip of the handle, is 19μ.

The suckers are spherical, 0·08 mm. in diameter. Immediately behind the head the strobila is 0·19 mm. wide, the segments being 8μ in length. The last thirty segments are somewhat narrower, measuring 1 mm. in width and 0·03 mm. in length.

The musculature is well developed. The longitudinal muscles are arranged in two layers, of which the inner layer is formed by bundles of stout fibres, there being about three to five fibres per bundle. The outer layer is also composed of bundles nearly six times more numerous than the former. These bundles also contain three to five fibres each. The transverse as well as the dorso-ventral muscles are very weakly developed.

The calcareous corpuscles, about 5μ in diameter, are to be found in abundance throughout the entire parenchyma.

The dorsal excretory vessels are 11μ in diameter, and are situated dorsally to the ventral vessels; the latter are nearly three times as large as the former, and measure on cross-section 26μ in diameter.

The position of the testes is that most frequently found, namely, two testes on the aporal side and one on the poral side of the segment. The vas deferens forms, just before entering the cirrus pouch, a large vesicula seminis, which opens into the latter through a small canal which is doubled up dorso-ventrally. The cirrus pouch is spindle-shaped, measuring 0·133 mm. in length, and has a fairly thin muscular wall. It contains a large vesicula seminis interna 0·1 mm. long. The cirrus is 34μ long and about 4μ in diameter. It does not bear any spines.

The genital cloaca is provided at its orifice with a powerful sphincter muscle.

The vagina is ventral to the cirrus pouch, and very soon dilates to form an enormous receptaculum seminis. The ovary is situated ventrally, and measures on cross-section 0·114 mm. in width. The yolk-gland is situated behind and dorsal to the former, and measures 0·03 mm. in diameter. The gravid uterus fills the entire segment. The outer shell of the embryo measures 36μ in diameter, the embryo itself being 22μ in diameter. The hooks of the latter are 19μ in length. The shape and size of the hooks, as well as their number, are sufficient to distinguish this species from all the other species of *Hymenolepis* found in mammals.

20. *Hymenolepis* sp.

Host: *Tatera lobengulae* De Winton.
Locality: Elandsfontein No. 204, Pretoria.
Coll. No. P. 136.

Unfortunately, there are only a few badly preserved fragments of this worm, which we have been unable to refer to any known species of *Hymenolepis*, as the scolex is missing, and as the anatomy does not present any salient features.

List of the Species of *Hymenolepis* from Mammals.

Species.	Author.	Year.	Sexes.	Number of Hooks.	Size of Hooks. μ	Length. mm.	Width. mm.	Host.	Distribution.
H. peramelidarum	Nybelin	1917	Armed	44–46	100	60–130	1·5–2	*Peragale macrura*	Australia.
H. decipiens	(Diesing)	1850	Armed	44–46	23	50	1·3	*Chilonycteris rubiginosa, Promops abrasus*	South America.
H. acuta	(Rudolphi)	1819	Armed	38–42	39	64	1·6	*Pterygistes noctula, Vespertilio nattesii*	Europe.
H. bacillaris	(Goeze)	1782	Armed	36	20	150	1·5	*Talpa europaea, Scalops aquaticus*	Europe, North America.
H. tiara	(Dujardin)	1845	Armed	30–32	22–26	3·5·5	0·3–0·5	*Sorex araneus*	Europe.
H. microstoma	(Dujardin)	1845	Armed	30	11	162	0·3–2·1	*Mus musculus, Epimys rattus, E. norvegicus*	Europe.
H. contracta	Janicki	1904	Armed	28	?	25	1·9	*Mus musculus*	Europe.
H. criceti	Janicki	1904	Armed	24	16	Fragments	0·44	*Cricetus cricetus*	Europe.
H. furcata	(Stieda)	1862	Armed	22–28	24	?	?	*Sorex araneus*	Europe.
H. nana	(v. Siebold)	1853	Armed	22–27	16–20	25–40	0·6–0·9	*Homo sapiens*	Cosmopolitan.
H. fraterna	Stiles	1906	Armed	22–24	18–24	20	0·55–0·9	*Mus musculus, M. sylvaticus, M. decumanus, Micromys minutus, M. agraricus, Eliomys quercinus, Epimys rattus, E. norvegicus*	Cosmopolitan.
H. longior	Baylis	1922	Armed	21–22	19–20	45–60	0·4–0·7	*Epimys rattus*	Europe.
H. pistillum	(Dujardin)	1845	Armed	20–22	10	1·5–2	0·08–0·3	*Sorex araneus*	Europe.
H. muris-variegati	Janicki	1904	Armed	20	105	5–6	0·34	*Arvicanth s niloticus*	South Africa.
H. macroscelidarum	N. sp.	—	Armed	20	19	34	1·7	*Macroscelides brachyrhynchus*	South Africa.
H. erinacei	(Gmelin)	1790	Armed	20	17	110–160	1·9	*Erinaceus* sp., *E. europaeus*	Europe.
H. inexpectata	Cholodkovski	1912	Armed	20	17	40	0·7	*Mus decumanus*	Europe.
H. spinulosa	Cholodkovski	1906	Armed	18–20	34	20–30	0·8	*Sorex araneus*	Asia.
H. uncinata	(Stieda)	1862	Armed	18–20	17–20	?	?	*Sorex araneus*	Europe.
H. chrysochloridis	Janicki	1904	Armed	16–18	29	Fragments	0·6	*Chrysochloris aurea*	South Africa.
H. scalaris	(Dujardin)	1845	Armed	12–13	26–33	3·5–5	0·3–0·5	*Sorex araneus*	Europe.
H. jackobsoni	v. Linstow	1907	Armed	10	21	34	1·2	*Pachyura murina*	Asia.
H. evaginata	Barker and Andrews	1915	Armed	10	7	200–400	2–3	*Fiber zibethicus*	North America.
H. singularis	Cholodkovski	1912	Armed	10	—	7	0·25	*Sorex* sp.	Europe.
H. octocoronata	v. Linstow	1879	Armed	8	62	81	0·9	*Myocastor coypus*	South America.
H. straminea	(Goeze)	1782	Armed	?	14	120	1·4	*Cricetus ericetus*	Asia.
H. diminuta	(Rudolphi)	1819	Unarmed	—	—	200–600	3·5	*Mus musculus, M. decumanus, Epimys rattus, Homo sapiens, Thomasomys pyrrhonotus*	Cosmopolitan.

LIST OF THE SPECIES OF *Hymenolepis* FROM MAMMALS—(*Continued*).

Species.	Author.	Year.	Scolex.	Number of Hooks.	Size of Hooks.	Length.	Width.	Host.	Distribution.
					μ	mm.	mm.		
H. diminutoides	Cholodkovski	1912	Unarmed	—	—	200–600	3·5	*Microtus agrestis*	Europe.
H. cebidarum	Baer	1924	Unarmed	—	—	180–220	2·5	*Callithrix nigrifrons*	South America.
H. megaloon	v. Linstow	1901	Unarmed	—	—	155	1·7–2·7	*Citellus* sp.	Asia.
H. horrida	v. Linstow	1900	Unarmed	—	—	80	2·1	*Mus decumanus*	Europe.
H. arvicolina	Cholodkovski	1912	Unarmed	—	—	40	1	*Microtus agrestis*	Europe.
H. myoxi	(Rudolphi)	1819	Unarmed	—	—	35	1	*Myoxus glis, M. nitedula*	Europe.
H. steudneri	Janicki	1904	Unarmed	—	—	33	0·9	*Erinaceus europaeus*	Europe.
H. procera	Janicki	1904	Unarmed	—	—	28–40	1·2–2	*Arvicola terrestris*	Europe.
H. relicta	(Zschokke)	1887	Unarmed	—	—	25–40	0·3	*Mus decumanus*	Europe.
H. diaphana	Cholodkovski	1906	Unarmed	—	—	2–3	0·23	*Sorex araneus*	Europe.
H. moniezii	Parona	1893	Unarmed	—	—	?	?	*Pteropus medius*	Asia.
H. sciurina	Cholodkovski	1912	?	?	?	50–100	1·5	*Sciurus vulgaris*	Europe.
H. crassa	Janicki	1904	?	?	?	70	1·3	*Chrysochloris aurea*	South Africa.
H. asymetrica	Janicki	1904	?	?	?	60	4	*Microtus agrestis*	Europe.
H. capensis	Janicki	1904	?	?	?	Fragments	1·2	*Chrysochloris aurea*	South Africa.
H. barroisii	(Moniez)	1880	?	?	?	—	—	*Talpa europaea*	Europe.

F. TAENIIDAE Perrier, 1897, e.p.

XII. *Taenia* Linneus, 1758.

21. *Taenia hyaenae*, n.sp.
(Figs. 42, 43.)

Host: *Hyaena brunea* Thumb.
Locality: Mooivlei No. 144, Rustenburg.
Coll. No. P. 483.

The length of this species is 300 mm. and the greatest width 8 mm. The scolex is 1·2 mm. in diameter, and is provided with large suckers 0·4 mm. in diameter. The rostellum is 0·5 mm. in diameter, and is armed with a double circlet of thirty-two to thirty-eight powerful hooks. The large hooks are 223μ in length, with a base of 147μ. The handle is long, and, viewed from the side, the edges appear almost parallel, terminating in a blunt point. The blade is strongly curved, and the guard is heart-shaped. The small hooks are 127μ long, with a base of only 83μ. The handle is short, and terminates in a blunt point which has a tendency to curve upwards. The curvature of the blade is slight, and the guard, seen from above, presents the aspect shown in fig. 42.

Behind the scolex there is a distinct "neck" 0·8 mm. long. There are about 150 segments, of which only the last ones are longer than broad. The latter measure 5 to 8 : 4 to 5 mm.

The longitudinal muscles are evenly distributed throughout the whole of the cortical parenchyma, showing, however, immediately outside the transverse muscles, a tendency to form bundles of eight to eleven fibres each. The transverse and dorso-ventral muscles are very well developed. The calcareous corpuscles are not very numerous, and are found throughout the entire parenchyma. They measure 17 : 13μ.

The genital pores are situated in the posterior half of the segment. The genital ducts pass between the excretory vessels and ventrally to the nerve. There are about 300 testes, occupying the entire medullary parenchyma, leaving only a clear space around the female genitalia. There is no vesicula seminis, but the vas deferens is extremely coiled. The cirrus pouch is 0·4 mm. long.

The vagina opening posterior to the cirrus pouch does not cross the ovary, and forms a distinct receptaculum seminis in its distal portion.

The gravid uterus has from twelve to fourteen lateral branches, although in certain abnormal cases these branches subdivide, forming twenty to twenty-four lateral branches. The embryophores measure 34 : 29μ, the shell being about 4μ thick.

22. *Taenia parva*, n.sp.
(Figs. 33, 34, 35, 36, 37, 38, 39, 40, 41.)

Host: *Genetta ludia*.
Localities: Buffelspruit No. 253, Pretoria;
Rooikrans No. 760, Fairfield, Rustenburg.
Coll. Nos. P. 55, 59, 60, 63, 67, 82, 114, 187, 189.

A large number of specimens of this curious worm was collected from a small spotted genett. The general appearance leaves the impression of an exceedingly muscular strobila, and the firm consistency of the latter confirms this view.

The longest specimen is only 55 mm. in length, and is to our knowledge the smallest *Taenia* s.str. ever described. There are about eighty segments. All except the last two or three are broader than long. Immediately behind the head is to be found a short " neck " 0·2 mm. long and about 1·6 mm. wide. The maximum breadth is attained in about the sixtieth segment, which is 3·2 mm. wide and 0·3 mm. long; the last segments are 2 mm. wide and 2·5 mm. long. The scolex measures 1 mm. in diameter, and the suckers 0·2 mm. respectively. The powerful rostellum on horizontal sections is 0·6 mm. in diameter. It is armed with a double circlet of forty-four hooks. The large hooks are 361μ in length with a base measuring 228μ. The curvature of the blade is not very pronounced, and the guard presents a small protuberance. The handle has a slight upward curve towards its distal extremity. The small hooks are 228μ in length, the base measuring 141μ. The curvature of the blade is more pronounced than that of the large hooks, and the distal portion of the handle does not show the same tendency to curve upwards.

The cuticula is extraordinarily thick, measuring as much as 29μ in thickness. Immediately beneath the cuticula we find one to two layers of circular muscles, and beneath the latter are to be found two to three layers of longitudinal muscles. These sub-cuticular muscles consist of stout isolated fibres 1·6μ in diameter. The sub-cuticular cell layer is very distinct, being 50μ wide. The musculature of the parenchyma is extraordinarily well developed, as a glance at the photo-micrographs will show. The longitudinal muscles are disposed in two layers. The external layer is composed of bundles of twenty-seven to thirty fibres each, and immediately beneath the latter we find the internal layer, which is even more powerful, being constituted by bundles of thirty-six to thirty-eight fibres each. In the lateral fields of the cortical parenchyma these two muscle layers adopt the curious disposition as shown in the photo-micrographs. Internal to the longitudinal muscle layers is to be found a very powerful layer of transverse muscles. This layer is 0·07 mm. wide, and in the lateral fields passes in between the longitudinal muscle bundles. The dorso-ventral muscles are very numerous though fine. Calcareous corpuscles are very abundant throughout the entire parenchyma, and are even to be found directly beneath the cuticula. They are large and measure 19 : 15μ.

The main longitudinal nerve stems are very distinct, and measure on transverse sections 95 : 38μ. The two secondary nerves are also exceptionally distinct and measure 19μ in diameter.

The ventral excretory vessels are lined with a thin cuticula, and are about 120μ in diameter. The dorsal vessels are about six times smaller than the ventral, and are lined with a thicker cuticula. The latter is probably derived from the dark-staining layer of cells surrounding the dorsal vessels, and also visible, to a lesser extent, however, around the ventral vessels.

There are about 500 testes in each segment, and the latter are situated in two to three layers on the dorsal surface of the segment, there being no testes immediately dorsal to the female genitalia. The dorso-ventral diameter of a testes is 0·1 mm. The vasa efferentia arise immediatelv behind the ovary, and unite to form the vas deferens without forming a vesicula seminis as is found in certain species (*vide* Hall, 1919). The vas deferens is extremely

coiled, and is surrounded on its entire course by a layer of dark-staining cells presenting exactly the same aspect as the so-called " prostatic " cells of most authors. The vas deferens opens into an extraordinarily long cirrus pouch, within which it forms a few loose coils before forming the cirrus proper. The cirrus pouch is 0·44 mm. in length and 0·08 mm. in diameter, and reaches far beyond the nerve and excretory vessels, passing ventrally to these last three organs. The wall of the pouch consists chiefly of longitudinal muscles, forming in the distal portion of the pouch two powerful retractors ' embedding themselves in the transverse musculature. These two retractors are only to be found in the dorso-ventral plane, and have already been described by Fuhrmann (1922) for *Taenia antarctica* Fuhrmann. The cirrus itself is 0·3 mm. long and 0·02 mm. in diameter, and is provided with an extremely thick cuticula, the latter measuring 8μ.

The cirrus pouch opens into a very deep funnel-shaped genital atrium. The cuticula lining the latter is distinctly crenated. This may, perhaps, be only due to contraction, but appears on all our sections.

The ovary is bi-lobed, the poral lobe being, as is usual, smaller than the aporal lobe. The yolk-gland is well developed, and is situated behind the ovary. There is a distinct shell-gland and a receptaculum seminis. The latter is thick-walled, and is formed by a dilatation of the distal portion of the vagina. This organ appears as a thick-walled tube passing dorsally of the ovary and surrounded throughout with glandular cells. The entire vagina is lined with setae, directed towards the vaginal pore, the latter being situated posterior to the cirrus pouch. The uterus, after describing a few coils, passes between the testes and the ovary diverticula, appearing for the first time in about the sixtieth segment. The gravid uterus has from seven to twelve lateral branches, which in turn can form two or more secondary branches.

The embryophores are egg-shaped. 27 : 23μ. The shell is 4μ thick.

Most authors subdivide the genus *Taenia* s.str. into three sub-genera, viz., *Taenia, Taeniarhynchus,* and *Multiceps.* The first two are to be distinguished from one another by the presence or absence of hooks on the scolex, and the last is to be distinguished from the other two in that the larval stage is a bladderworm, and that the handle of the hooks is usually sinuous.

We really do not see the necessity of these sub-genera. The presence or absence of hooks on the scolex can quite well be found side by side in the same genus. The genus *Hymenolepis* is a typical example, and as to using the larval stage as a character for sub-generic distinction, this also seems to us to be rather far-fetched, as at that rate we would have to create a new sub-genus for *T. taeniaeformis* (Batsch). In the sub-genus *Multiceps* we find a characteristic loop in the vagina, but if we use this character, then we must create another sub-genus for *T. taeniaeformis* (Batsch), *T. antarctica* Fuhrmann, and *T. regis* Baer, as these three species present powerful sphincter vaginae not recorded from other species.

There now arises another point which may eventually lead to confusion, and that is the present tendency to ascribe all larval *Taeniae* with two circlets of hooks to the genus *Multiceps,* the result being that this genus or sub-genus contains three adult worms and nine larval forms of which the adults are unknown.

We therefore propose to unite the above three sub-genera in the one genus *Taenia*, and to retain the name *Multiceps* to indicate the larval forms of which the adult worms are unknown.

It seems little short of extraordinary that we find not less than eleven different species of *Taenia* s.str. in the dog. The question arises in the writer's mind whether the characters such as size and shape of the hooks, and the number of the diverticulae of the uterus, are really of specific value.

In a paper that is not very convincing, Stevenson (1904) has studied the variation in shape and size of the hooks of *T. serrata* and *T. serialis*, and comes to the conclusion that whereas the total length of the hook varies but slightly, the curvature of the blade, and hence the shape, is much more variable.

It is also interesting to note that rarely do two authors find the same number of uterine diverticulae for the same species. These facts seem to denote that there must be a much greater variability than is usually thought, and we would urge helminthologists who can obtain large quantities of material to undertake a comparative study of these various species. We feel certain that the results of such studies will greatly reduce the existing number of species of the genus *Taenia* s.str., and perhaps also bring to light the existence of "geographical varieties." It is in this latter class that we place, with specific rank for the present, the species *T. confusa* Ward and *T. bremneri* Stephens, while awaiting a comparative study of *T. saginata* (Goeze).

T. monostephanos v. Linstow is considered as an anomally, and does not figure in the list given below, as we do not see the necessity to maintain such a worm with specific rank.

T. ursina v. Linstow is too badly described to be recognized as a distinct species, the description not corresponding to the figure. One fact is certain, and that is that the hooks as figured by v. Linstow do not correspond to those of any known species of *Taenia* s.str., and appear to be deformed by refraction.

From the shape and size of the hooks, as well as from their number, *T. hyperborea* v. Linstow is a synonym of *T. multiceps* Leske: and for the same reason *T. polycalcaria* v. Linstow is a synonym of *T. pisiformis* (Bloch). *T. intermedia Rudolphi* and *T. foinae* E. Blanchard are undoubtedly synonyms of *T. taeniaeformis* (Batsch).

For the reasons given in the preceding paragraph, *T. brachysoma* Setti is a synonym of *T. brauni* Setti. *T. erythruaea* Setti is placed provisionally in the list given below, as no definite details with regard to the single circlet of hooks are given. It is, however, interesting to note the small size of the hooks.

We have been fortunate enough to be able to cut sections of the original material of Rudolph's *T. laticollis*, and, although it was in a bad state of preservation, we are able to state that this is a distinct species, as the following will show. According to the size of the large hooks *T. laticollis* ought to come very near to *T. taeniaeformis*. However, the small hooks of the latter species are much larger than those of the former species. In *T. taeniaeformis* there appears a distinct sphincter vagina; this latter, however, is absent in *T. laticollis*. For the above reason one seems justified in considering *T. laticollis* as a distinct species.

List of the Species of *Taenia* from Mammals.

Species.	Author.	Year.	Number of Hooks.	Size of Large Hooks. μ	Size of Small Hooks. μ	Length. mm.	Uterine Branches.	Ova. μ	Host.	Distribution.
T. multiceps	(Leske)	1780	22–32	150–170	90–130	400–1,000	9–26	29–37	*Canis* fam., *C. nebrascensis*, *Vulpes lagopus*	Cosmopolitan.
T. hydatigena	Pallas	1766	22–44	170–220	110–160	750–5,000	5–10	38–39 : 34–35	*Canis* fam., *Thous lupus*, *T. mesomelas*	Cosmopolitan.
T. ovis	(Cobbold)	1869	24–36	156–188	96–128	450–1,000	20–25	30–34 : 24–28	*Canis* fam.	Europe, Africa, Australia, United States of America.
T. solium	Linneus	1767	25–50	160–180	110–140	2,000–8,000	7–10	31–56	*Homo sapiens*	Cosmopolitan (sporadic).
T. serialis	(Gervais)	1847	26–32	135–175	78–120	200–720	20–25	31–34 : 29–30	*Canis* fam.	Europe, Asia, Australia, United States of America.
T. krabbei	Moniez	1879	26–34	148–170	85–120	260	10	?	*Canis* fam.	Iceland, Alaska.
T. taeniaeformis	(Batsch)	1786	26–52	380–420	250–270	150–160	17–18	31–37	*Felis catus*, *F. maniculata*, *F. melivora*, *Catopuma eyra*, *Uncia concolor*, *Oncöides mitis*, *O. weidi*, *O. tigrina*, *Cervaria venta*, *Arctogale ermineus*, *Mustela foina*, *M. martes*, *Putorius putorius*	Europe, Asia, United States of America, South America.
T. gaigeri	(Hall)	1916	28–32	160–180	115–150	250–1,800	12–15	25–30	*Canis* fam.	India, Ceylon.
T. balaniceps	Hall	1910	28–32	145	93–98	240	16–17	29–37 : 27–33	*Canis* fam., *Cervaria rufa*	United States of America.
T. antarctica	Fuhrmann	1922	28–34	144–156	92–102	250	13–15	20	*Canis* fam.	Antarctic.
T. brauni	Setti	1897	30–32	130–140	85–90	100–180	10–12	35–38	*Canis* fam.	Erythrea, Italy.
T. regis	Baer	1923	32	290	190	160	7–10	40	*Uncia leo*	Sudan.
T. crassiceps	Rudolphi	1810	32–34	186	135	120–220	8	25 : 19	*Vulpes alopex*	Europe.
T. hyaenae	N. sp.	—	32–38	223	127	300	12–14	34 : 27	*Hyaena brunea*	South Africa.
T. retracta	v. Linstow	1904	34	308	211	550	Immature	—	*Vulpes ferrilatus*	Thibet (?)
T. pisiformis	(Bloch)	1780	34–48	225–294	132–177	600–2,000	8–14	37 : 32	*Canis* fam., *C. nebrascensis*, *Thous latrans*, *Felis catus*, *Uncia tigris*, *Leopardus pardus*, *Urocyon cinereo-argenteus*	Cosmopolitan.
T. infantis	Bacigalupo	1922	35–40	410	260	300	?	35–40	*Homo sapiens*	South America.
T. laticollis	Rudolphi	1819	38–60	380–420	150–183	50–95	Immature	—	*Lynx lynx*	?
T. omissa	Lühe	1910	40	270–290	90	500–600	4–5	40	*Uncia concolor*, *Oncöides tigrina*	South America.
T. parva	N. sp.	—	44	361	228	55	9–14	27 : 23	*Genetta ludia*	South Africa.
T. macrocystis	Diesing	1850	60–74	320–365	180–200	120	8–15	34–48 : 25–27	*Cervaria rufa*, *C. fasciata*, *Catopuma jaguarandi*, *Oncöides tigrina*, *O. weidi*, *Felis macrura*, *F.* sp., *Galictis* sp.	South America, United States of America.
T. polyacantha	Leuckart	1856	62	58	34	120	8	28 : 22	*Vulpes alopex*	Europe.
T. erythraea	Setti	1897	20	85	95	140–170	6–14	27 : 28	*Thous mesomelas*	Abyssinia.
T. philippina	Garrison	1907	—	—	—	800–1,000	?	35–41 : 26–35	*Homo sapiens*	Philippines.
T. suginata	(Goeze)	1782	—	—	—	4,000–10,000	15–30	30–40 : 20–30	*Homo sapiens*	Cosmopolitan.
T. confusa	Ward	1895	—	—	—	5,000–8,000	14–18	39 : 30	*Homo sapiens*	Texas.
T. bremneri	Stephens	1908	—	—	—	?	22–24	39 : 30	*Homo sapiens*	Nigeria.

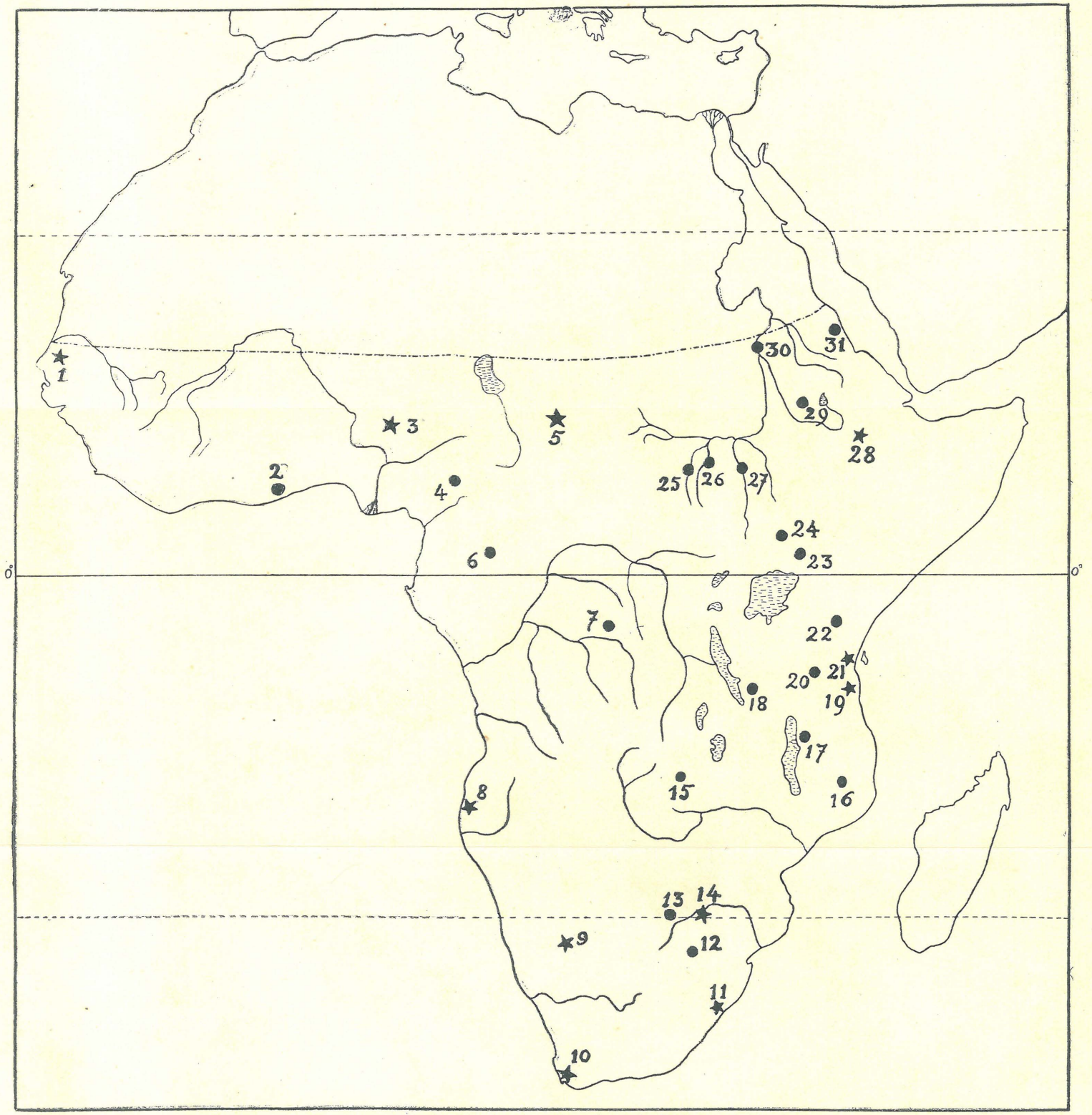
III. DISTRIBUTION OF THE AFRICAN CESTODA.

We have endeavoured to collect in the following list all the species of adult Cestoda which have been recorded from Africa.

As the accompanying map will show, we consider under the heading of Africa the Ethiopian region of most zoo-geographers, minus Arabia and Madagascar. This territory can be considered as strictly African, and, except for the higher Nile Valley, is isolated from the Mediterranean region by the Sahara, an unsurmountable barrier to beast.

We have numbered the regions from which parasites have been recorded, and have designated with a star an occasional occurrence and with a spot expeditions and systematic investigations. In the following list the numbers in brackets refer to these regions [the species marked with an asterisk are also to be found outside the Ethiopian region].

It is really astonishing when we consider that in an area of something like 700,000 square miles there have been found only 162 species of Cestoda [of these species 118 are autochtonous to the Ethiopian region] from thirty-one different regions. These figures represent about 8 per cent. of the entire Cestode fauna of the globe. Let us hope that in the future our knowledge of the African Cestode fauna will be increased so as to form a basis of comparison with other continents, thus giving rise to interesting relationships.



Map showing the distribution of the Cestodes of the Ethiopian Region.

List of Cestoda from the Ethiopian Region.

Parasite.	Host.	Distribution.
	MAMMALIA.	
Lüheella pretoriensis n. g., n. sp.	*Otocyon megalotis*	Transvaal (12).
**Diphyllobothrium decipiens* (Diesing)	*Felis pardus*	Transvaal (12) (Zoo).
Diphyllobothrium theileri n. sp.	*Zibethailurus serval, Felis caffra*	Transvaal (12).
Diplocotyle serrata v. Linstow [?]	*Strepsiceros strepsiceros*	South Africa (10).
**Mesocestoides lineatus* (Goeze)	*Caracal caracal*	Transvaal (12) (Zoo).
**Anoplocephala magna* (Abilgaard)	*Equus caballus, Hippotigris zebra*	Transvaal (12).
**Anoplocephala magna* var. *gigantea* (Peters)	*Ceratorhinus bicornis*	East Africa (15, 16, 19).
**Anoplocephala perfoliata* (Goeze)	*Equus caballus, Hippotigris burchelli*	South Africa (10, 11, 12), East Africa (21).
Anoplocephala rhodesiensis (Collin)	*Equus burchelli*	Transvaal (12), East Africa (15).
Anoplocephala spatula (v. Linstow)	*Procavia capensis, Heterohyrax brucei, P.* sp.	Transvaal (12), East Africa (15, 16, 17).
Paranoplocephala acanthocirrosa n. sp.	*Otomys irroratus*	Transvaal (12).
Fuhrmannella transvaalensis n. g., n. sp.	*Thryonomys swinderenianus*	Transvaal (12).
**Moniezia alba* (*Perroncito*)	*Hippopotamus alba, Hippotragus equinus*	East Africa (17), Sudan (26).
**Moniezia expansa* (Rudolphi)	*Ovis aries, Cephalophus monticola*	Transvaal (12).
**Moniezia trigonophora* Stiles & Hassall	*Bos taurus, Cephalophus grimmia, Pediotragus sharpei, P. horstocki*	Transvaal (12).
Oochoristica herpestis Kofend	*Herpestis sanguineus*	Sudan (25).
Oochoristica ichneumontis n. sp.	*Herpestis gracilis*	Transvaal (12).
Inermicapsifer aberratus n. sp.	*Mus moggi*	Transvaal (12).
Inermicapsifer apospasmation Bischoff	*Heterohyrax brucei, P.* sp.	East Africa (18, 28).
Inermicapsifer arvicanthidis (Kofend)	*Arvicanthis testicularis, Mus moggi, Otomys irroratus*	Sudan (25), Transvaal (12).
Inermicapsifer guineensis (Graham)	*Cricetomys gambianum, Epimys rattus, Mus damarensis*	West Africa (28), East Africa (21).
Inermicapsifer hyracis (Rudolphi)	*Procavia syriaca, P. capensis, P.* sp.	East Africa (28, 20), South Africa (9, 12).
**Inermicapsifer interpositus* Janicki	*Procavia syriaca, P.* sp.	East Africa (28, 31), South Africa (9, 12).
Inermicapsifer lopas Bischoff	*Heterohyrax brucei, P.* sp.	East Africa (18, 20).
Inermicapsifer norhalli Baer	*Procavia capensis, P.* sp.	East Africa (20), Transvaal (12).
Inermicapsifer pagenstecheri (Setti)	*Procavia capensis, Heterohyrax brucei, P.* sp.	East Africa (18, 28, 31).
Inermicapsifer prionodes Bischoff	*Heterohyrax brucei, P.* sp.	East Africa (18, 19, 20).
Inermicapsifer settii Janicki	*Procavia capensis, P.* sp.	South Africa (9).
**Thysanosoma giardi* (Diesing)	*Bos taurus, Bubalis canna*	Transvaal (12).
**Avitellina centripunctata* (Rivolta)	*Ovis aries, Cephalophus grimmia, Pediotragus sharpei, P. horstocki, Oreotragus oreotragus, Hippotragus equinus*	Sudan (26), Transvaal (12).
Stilesia hepatica (Wolffhügel)	*Ovis aries, Capra hircus*	Transvaal (12).
Stilesia vittata Railliet	*Camelus dromedarius*	East Africa (21).
Raillietina isomydis (Setti)	*Arvicanthis abyssinicus*	East Africa (31).
Raillietina sphaerocephala (Rudolphi)	*Chrysochloris a rea*	South Africa (10).
Raillietina voluta (v. Linstow)	*Erinaceus albiventris*	West Africa (3).
Dilepis trichocephalus v. Linstow	*Erythrocebus pyrrhonotus*	West Africa (3).
**Dipylidium chyzeri* v. Rátz	*Felis* dom.	East Africa (21).
Dipylidium fuhrmanni n. sp.	*Zibethailurus serval, Felis caffra*	Sudan (25), Transvaal (12).
**Dipylidium caninum* (Linneus)	*Canis* fam., *Thous mesomelas* (?), *Otocyon megalotis, Proteles cristatus*	West Africa (2), Transvaal (12).
**Dipylidium oerleyi* v. Rátz	*Felis* d. m.	East Africa (21).
Dipylidium zschokkei Hungerbühler	*Cynictis pencillata*	South Africa (13).
Hymenolepis macroscelidarum n. sp.	*Macroscelides brachyrhynchus.*	Transvaal (12).
Hymenolepis muris-variegati Janicki	*Arvicanthis niloticus*	South Africa (10).
**Hymenolepis nana* (v. Siebold)	*Homo sapiens*	West Africa (4), East Africa (?). Sudan (30).
Hymenolepis crassa Janicki	*Mus musculus*	South Africa (10).
Hymenolepis capensis Janicki	*Chrysochloris capensis*	South Africa (10).
Hymenolepis chrysochloridis Janicki	*Chrysochloris capensis*	South Africa (10).
**Taenia brauni* Setti	*Canis* fam.	East Africa (28).
Taenia bremneri Stephens	*Homo sapiens*	West Africa (3).
Taenia erythraea Setti	*Thous mesomelas*	East Africa (28).
Taenia hyaenae n. sp.	*Hyaena brunea*	Transvaal (12).
**Taenia hydatigena* (Pallas)	*Canis* fam.	East Africa (21).
**Taenia ovis* (Cobbold)	*Canis* fam.	South Africa (9).
Taenia parva n. sp.	*Genetta ludia*	Transvaal (12).
**Taenia pisiformis* (Bloch)	*Canis* fam.	East Africa (15).
Taenia regis Baer	*Felis leo*	Sudan (26).
**Taenia saginata* (Goeze)	*Homo sapiens*	East Africa (20), South Africa (12), West Africa (6).
**Taenia solium* Linneus	*Homo sapiens*	South Africa (12).

List of Cestoda from the Ethiopian Region—(*Continued*).

Parasite.	Host.	Distribution.
	Aves.	
Chaetorhallus robustus Nybelin.....	*Chlororhynchus* sp.....	West Africa (8).
Tetrabothrius campanulata Fuhrmann	*Porcellaria* sp.....	South Africa (10).
Tetrabothrius filiformis Nybelin.....	*Magqueus aequinochiales*.....	South Africa (10).
Tetrabothrius fuhrmanni Nybelin.....	*Thalassogera chlororhynchus*..	West Africa (8).
Tetrabothrius gracilis Nybelin.....	*Magqueus aequinochiales*.....	West Africa (8).
Tetrabothrius intermedia Fuhrmann...	*Porcellaria* sp.....	South Africa (10).
Tetrabothrius skoogi Nybelin.....	*Puffinus griseus*.....	West Africa (8).
Mesocestoides charadrii Fuhrmann...	*Tringa minuta*.....	Sudan (29).
**Bertiella delafondi* (Railliet).....	*Oena capensis*.....	South Africa (10).
Inermicapsifer linstowi (Parona).....	*Numida ptilorhyncha*.....	Sudan (27), East Africa (18).
Ophryocotyle herodiae Fuhrmann.....	*Theristicus hagedash*	Sudan (27).
Davainea paucisegmentata Fuhrmann.	*Numida ptilorhyncha, N. meleagris*	Sudan (27), West Africa (3).
**Davainea proglottina* (Davaine).....	*Gallus* dom.....	Transvaal (12).
Raillietina debilis (Baylis).....	*Anastomus lamelligerus*.....	East Africa (23, 24).
Raillietina senaariensis (Weithofer)..	*Columba guinea*.....	Sudan (25).
Raillietina vaganda (Baylis).....	*Halietus vocifer*.....	East Africa (23, 24).
**Raillietina (Paroniella) corvina* (Fuhrmann)	*Corvus* sp.....	East Africa (28).
Raillietina (Ransomia) bycanistis (Baylis)	*Bycanistis subquadratus*.....	East Africa (23, 24).
Raillietina (Ransomia) calcaria (Fuhrmann)	*Corythaeola cristata*.....	West Africa (4).
Raillietina (Ransomia) clavicirrosa (Fuhrmann)	*Francolinus clapertoni, Pternistes lucani*	Sudan (29), West Africa (8).
Raillietina (Ransomia) cohni (Baczynska)	*Gallus* dom.....	East Africa.
**Raillietina (Ransomia) echinobothrida* (Mégnin)	*Gallus* dom.....	West Africa (3).
Raillietina (Ransomia) emperus (Skrjabin)	*Buceros seratogynina*.....	West Africa (6).
Raillietina (Ransomia) macrocirrosa (Fuhrmann)	*Turacus buffonis*.....	West Africa (6).
Raillietina (Ransomia) gendrei Joyeux	*Vinago calva*.....	West Africa (3).
Raillietina (Ransomia) numida (Fuhrmann)	*Numida ptilorhyncha, N. meleagris*, n. sp.	East Africa (23, 28), West Africa (3).
**Raillietina (Ransomia) penetrans* (Bascyznska)	*Gallus* dom.....	East Africa.
Raillietina (Ransomia) pintneri (Klaptocz)	*Numida ptilorhyncha, N. meleagris*	Sudan (29), West Africa (1).
Raillietina (Ransomia) provincialis (v. Linstow)	*Francolinus adspersus*.....	West Africa (3).
**Raillietina (Ransomia) tetragona* (Molin)	*Numida ptilorhyncha, Gallus* dom	East Africa (28, 17), West Africa (7).
Raillietina (Ransomia) undulata (Fuhrmann)	*Corythacola cristata*.....	West Africa (4).
Raillietina (Ransomia) werneri (Klaptocz)	*Colius leucotis*.....	East Africa (24).
Raillietina (Raillietina) crassula (Rudolphi)	*Columba* dom.....	Africa (?).
Raillietina (Raillietina) leptotrachela (Hungerbühler)	*Pteroclurus namaqua*.....	South Africa (13).
Raillietina (Skrjabina) cesticellus (Molin)	*Gallus* dom.....	West Africa (7).
Houttuynia struthionis (Rudolphi)....	*Struthio camelus, S. molybdophannus, S. masaicus, S. australis*	South Africa (12, 13, 14).
Porogynia paronai (Moniez).....	*Numida ptylorhyncha, N. meleagris*	East Africa (28), West Africa (1).
Cotungia crassa Fuhrmann.....	*Numida ptylorhyncha, N. rickwae*, n. sp.	East Africa (23), West Africa (7).
Idiogenes flagellum (Goeze).....	*Milvus parasitus*.....	East Africa (17).
Idiogenes horridus africanus Hungerbühler	*Raptatores*.....	South Africa (13).
Sphryonchotaenia uncinata Ransom..	*Neotis caffra*.....	East Africa (22).
**Chapmania tapica* (Clerc).....	*Otis arabs*.....	Sudan (29).
Chapmania unilateralis Skrjabin.....	*Bucorax cafer*.....	East Africa (20).
Schistometra wettsteini Weithofer.....	*Otis arabs* (?).....	Sudan (25).
**Dilepis macrosphincter* Fuhrmann....	*Ardeola ralloides*.....	Sudan (27).
Dilepis odhneri Fuhrmann.....	*Oedionemus senegalensis*.....	Sudan (27).
**Trichocephaloides birostrata* Clerc.....	*Totanus calidris, T. rubaquata*	Sudan (27).
**Parachoanotaenia coronata* (Creplin)..	*Charadrius cantinearius*.....	Sudan (27).
Parachoanotaenia megistacantha (Fuhrmann)	*Oedicnemus senegalensis*.....	Sudan (27).
Anomotaenia discoidea (v. Beneden)..	*Ciconia ciconia*.....	Sudan (27).
Anomotaenia microphallos (Krabbe)..	*Rhycopylus glariola*.....	Sudan (27).
Anomotaenia procirrosa Fuhrmann...	*Francolinus clapertoni*.....	Sudan (27).
**Anomotaenia trapezoides* Fuhrmann..	*Milvus aegypticus, M. ater*...	South Africa (13).
**Cyclustera cazito* (Rudolphi).....	*Pseudotantalus ibis*.....	Sudan (27).
Dendrouterina herodiae Fuhrmann....	*Herodias garzettae*.....	Sudan (5).
**Cyclorchida omalancistrota* (Wedl.)...	*Platalea leucodia*.....	Sudan (25), East Africa (17).

List of Cestoda from the Ethiopian Region—(*Continued*).

Parasite.	Host.	Distribution.
	Aves.	
Echinorhynchotaenia tritesticulata Fuhrmann	*Anhinja rufa*	Sudan (27).
Dipylidium arvicola Fuhrmann	*Gyps kolbi*	South Africa (10).
Choanotaenia polyorchis (Klaptocz)	*Milvus aegypticus, M. parasitus*	Sudan (27), East Africa (17).
Paruterina bucerotina Fuhrmann	*Lophoceros nasutus*	Sudan (27).
Buiterina unganda Baylis	*Cynnires gutturales*	East Africa (24).
Rhabdometra numida Fuhrmann	*Numida ptilorhyncha, N. meleagris*	Sudan (27), West Africa (4).
Octopetalum gutterae Baylis	*Guttera edouardii, Numida ptilorhyncha*	East Africa (17).
Oligorchis delachauxi Fuhrmann	*Phalacrocorax africanus*	Sudan (27).
**Hymenolepis carioca* (Magalhaes)	*Numida meleagris*	West Africa (3).
Hymenolepis columbinae Fuhrmann	*Rena capensis*	Sudan (27).
Hymenolepis biaculeata Fuhrmann	*Chenalopex aegypticus*	East Africa (20).
Hymenolepis glandularis Fuhrmann	*Himantopus himantopus*	Sudan (27).
Hymenolepis himantopodis (Krabbe)	*Himantopus himantopus*	Sudan (25).
**Hymenolepis medici* Stossich	*Pelecanus rufescens*	Sudan (27).
Hymenolepis microcephala (Rudolphi)	*Ciconia ciconia, Ardea cinerea, A. purpurea, Nycticorax nycticorax, Ibis plicinellum, Pelegadis autumnalis*	Sudan (27).
**Hymenolepis multiformis* (Creplin)	*Ardea cinerea*	Sudan (27).
Hymenolepis parvirostellata v. Linstow	*Eurystomus afer*	Africa (?).
**Hymenolepis rugosus* Clerc	*Columba guinea*	Sudan (25).
**Hymenolepis villosa* (Bloch)	*Numida ptilorhyncha*, n. sp.	East Africa (28).
Taenia heteracantha Fuhrmann	*Milvus aegypticus*	South Africa (10).
**Cladotaenia cylindracea* (Bloch)	*Falcones*	East Africa (24, 27).
**Acoleus vaginatus* (Rudolphi)	*Himantopus candidus*	Sudan (27).
Gyrocoelia brevis Fuhrmann	*Hoplopterus spinosus*	Sudan (27).
**Diplophallus polymorphus* (Rudolphi)	*Himantopus candidus, H. himantopus*	Sudan (25, 27).
Dioicocestus aspera (Mehlis)	*Podiceps capensis*	East Africa (17).
Progynotaenia evaginata Fuhrmann	*Oedicnemus senegalensis*	Sudan (27).
Progynotaenia fuhrmanni Skrjabin	*Charadrius minor*	Sudan (27).
Progynotaenia jaegerskiöldi Fuhrmann	*Pluvianus aegypticus*	Sudan (27).
	Reptilia.	
Duthiersia fimbriata (Diesing)	*Varanus albigularis, V. niloticus, V.* sp.	East Africa (17), Transvaal (12), West Africa (1).
**Bothridium pythonis* (Blainville)	*Python natalensis*	Transvaal (12) (Zoo).
**Palaia varani* Shipley	*Varanus niloticus*	West Africa (3).
Acanthotaenia continua Rudin	*Varanus niloticus*	Transvaal (12).
Acanthotaenia articulata Rudin	*Varanus niloticus*	Transvaal (12).
Oochoristica agamae Baylis	*Agama sanguinolenta*	East Africa (22).
Oochoristica theileri Fuhrmann	*Agama hispida*, var. *distans*	Transvaal (12).
**Oochoristica crassiceps* Baylis	*Psammophis subtaeniatus*	East Africa (22).
Oochoristica zonuri Baylis	*Zonurus tropidosternum*	East Africa (22).
Ophiotaenia adiposa Rudin	*Bitis arietans*	West Africa (9).
Ophiotaenia gabonica (Beddard)	*Bitis gabonica*	West Africa.
Ophiotaenia mönnigi Fuhrmann	*Leptodira hotambeia*	Transvaal (12).
Ophiotaenia theileri Rudin	*Naja haie*	Transvaal (12).
Ophiotaenia zschokkei Rudin	*Naja haie*	Transvaal (12).
Cephalochlamys namaquensis Cohn	*Xenopus laevis*	East Africa (20).
	Amphibia.	
**Cylindrotaenia americana* Jewell	*Rana aequiplicata, Arthroleptis ogoensis*	East Africa (22).
Bactrachotaenia schultzei (Hungerbühler)	*Rana adspersus*	South Africa (13, 14).
	Pisces.	
Gyrocotyle plana Linton	*Callorhynchus antarcticus*	South Africa (11).
Gyrocotyle rugosa Diesing	*Callorhynchus antarcticus*	South Africa (11).
**Gyrocotyle urna* (Grube & Wagner)	*Callorhynchus antarcticus*	Transvaal (14).
Caryophyllaeus filiformis Woodland	*Mormyrus caschive*	Sudan (30).
Weynionia acuminata Woodland	*Synodontis membranaceus*	Sudan (30).
Wenyonia minuta Woodland	*Chrysichthys auratus*	Sudan (30).
Wenyonia virilis Woodland	*Synodontis schall*	Sudan (30).
Proteocephalus pentastomum (Klaptocz)	*Polypterus bichir*	Sudan (27).
Proteocephalus sulcatus (Klaptocz)	*Polypterus endlicheri, Clarotes laticeps, Chrysichthys* sp.	Sudan (27), West Africa (7).
Corallobothrium solidum (Fritsch)	*Malopterurus electricus*	Sudan (27).
Monticellia malopteruri (Fritsch)	*Malopterurus electricus*	Sudan (27).
Ancistrocephalus microcephalus (Rud.)	*Mola mola*	South Africa (11).
Echeneibothrium austrinum Linton	*Raja* sp.	South Africa (11).
Crossobothrium angustum (Linton)	*Carcharias melanopterus*	South Africa (11).
Acanthobothrium paulum Linton	*Raja* sp.	South Africa (11).
Rhynchobothrium imparispine Linton.	*Raja* sp.	South Africa (11).

REFERENCES.

The references marked with an asterisk refer to the African helminth-fauna.

Ariola, V.—1896A. "Sopra alcuni dibotrii e sulla classificazione del genere Bothriocephalus." Atti Soc. Ligust. Sc. Nat. Genova, 7, pp. 1–24, pl. IV.

Ariola, V.—1896B. "Note Intorna Agli Elminti del Museo Zoologico di Torino." Boll. Mus-zool, e Anat Comp Torino, 11, pp. 1–7, figs. 7–8.

Ariola, V.—1899. "Notizie Sopra Alcuni Botriocefali del Museo Universitario di Copenhagen." Boll. Mus. Zool. e Anat Comp. Genova, No. 89, pp. 7–8.

Ariola, V.—1900. "Revisione della Famiglia Bothriocephalidae." S.str. Arch. Parasit, 3, pp. 369–480, pls. VIII–X.

Bacigalupo.—1922. "*Taenia infantis*" N.sp. Semana Med., 29, pp. 302–305, figs. 1–5, Buenos Aires.

* *Baer, J. G.*—1923. "Resultats Zoologiques du Voyage du Dr. P. A. Chappuis, au Nil superiéur. III, Helminthes. Rev. Suisse Zool., 30, pp. 337–352, figs. 1–11.

Baer, J. G.—1924A. "Considerations sur le genre *Anoplocephala.*" Bull. Soc. Neuchâteloise Sc. Nat. 48, pp. 1–16, 2 pls.

* *Baer, J. G.*—1924B. "On a Cestode Parasite of an East African Rock Rabbit (*Procavia sp.*)." Journl. of Helminth. 2, pp. 77–80, 1 fig.

* *Baer, J. G.*—1924C. "Contribution a la Faune Helminthologique Sud-africaine." Note préliminaire, Ann. Parasit, 2, pp. 239–247.

Baer, J. G.—1924D. "Die Cestoden der Saugetiere Brasiliens." Zool. Jahrb. Abt. f. Syst.

* *Baylis, H. A.*—1915. "A New Cestode of the Genus *Zschokkeella.*" Ann. and Mag., Nat. Hist. Ser., 8, 16, pp. 40–50, pl. VI.

* *Baylis, H. A.*—1919. "On Two New Species of the Cestode Genus *Oochorisitica* from Lizards." Parasitol. 11, pp. 405–414, pl. XXI.

* *Baylis, H. A.*—1920. "Notes on some Parasitic Worms from East Africa." Ann. and Mag., Nat. Hist., set 9, 6, pp. 283–295, figs. 1–9.

Baylis, H. A.—1922. "Observations on certain Cestodes of Rats, with an Account of a New Species of *Hymenolepis.*" Parasitol, 14, pp. 1–8, figs. 1–4.

* *Beauchamp, P. de.*—1914. "Sur quelques Parasites provenant du Congo Belge." Rev. Zool. Africaine, 4, pp. 109–116, 1 fig.

Becker, R.—1921. "Weitre Beitrage zur Anatomie der Pferdebandwürmer." Centralbl. f. Bakt. u. Parasit. 87, pp. 216–217, figs. 1–4.

Becker R.—1922. "Der Genitalapparat der Pferdebandwürmer." Ibid. 88, pp. 483–501, 1 fig.

* *Beddard, F. E.*—1911A.—" Contributions to the Anatomy and Systematic Arrangement of the Cestoidea, I." Proc. Zool. Soc. Lond., pp. 626–660, figs. 148–159.

Beddard, F. E.—1911B. "Contributions to the Anatomy and Systematic Arrangement of the Cestoidea, II." Ibid., pp. 994–1018, figs. 204–215.

* *Beddard, F. E.*—1912. "Contributions to the Anatomy and Systematic Arrangement of the Cestoidea, IV." Ibid., pp. 576–607, figs. 72–83.

Beddard F. E.—1913. "Contributions to the Anatomy and Systematic Arrangement of the Cestoidea, VII." Ibid., pp. 549–571, figs. 85–94.

Beddard, F. E.—1914. "Contributions to the Anatomy and Systematic Arrangement of the Cestoidea, IX." Ibid., pp. 263–283, figs. 1–8.

Beddard, F. E.—1916. "On Two New Species of Cestodes belonging respectively to the Genera *Linstowia* and *Oochoristica.*" Ibid., pp. 695–706, figs. 1–4.

* *Bischoff, C. R.*—1913. "Cestoden aus Hyrax." Rev. Suisse Zool., 21, pp. 224–284, pls. 7–9.

Blanchard, E.—1848. "Recherches sur l'organisation des Vers." Ann. Sc. Nat. Paris, 10, pp. 321–364, pls. 11–12.

Blei, R.—1922. Drei Neue Schafcestoden." Centralbl. f. Bakt. u. Parasit, 87, pp. 365–387, figs. 1–17.

Böhm, K.—1922. "Beitrage zur Kenntniss Tierischer Parasiten." Centralbl. f. Bakt. u. Parasit, 87, pp. 407–427, figs. 1–4, 1 pl.

Bourquin, J.—1905. "Cestodes de Mammiferès." Le Genre *Bertia.*, Rev. Suisse. Zool. 13, pp. 415–506, pls. 7–9.

Brumpt, E.—1922. "Précis de Parasitologie." 3e. ed., Paris.

Castellani, A., and Chalmers, T.—1919. "Manual of Tropical Medicine."

Chandler, A. C.—1920. "New Record of *Taenia confusa.*" Journl. Parasit. 7, pp. 34–38, pl. viii.

Cholodkovsky, N. A.—1902. "Contributions a la connassiance des Taenias des Ruminants." Arch. Parasit. 6, pp. 145–148, pl. 1.

Cholodkovsky, N. A.—1906. "Cestodes Nouveaux ou peu connus." 1e. Partie. Arch. Parasit, 10, pp. 332–347, pls. viii–x.

Cholodkovsky, N. A.—1912. "Erklarender Katalog der Sammlung Parasitischer Würmer." Des Zoologischen Kabinets der Kais. Militarmedizinische Akademie, Lfg. I Bandwürmer (*Cyclophyllidea*), St. Petersburg.

Cholodkovsky, N. A.—1913. "Cestodes Nouveaux ou peu connus." 2e. Partie. Ann. Mus. Zool. Acad. Imp. Sc., St. Petersburg, 18, pp. 221–232, pls. i–iii.

Cholodkovsky, N. A.—1914. "Zur Kenntniss der Bothriocephalen Russlands." Trav. Soc. Imp. Nat., St. Petersburg, 45, pp. 59–65.

Cohn, E.—1912. "Uber *Diphyllobothruim stemmacephalum* Cobbold." Dissertation, Konigsberg.

Cooper, A. R.—1917. "A Morphological Study of Bothriocephalid Cestodes from Fishes." Journl. Parasitool. 4, pp. 33–39, pls. i–ii.

Cooper A. R.—1918. "North American Pseudophylidean Cestodes from Fishes." Illinois Biological Monographs, 4, No. 4.

Cooper A. R.—1921. "Report of the Canadian Arctic Expedition." Vol. 9, Part G–H.

Daubeny, R.—1923. "The Adult Tapeworms of Sheep, Particularly those occurring in Great Britain." Nat. Med. Vet. Ass. Annual Meeting.

Diamare, V.—1892. "Di un Nuovo Cestode del Gen. *Dipylidium* Lkt." Boll. Soc. Nat. Napoli, 6, pp. 46–48.

Ditlevsen, H.—1914. "Conspectus Faunae Groenlandicae." Cestoder Meddeleser om Gronland, 23 Kobenhaven.

Douthitt, H.—1915. "Studies on the Cestode Family *Anoplocephalidae.*" Illinois Biological Monographs, I, No. 3.

Faust, C. E.—1921. "Preliminary Survey of the Parasites of Vertebrates of North China." China Med. Journl. 35, pp. 1–15.

* *Fritsch, G.*—1886. "Die Parasiten des Zitterwelses." Sitzungsher, K. A. Kad. Wiss. VI, pp. 99–108, pl. I.

Fuhrmann, O.—1902. "Die Anoplocephaliden der Vogel." Centralbl. f. Bakt. u. Parasit., 32, pp. 122–147, figs. 1–25.

Fuhrmann, O.—1908. "Die Cestoden der Vogel." Zool. Jahrb., supp. 10.

**Fuhrmann, O.*—1909. "Cestoden der Schwedischen Zoologischen Expedition nach dem Kilimandjaro, dem Meru, und Deutsch Ost-Afrika." Stockholm.

* *Fuhrmann, O.*—1910. "Die Cestoden der Vögel des Weissen Nils." Results of the Swedish Zoological Expedition to Egypt and the White Nile, No. 27, pp. 1–55, figs. 1–53.

* *Fuhrmann, O.*—1912. "Vögelcestoden." Dr. F. Werner's Reise nach dem Aegyptischen Sudan und Nord-Uganda. Sitzungsber. K. Akad. Wiss Wien, Math.-Naturw. 121, Abt. 1, pp. 1–12, figs. 1–7.

Fuhrmann, O.—1920. "Considerations Generales sur les *Davainea.*" Festschrift f. Zschokke, Basel.

Fuhrmann, O.—1921. "Einige Anoplocephaliden der Vögel." Contralbl. f. Bakt. u. Parasit, 87, pp. 438–451, figs. 1–21.

Fuhrmann, O.—1922. "Die Cestoden der Deutschen Sudpolar Expedition, 1901–1903 16." Zoologie, 8, pp. 469–524, figs. 1–13, pl. LVI.

Fuhrmann, O.—1924A. "*Hymenolepis macracanthus* (V. Linstow), avec Considérations sur le genre Hymenolepis." Journl. Parasitol.

Fuhrmann, O.—1924B. "Questions de Nomenclature Concernant le Genre *Raillietina.*" Fuhrm. (syn. *Davainea* R. Bl.). Ann. Parasit, 2, pp.

Furhmann, O.—(In the Press.) "Two New Reptilian Cestodes from South Africa."

Garrison, Ph. E.—1907. "A Preliminary Report upon the Specific Identity of the Cestode Parasites of Man in the Philippine Islands, with a Description of a New Species of Taenia." Phillippine Journl. Sc. B. Med. Sc., pp. 537–550, pls. I–V.

* *Gough, L. H.*—1908. "Notes on South African Parasites." Ann. Rep. S.A. A.A.S., pp. 1–4.

* *Gough L. H.*—1909. "The Anatomy of *Stilesia centripunctata.*" Commemoration book for the opening of the new Laboratories at Onderstepoort. Transvaal Dept. Agric., pp. 113–131, 2 pls.

Gough, L. H.—1911. "A Monograph of the Tapeworms of the sub-family *Avitellininae.*" Quart. Journl. Mic. Sc. 56, pp. 317–383, figs. 1–6, pls. 12–14.

Guyer, M. F.—1898. "On the Structure of *Taenia confusa.*" Ward Zool. Jahrb. Abt. f. Syst., 11, pp. 1–24, pl. 28.

Hall, M. C.—1910. "A new Species of Cestode Parasite (*Taenia balaniceps*) of the Dog and of the Lynx, with a note on *Proteocephalus punicus.*" Proc. U.S. Nat. Mus., 39, pp. 139–151, figs. 1–9.

Hall, M. C.—1916. "A New and Economically Important Tapeworm, *Multiceps gaigeri*, from the Dog." Journl. Am. Vet. Med. Ass.

Hall, M. C.—1918. "A Bothriocephalid Tape-worm from the Dog in North America, with notes on Cestode Parasites of Dogs." Journl. Am. Vet. Med. Ass., 53, N.S. 6, pp. 355–362, 1 fig.

Hall, M. C.—1919. "The Adult Taenioid Cestodes of Dogs and Cats and of related Carnivores in North America." Proc. U.S. Nat. Mus., 55, pp. 1–94, figs. 1–80.

* *Henry, A., and Joyeux, Ch.*—1920. "Contribution à la Faune Helminthologique de la Haute Guineé Francaise." Bull. Soc. Path. Exot., 13, pp. 176–182.

* *Hungerbühler, M.*—1910. "Studien an *Gyrocotyle* und Cestoden." Dissert., Basel.

Janicki, C.—1904. "Zur Kenntniss Einiger Saugetier Cestoden." Zool. Anz., 27, pp. 770–782.

Janicki, C.—1906A. "Die Cestoden Neu-Guineas." Résultats de l'Expédition Scientifique Neerlandaise a la Nouvelle Guinée, pp. 181–199, pl. VII–X.

**Janicki, C.*—1906B. "Studien an Säugetiercestoden." Zeitschr. f. Wiss. Zool., 81, pp. 505–597, figs. 1–15, pls. XX–XXV.

**Janicki, C.*—1910. "Die Cestoden aus *Procavia.*" Jenaische Denkschr., 16 ,pp. 373–396, pl. XIII–XIV.

Jenkins, J. A.—1923. "A New Species of *Moniezia.*" Ann. Appl. Biol. 10, 2.

Johnston, T. H.—1909. "Notes on some Australian Parasites." Agric. Gazette, N.S. Wales, Misc. Pub., No. 1253.

Joyeux, Ch.—1920. "Cycle Evolutif de quelques Cestodes." Bull. Biol. France et Belgique, Supp. II.

Joyeux, Ch.—1923A. "Note sur le *Multiceps spalacis* (Moniez, 1880)." Ann. Parasit, 1, pp. 65–69, 1 fig.

Joyeux, Ch.—1923B. "Recherches sur la Faune Helminthologique Africaine." Arch. Inst. Past. Tunis, 12, pp. 119–167, figs. 1–17.

Joyeux, Ch.—1924A. "Recherches sur le Cycle Evolutif des *Cylindrotaenia.*" Ann. Parasit, 2, pp. 74–81, figs. 1–7.

Joyeux, Ch.—1924B. "Helminthes des Colonies Portugaises d'Afrique." Ann. Parasitol, 2, pp. 232–235, 1 fig.

* *Klaptocz, B.*—1906. "Cestoden aus Fischen, aus Varanus und Hyrax." Sitzungsber. K. Akad. Wiss. Wien. Math.-naturw. 115, pp. 1–24, 1 pl.

* *Klaptocz, B.*—1906B. "Cestoden aus Numida ptilorhyncha Licht." Sitzungsber. K. Akad. Wiss. Wien. Math.-naturw., 115, pp. 963–974, 7 pl.

* *Kofend, L.*—1917. Cestoden aus Säugetiere und aus Agama Colonorum." Vorlaufige Mitteilung. Anz. Wien Akad. Math.-naturw., 54, pp. 229–231.

* *Kofend, L.*—1921. "Cestoden aus Saügetiere und aus Agama Colonorum." Wiss. Ergeb. der mit Unterstütz. der Akad. Wiss. Wien. Unternommenen Zool. exped. nach dem Anglo-Aegyptisch Sudan (Kordofan), 1914, pp. 1–10, figs. 1–8.

Kotlán, A.—1923. "Ueber *Sparganum raillieti* (v. Rátz) und den zugehörigen geschlecktsreifen Bandwürm, *Dibothriocephalus raillieti* (v. Rátz)." Centalbl. f. Bakt. u. Parasit, 90, pp. 272–285, figs. 1–9.

Krabbe, H.—1879. "Cestodes collected in Turkestan by A. P. Fedschenko." (Russian) Izviest Imp. Obsh. Liub. Esterstvozn. Moskova, 34, pp. 1–23, figs. 1–88.

Krefft, G.—1871. "On Australian Entozoa." Trans. Ent. Soc. N. S. Wales, 2, pp. 206–232 pls. I–III.

Landois, H.—1877. "*Bothriocephalus ursi*, New Species." Secretary's Rep., Jahresber, Westphalichan Prov., Ver. J. Wiss. u. Kurst.

Leiper, R. T., and Atkinson, E. L.—1915. "Parasitic Worms." British Antarctic ("Terra Nova") Expedition, 1910, Nat. Hist. Report, Zool. 2, pp. 19–60, pls. I–V.

Leon, N.—1908. "Contributions à l'étude des Parasites animaux de Roumanie." Bull. Med. et Nat. Jassy., pp. 1–9.

Leon, N.—1916. "*Bothriocephalus taenioides*, New Species." Centralbl. f. Bakt. u. Parasit. 78, pp. 503–504.

Leon, N.—1920. "*Dibothriocephalus taenoides* (Leon), a New case in Roumania." Journl. Parasit. 7, pp. 43–45, figs. 1–3.

* *Linstow, O. von.*—1901. "Helminthen von den Ufern des Nyassa—Sees." Jenáische Zeitschr. f. Naturwiss, 35, figs. 23–34.

* *Linstow, O. von.*—1904A. "Neue Helminthen aus Westafrika." Centralbl. f. Bakt. u. Parasit, 36, pp 379–383, 1 pl.

Linstow, O. von.—1904B. "Entozoa des Zoologischen Museums der Kais." Akad. f. Wiss St. Petersburg, II, pp. 1–30, pls. XVII–XIX.

Linstow, O. von.—1904C. "Neue Helminthen." Centralbl. f. Bakt. u. Parasit. 37, pp. 678–683, figs. 1–11.

Linstow, O. von.—1905A. "Helminthen der Russichen Polar-Expedition, 1900–1903." Mem. Acad. Imp. Sc., St. Petersburg, Ser. 8, Classe Physico-math. 18, pp. 1–17, pls.1–3.

Linstow, O. von.—1905B. "Helminthen aus Ceylon und Arctischen." Breiten Zeitschr. f. Wiss. Zool. Festchrifft., Ehlers I.

Linstow, O. von.—1905C. "Neue Helminthen." Archiv. f. Naturg. I, pp. 267–276, pl. X.

Linstow, O. von.—1906. "Helminths from the Collection of the Colombo Museum." Spolia Zelanica, 3, pp. 163–186, pls. I–III.

* *Linton, E.*—1924. "Gyrocotyle plana, sp. nov., with Notes on South African Cestodes of Fishes." Fisheries and Marine Biol. Survey, Rep. No. 3 for the Year 1922, Union of South Africa.

Lönnberg, E.—1891. "Anatomische Studien über Skandinavische Cestoden." K. Sven. Veten.-Akad. Handl., 24. pp. 1–107, pls. 1–3.

Lopez-Neyra, R.—1918. "Notas Helminthólogicas." Bol, R. Soc. Esp. Hist. Nat., 18, pp. 145–155.

Lopez-Neyra, R.—1920. "Notas Helminthólogicas, Ibid., 20, pp. 75–80.

Lopez-Neyra, R., and Medina, M.—1921. "*Dipylidium quinquecoronatum*, n. sp., Parasito Intestinal del Gato Domestico." Bol. R. Soc. Esp. Hist. Nat., 21, pp. 421–426, pl. XXVI.

* *Loveridge, A.*—1922. "Notes on East-African Birds (Chiefly Nesting Habits and Endoparasites) collected 1920–23." Proc. Zool. Soc., London, pp. 899–921.

Lühe, M.—1895. "Mitteilungen über Wenig Bekannte bez. neue Süd-Amerikanische Taenien des k.k.naturhist." Hof Mus. Wien. Archir. f. Naturg. Jahrg., 61, I, figs. 1–19.

Lühe, M.—1898A. "*Oochoristica*, nov. gen. Taeniadarum." Zool. Anz., 21, pp. 650–652.

* *Lühe, M.*—1898B. "Beiträge zur Helminthfauna der Berberi." Sitzungsber. K.Preuss. Akad. d. Wiss. Berlin, 40, pp. 619–628.

Lühe, M.—1899A. "Beiträge zur Kenntniss der Bothriocephaliden." Centralbl. f. Bakt. u. Parasit. 26, pp. 702–719.

Lühe, M.—1899B. "Zur Anatomie und Systematic der Bothriocephaliden." Verhandl. Deutsch. Zool. Ges., pp. 30–35.

Lühe, M.—1900A. "Beiträge zur Kenntniss der Bothriocephaliden." Centralbl. f. Bakt. u. Parasit, 27, pp. 209–227.

Lühe, M.—1900B. "Beiträge zur Kenntniss der Bothriocephaliden." Ibid., 27, pp. 252–258.

Lühe, M.—1910A. "Die Susswasserfauna Deutschlands." Heft. 18, Cestodes Jena.

Lühe, M.—1910B. "Cystotaenien Südamerikanischer Feliden Zool." Jahrb. Supp. 12, pp. 687–710, figs. 1-8, pls. 19-20.

Lydekker, R.—1896. "A Geographical History of Mammals." Cambridge.

MacCallum, G. A.—1921. "Studies in Helminthology." Zoopathologica, I., No. 6.

Maplestone, P. A., and Southwell, T.—1923. "Notes on Australian Cestodes." Ann. Trop. Med. and Parasit. 17, pp. 317–331, figs. 1–10.

Marotel, G.—1899. "Sur un Téniadé du Blaireau." Compt. Rend. Soc. Biol., Paris, 51, pp. 21–23.

Marotel, G.—1912. "Nouveau Cestode du Mouton." Soc. des Sc. Vet., Lyon.

Marotel, G.—1914. "Nouveau mode de présentation des Cestodes avec Application aux Parasites de Ruminants." 9e. Congrés Int. Zool., Monaco, pp. 662–663.

Matz, F.—1892. "Beiträge zur Kenntniss der Bothriocephaliden." Archir. f. Naturg. 58, Jahrg. 1, pp. 97–122, pl. VIII, figs. 1–30.

Meggitt, F. J.—1920. "On a new Species of Cestode, *Oochoristica erinacei*, from the Hedgehog." Parasitol 12, pp. 310–312, pl. XVII, figs. 12–13.

* *Meggitt, F. J.*—1921. "On a New Cestode from the Pouched Rat, *Cricetomys gambianum*." Ibid., 13, pp. 195–204, pl. IX.

Meggitt, F. J.—1924. "On two species of Cestoda from a Mongoose." Ibid., 16, pp. 48–54, 2 figs.

Mola, P.—1907. "Una Nuova Tenia della Talpa." Arch. Parasit. 11, pp. 379–386, pl. IV.

Molin, R.—1859. "*Cephalocotylea* e *Nematoidea*." Sitzingsber. k. Akad. Wiss. Wien. Math-naturw., 38, pp. 7–38, 1 pl.

Nassonow.—1897. "The Endoparasites of *Procavia syriaca* Ehrenb." (Russian). Zool. Lab. Univ. Warsaw.

Neumann, G.—1896. "Notes sur les Téniadés du Chien, et du Chat." Arch. Parasit. 9, pp. 171–184, figs. 1–5.

* *Nybelin, O.*—1916. "Neue Tetrabothriden aus Vögel." Zool. Anz., 47, pp. 297–301.

Nybelin, O.—1918. "Australische Cestoden." Results of Dr. E. Mjöberg's Swedish Scientific Expeditions to Australia, 1910–1913, pp. 1–47, figs. 1–5, pl. I–III.

Nybelin, O.—1922. "Anatomisch-Systematische Studien über Pseudophyllideen. Dissertation, Göteborg.

Okumura, I.—1919. "An Experimental Study of the Life-History of *Sparganum mansoni*, Cobbold." Kitasuto Archiv. Experiment, Med. 3, pp. 190–197, pls. I–II.

* *Pagenstecher, H. A.*—1877. Zur Naturgeschichte der Cestoden. Zeitschr. f. Wiss. Zool., 30, pp. 171–193, pl. X.

Parodi, S. E., and Widacowitch, V.—1918. "Cestodes del Genero Bothryocefalus Parásitas de algunas Especies de Neuestros Felinos Salvages." Rev. Jardin Zool., Buenos Aires, 2, pp. 222–227.

Preiswerk, G.—1895. "Beiträge zur Kenntniss de Schmelzstructur bei Säugethieren." Dissertation, Basel.

Railliet, A.—1899. "Sur les Cestodes du Blaireau." Compt. Rend. Soc. Bio., Paris, 51' 115 ser., 1, pp. 23–25.

Railliet, A., and Henry, A.—1912. "Helminthes Receuillis par l'Expédition Française du Pourquoi pas ?" Bull. Mus. Hist. Nat., Paris., No. 3, pp. 153–159.

Rátz, S. von.—1897. "*Dipylidium chyzeri*, n. sp., Ein neuer Bandwürm der Katze." Termaszetrajzi Füzetek, 20, pp. 197–266, pl. IV.

Rennie, J., and Reid, A.—1912. The Cestoda of the Scottish National Antarctic Expedition." Trans. R. Soc. Edin., 48, pp. 441–453, pls. I–II.

Riggenbach, E.—1896. Das genus *Ichthyotaenia*, Rev. Suisse. Zool., 4, pp. 165–275, pls. 7–9.

Rudin, E.—1916. "*Oochoristica truncata* Krabbe." Zool. Anz., 47, pp. 75–83, figs. 1–3.

* *Rudin, E.*—1917. "Die Ichthyotaenien der Reptilien." Rev. Suisse Zool., 25, pp. 179–381, pls. V–VII.

Rudolphi, C.—1819. "Entozoorum Synopsis."

Sauter, K.—1917. Beiträge zur Anatomie, Histologie, Entwicklungsgeschichte und Systematic der Rindertänien." Dissertation, Münich.

* *Setti, E.*—1891. "Sulle Tenie del l'Hyrax dello Scioa." Atti. Soc. Ligust, Sc. Nat., Genova, 2, pp. 316–325, pl, IX, figs. 1–4.

Setti, E.—1895. "*Dipylidium gervaisii*, n. sp. e Qualche Considerazione sui limiti Specifici nei Cestodi." Boll. Mus. Zool, e Anat. Comp., No. 32, pp. 1–8, pl. V.

* *Setti, E.*—1897. "Nuovi Elminthi del Erithrea." Atti. Soc. Ligust Sc. Nat., Genova, 8, pp. 28–32, pl. X, figs. 22–26.

Setti, E.—1898. Nuove Osservazione sui Cestodi Parasiti Degli Iraci." Ibid., 9, pp. 1–15.

Shipley, A. E.—1900. "A description of the Entozoa Collected by Dr. Willey during His Sojourn in the Western Pacific. Willey's Zoological Results, pp. 531–566, pls. LIV–LVI.

* *Shipley, A. E.*—1902. "On a Collection of Parasites from the Sudan." Arch. Parasit., 6, pp. 604–612.

Shipley, A. E.—1905. "Note on a Collection of Parasites belonging to the Museum of University College, Dundee." Proc. Camb. Phil. Soc., 13, pp. 95–102, 2 figs.

Shipley, A. E.—1907. "National Antarctic Expedition." Nat. Hist., 3, pp. 1–6, pl. I.

* *Simpson, W. J.*—1908. "Report on Plague in the Gold Coast in 1908."

Skrjabin, K. J.—1923. Studien zur Erforschung der parasitischen Würmer der Raubtiere I. Ein neuer Hundebandwürm, *Dipylidium rossicum*, n. sp." Arch. Nautschnoj Prakt. Weterinarij, 1, pp. 1–8, 6 figs. (Russian).

Sondhi, G.—1923. "Tapeworm Parasites of Dogs in the Punjab." Parasitol 15, pp. 59–66, pl. II.

Southwell, T.—1914. "A Short Account of Our Present Knowledge of the Cestode Fauna of British India and Ceylon." Proc. Asiatic Soc., Bengal, 10, pp. 139–145.

* *Southwell, T.*—1921. "On a New Species of Cestode (*Anoplocephala vulgaris*) from an African Rhinoceros." Ann. Trop. Med. and Parasit. 14, pp. 355–364, figs. 1–9.

Southwell, T.—1922. "Cestodes in the Collection of the Indian Museum." Ibid., 16, pp. 127–152.

* *Southwell, T., and Maplestone, P. A.*—1921. "A note on the Synonymy of the Genus *Zschokkeella* (Ransom, 1909) and of the Species *Z. guineensis* (Graham, 1908)." Ibid., 15, pp. 455–456.

* *Stephens, J. W. W.*—1908. "Two New Human Cestodes and a New Linguatulide." Ibid., 1, pp. 549–554, pl. L.

Stevenson, E. C.—1904. "Variation of the Hooks of the Dog Tapeworms *Taenia serrata* and *Taenia seriailis*." Studies from the Zool. Lab. Nebraska, No. 59, pp. 409–428, pls. I–VI.

Stiles, C. W.—1896. "A Revision of the Adult Tapeworms of Hares and Rabbits." Proc. U.S. Nat. Mus., 19, No. 1105.

Stiles, C. W., and Hassall, A.—1893. "A Revision of the Adult Cestodes of Cattle, Sheep, and Allied Animals." U.S. Dept. Agric., Bull. No. 4.

Stiles, C. W., and Hassall, A.—1902–1912. "Index Catalogue of Medical and Veterinary Zoology." Cestoda.

Sweet, G.—1909. "The Endoparasites of Australian Stock and Native Fauna, Parts I and II." Proc. R. Soc. Victoria, 21, pp. 454–527, pl. XXIX.

Theiler, G.—1924. "On the Classification of the Cestode genus *Moniezia*." Ann. Trop. Med. and Parasit. 18, pp. 109–123, figs. 1–12.

Trouessart, E. L.—1899. "Catalogus Mammalium."

Trouessart, E. L.—1905. "Catalogus Mammalium." Supplementum.

* *Veglia, F.*—1919. "I Vermi Parassiti Negli Animali del Sud-Africa." Ann. Acad. Agric., Torino, 62, pp. 16–38.

Vevers, G. M.—1922. "On the Cestode Parasites from Mammalian Hosts which died in the Gardens of the Zoological Society of London during the Years 1919–1921." Proc. Zool. Soc., Lond., pp. 921–928, figs. 11–12.

Ward, H. B.—1896. "A new Human Tapeworm." Western Med. Rev., 1, pp. 35–36, figs. 1–2.

Ward, H. B.—1897A. "Animal Parasites of Nebraska." Ref. for 1896, Nebr. St. Bd. Agric., Lincoln, Nebraska, pp. 173–189, figs. 1–12.

Ward, H. B.—1897B. "Note on *Taenia confusa*." Zool. Anz., 20, pp. 321–322.

Ward, H. B.—1923. "Report of a Case of *Dibothriocephalus latus*." Journl. Parasit. 9, p. 244.

* *Weithofer, M.*—1916. "Vogelcestoden aus Senaar und Kordofan, I." Teil. Anz. K. Akad. Wiss. Wien. Math-maturw., 53, pp. 1–3.

Wharton, L. D.—1917. "The Intestinal Worms of Dogs in the Philippine Islands." Journl. Parasit. 4, pp. 80–82.

Wolffhugel, K.—1911. "Los Zooparasitos de los Animales Domesticas en la Republica Argentina." Rev. del Centro de Estud de Agron. y Vet., Buenos Aires, pp. 1–108.

* *Woodland, W. F. N.*—1923. "On some Remarkable new forms of *Caryophyllaeidae* from the Anglo-Egyptian Sudan, and a Revision of the Families of the *Cestodaria*." Quart. Journl. Mic. Sc., 67, pp. 435–472, pls. 24–25.

* *Yorke, W., and Southwell, T.*—1921. "Lappeted *Anoplocephala* in Horses." Ann. Trop. Med. and Parasit. 15, pp. 249–264, figs. 1–11, pl. XVII.

Yoshida, S.—1917. "The Occurrence of *Bothriocephalus liguloides* Leuckart, with Especial Reference to its Development." Journl. Parasit. 3, pp. 171–176.

Zschokke, F.—1889. "Recherches sur la Structure Anatomique et Histologique des Cestodes." Mem. Inst. Nat., Genevois, Genève, 17.

Zschokke, F.—1898A. "Die Cestoden aus Marsupialen und Monotremen." Semon, Zoologischeforschungsreise, Jenaisch Denkschr., 8, pp. 359–380, pl. XXIV.

Zschokke, F.—1898B. "Weitere Untersuchungen an Cestoden Aplacentaler Saügethiere." Zool. Anz., 21, pp. 477–479.

Zschokke, F.—1899. "Neue Studien an Cestoden Aplacentaler Saügethiere." Zeitschr. f. Wiss. Zool., 45, pp. 404–445, pls. XX–XXI.

Zschokke, F.—1903. "Die Arctischen Cestoden." Fauna Arctica, Jena, pp. 1–32, figs. 1–3, pls. I–II.

Zschokke, F.—1904. "Die Darmcestoden der Amerikanischer Beuteltiere." Centralbl. f. Bakt. u. Parasit., 36, pp. 51–62, 1 pl.

Zschokke, F.—1905. "Das Genus *Oochoristica*, Lühe." Zeitschr. f. Wiss. Zool, 83, pp. 53–67, pl. I.

Zschokke, F.—1917. "*Dibothriocephalus parvus*, J. J. Stephens." Rev. Suisse. Zool. 26, pp. 425–440.

EXPLANATION OF THE FIGURES.

Luheella pretoriensis, n.sp.

Fig. 1.—A diagrammatic transverse section, to show the relative position of the excretory vessels and of the nerves.
Fig. 2.—Whole mount of gravid segments, showing the characteristic aspect of the uterus.
Fig. 3.—A transverse section passing through the cirrus pouch.
Fig. 4.—A sagittal section, showing the internal anatomy.
Fig. 5.—The details of the cirrus pouch.

Diphyllobothrium theileri, n.sp.

Fig. 6.—A transverse section passing near the ovary.
Fig. 7.—A sagittal section, showing the internal anatomy.
Fig. 8.—A sagittal section through the gravid uterus.

Paranoplocephala acanthocirrosa, n.sp.

Fig. 9.—Two different aspects of the scolex : (*a*) relaxed, (*b*) contracted.
Fig. 10.—Horizontal section, showing internal anatomy (reconstructed).
Fig. 11.—Horizontal section through a gravid uterus.

Fuhrmannella transvaalensis, n.g., n.sp.

Fig. 12.—Horizontal section, showing the general anatomy (reconstructed).
Fig. 13.—Portion of a transverse section, showing the aspect of the uterus.
Fig. 14.—Diagrammatic view of a segment, showing the disposition of the uterus.
Fig. 15.—Sagittal section passing through the juncture of the ventral vessel and the transverse vessel.
Fig. 16.—Sagittal section, showing the growing uterus.
Fig. 17.—Sagittal section through 3 gravid segments.

Oochoristica ichneumontis, n.sp.

Fig. 18.—Horizontal section, showing the general anatomy (reconstructed).

Inermicapsifer aberratus, n.sp.

Fig. 19. Horizontal section, showing the anatomy (reconstructed).
Fig. 20.—Aspect of 3 gravid segments.

Inermicapsifer arvicanthidis (Kofend).

Fig. 21.—Whole mount of the scolex.
Fig. 22.—Horizontal section, showing anatomy (reconstructed).
Fig. 23.—Transverse section, showing the young uterus.
Fig. 24.—The aspect of 3 gravid segments.

Inermicapsifer lopas (Bischoff).

Fig. 25.—Nine individuals all at the same stage of development. (Drawn to the same scale.)

Inermicapsifer linstowi (Parona).

Fig. 26.—Whole mount of a gravid segment.

Inermicapsifer guineensis (Graham).

Fig. 27.—Horizontal section, showing the excretory system.

Dipylidium fuhrmanni, n.sp.

Fig. 28.—Three different aspects of the scolex.
Fig. 29.—Internal anatomy.

Hymenolepis macroscelidarum, n.sp.

Fig. 30.—Scolex.
Fig. 31.—Hooks.
Fig. 32.—Transverse section, showing the anatomy.

Taenia parva, n.sp.

Fig. 33.—Whole mount of the entire worm.
Fig. 34.—Large and small hooks.
Fig. 35.—Portion of a transverse section passing through the genital pore.
Fig. 36.—Photomicrograph of a transverse section passing through the ovary.

Fig. 37.—Photomicrograph of a transverse section passing through the cirrus pouch.
Fig. 38.—Photomicrograph of a transverse section passing through the vagina and cirrus pouch.
Fig. 39.—Photomicrograph of a transverse section passing through a young gravid uterus.
Fig. 40.—Photomicrograph, showing the longitudinal musculature.
Fig. 41.—Whole mount of two gravid segments.

Taenia hyaenae, n.sp.

Fig. 42.—Large and small hooks.
Fig. 43.—Whole mount of a gravid segment.

List of Abbreviations.

CP.	Cirrus pouch.	T.	Testes.
DV.	Dorsal excretory vessel.	TV.	Transverse excretory vessel.
E.	Ova in the parenchyma.	Ug.	Uterine glands.
GA.	Genital atrium.	Up.	Uterine pore.
MV.	Main excretory vessel.	Ut.	Uterus.
N.	Nerve.	V.	Excretory vessel.
Ov.	Ovary.	Va.	Vagina.
RM.	Retractor muscle.	VD.	Vas deferens.
RS.	Receptaculum seminis.	Vg.	Yolk-gland.
S.	Sphincter muscle.	VSi.	Vesicula seminis interna.
Sg.	Shell-gland.	VV.	Ventral excretory vessel.
SV.	Secondary vessel.		

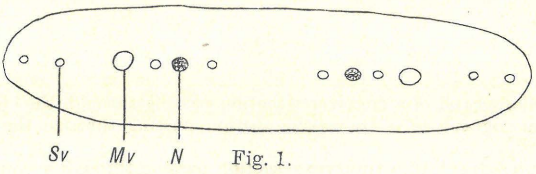


Fig. 1.

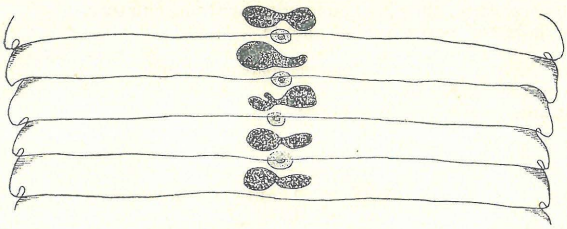


Fig. 2.

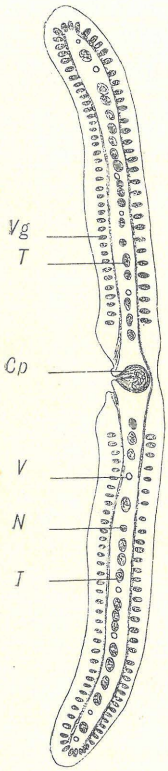


Fig 3.

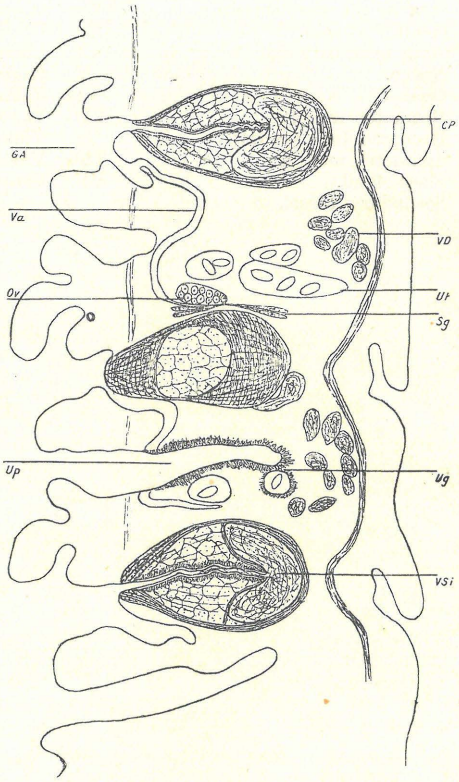


Fig. 4.

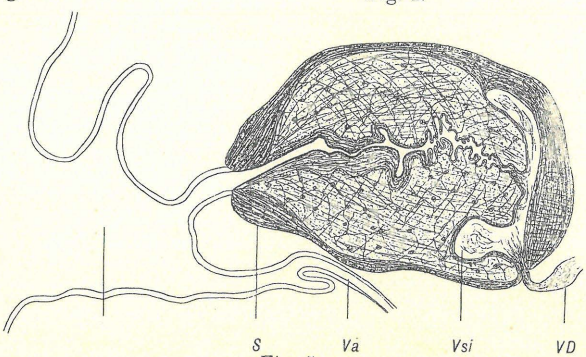


Fig. 5.

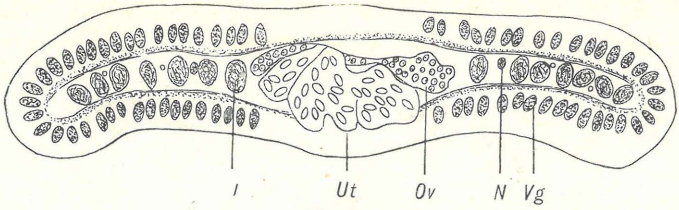


Fig. 6.

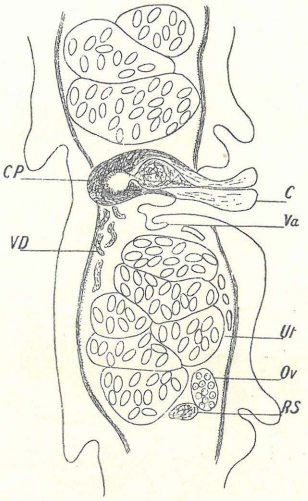


Fig. 7.

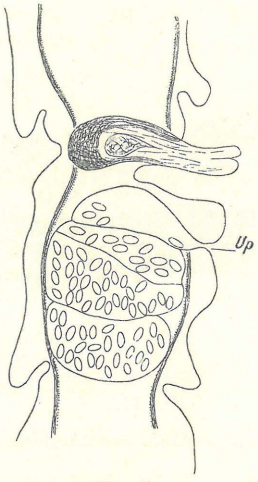
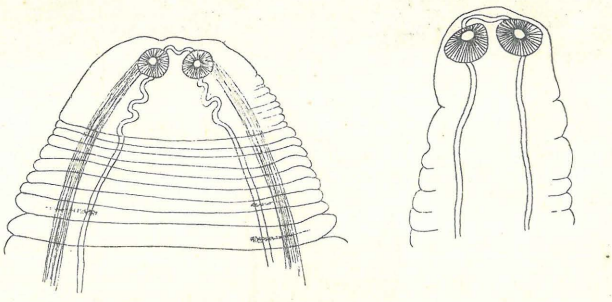


Fig. 8.



b *a*

Fig. 9.

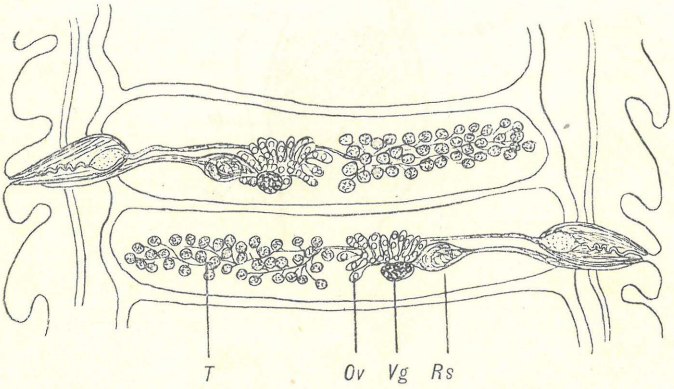


Fig. 10.

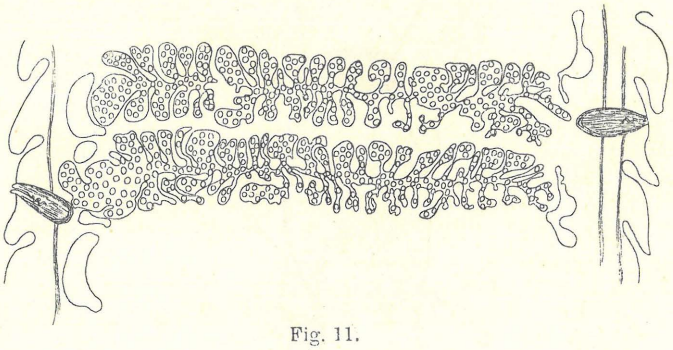


Fig. 11.

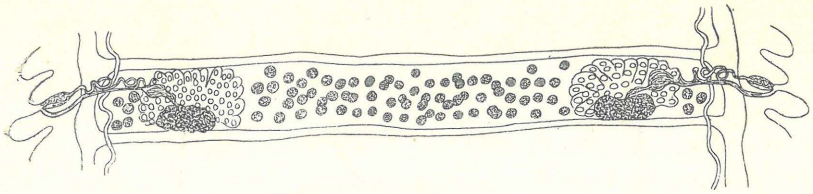


Fig. 12

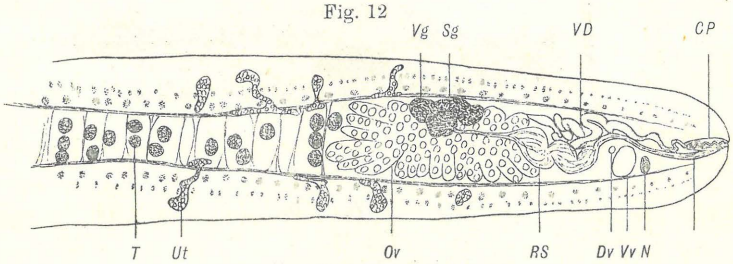


Fig. 13.

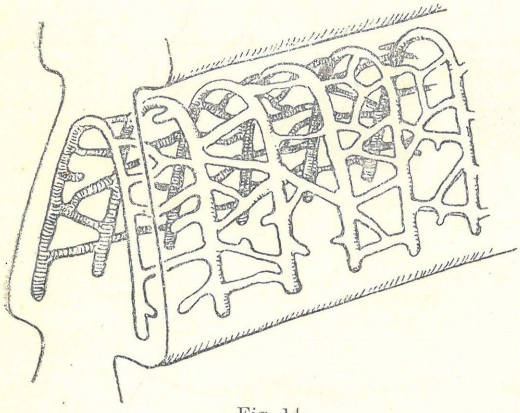


Fig. 14.

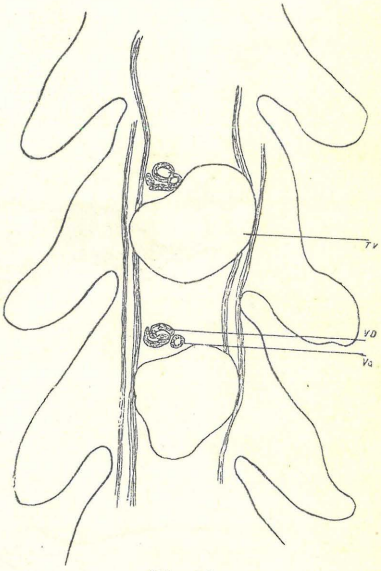


Fig. 15.

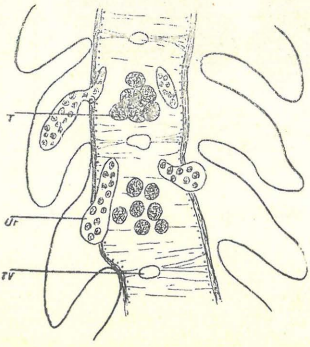


Fig. 16.

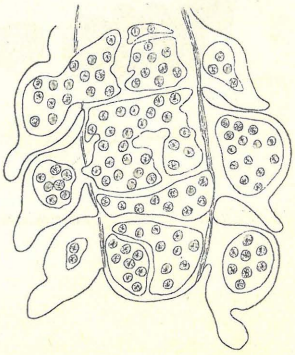


Fig. 17

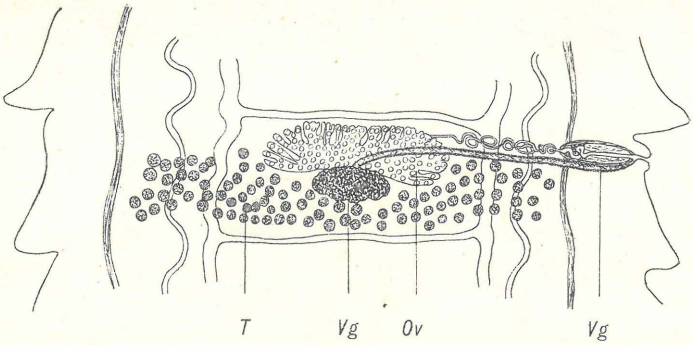


Fig. 18.

Oochoristica ichneumontis, n.sp.

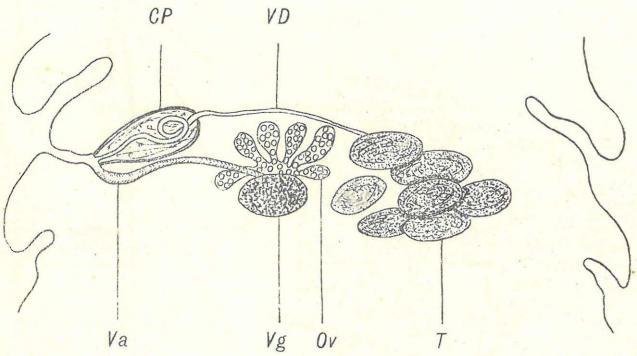


Fig. 19.

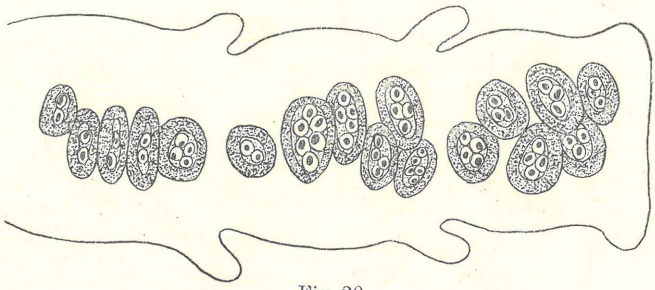


Fig. 20.

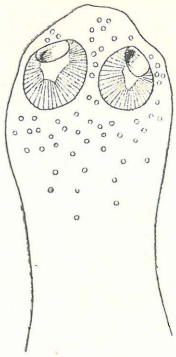


Fig. 21.

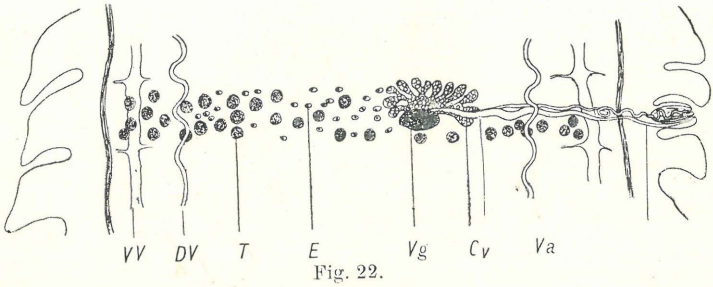


Fig. 22.

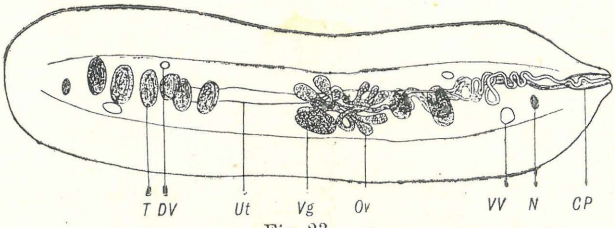


Fig. 23.

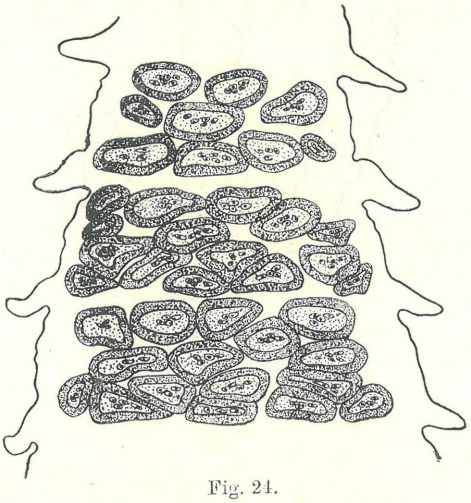


Fig. 24.

Inermicapsifer arvicanthidis (Kofend).

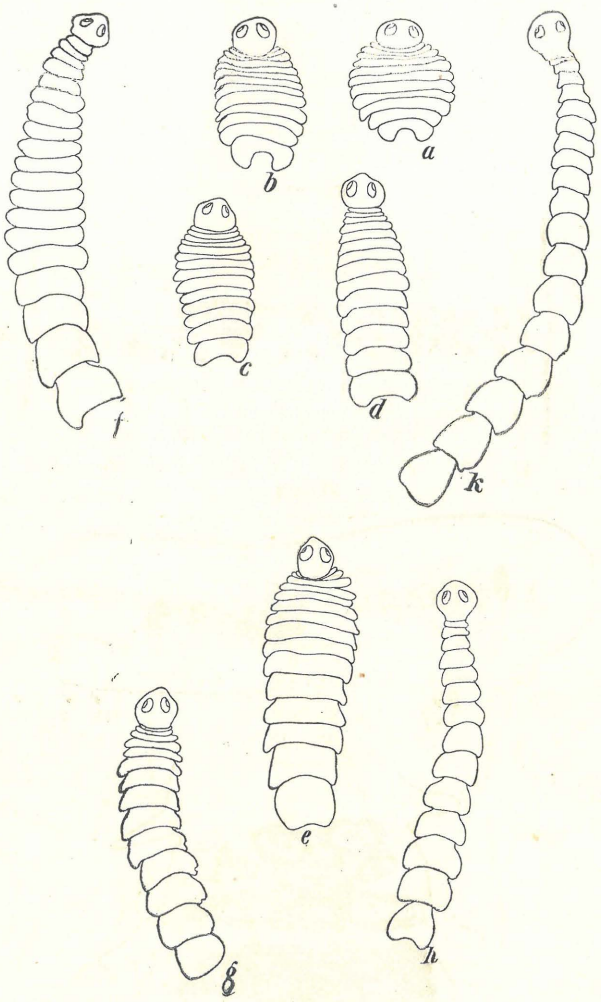


Fig. 25.

Inermicapsifer lopas (Bischoff).

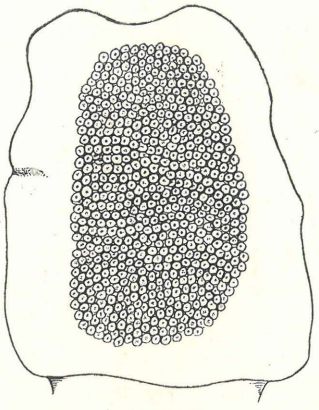


Fig. 26.
Multicapsiferina linstowi (Parona).

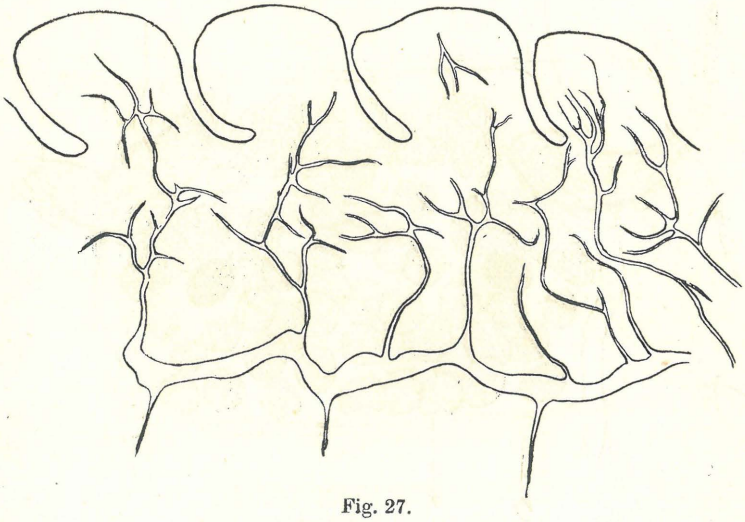


Fig. 27.
Inermicapsifer guineensis (Graham).

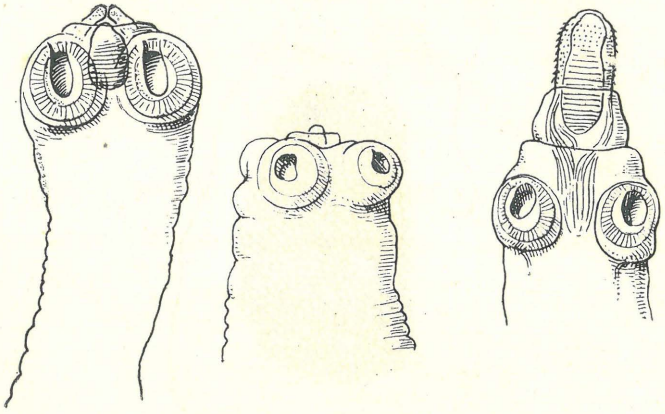


Fig. 28.

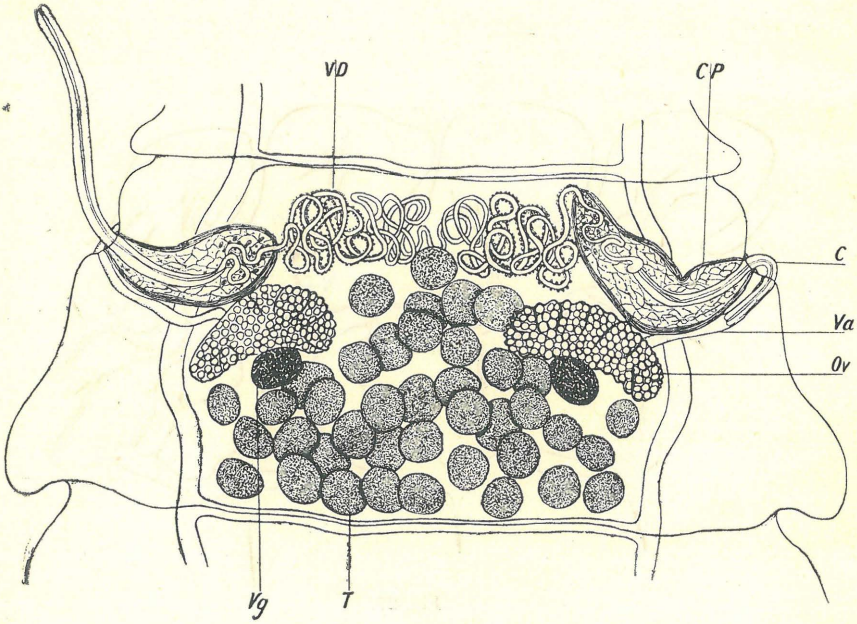


Fig. 29.

Dipylidium fuhrmanni, n.sp.

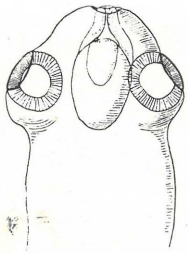


Fig. 30.

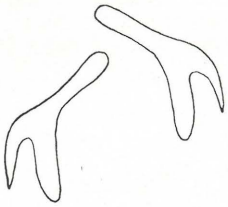


Fig. 31.

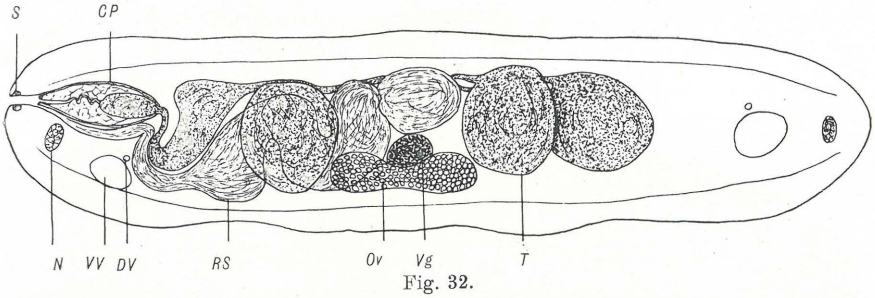


Fig. 32.

Hymenolepis macroscelidarum, n.sp.

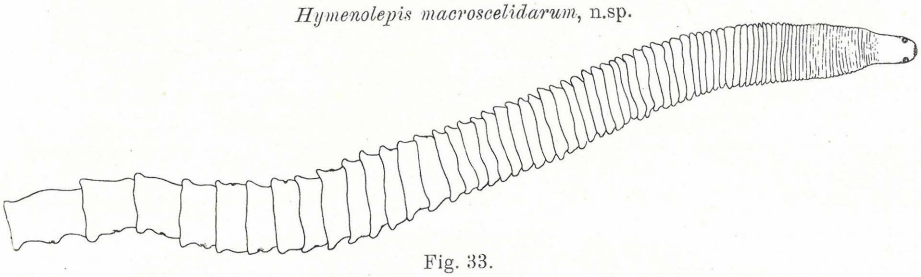


Fig. 33.

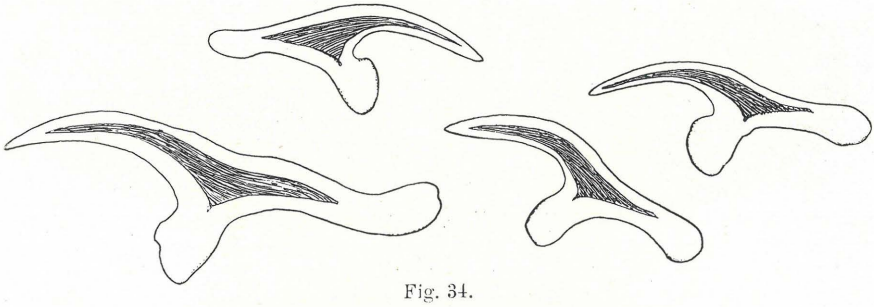


Fig. 34.

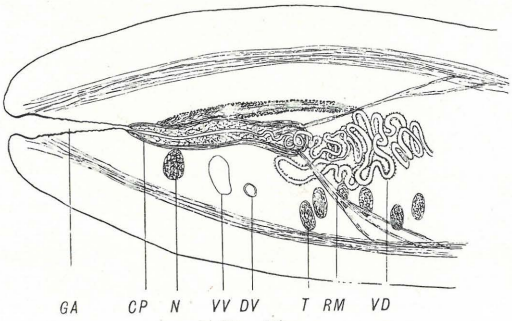


Fig. 35.

Taenia parva, n.sp.

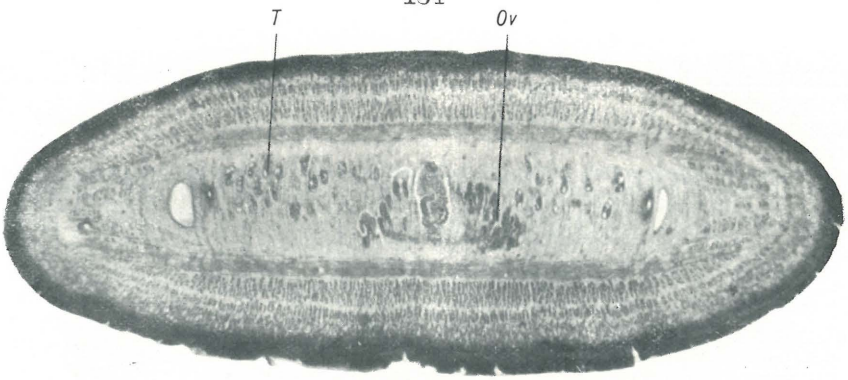


Fig. 36

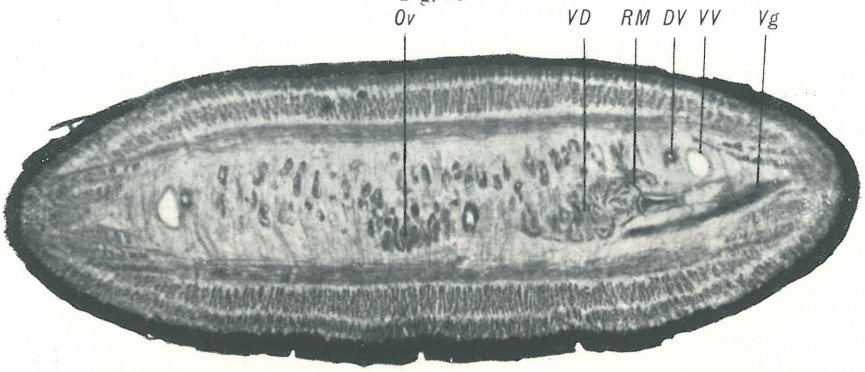


Fig. 37.

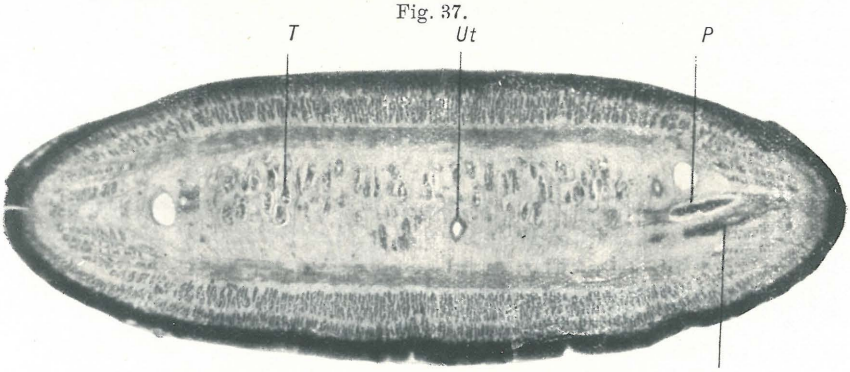


Fig. 38.

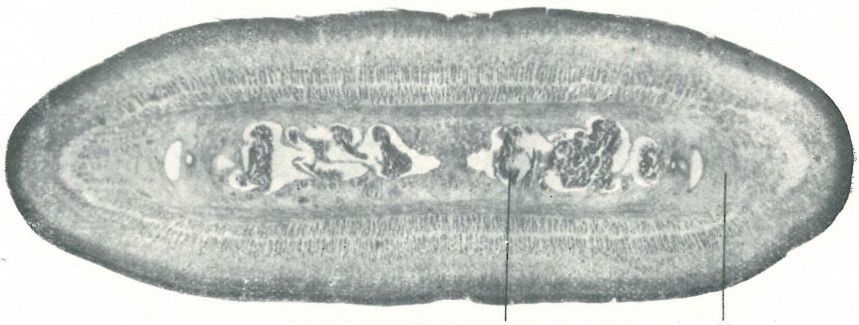


Fig. 39.

Taenia parva, n.sp.

Fig. 40.

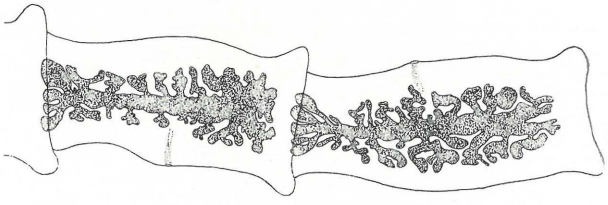


Fig. 41.

Taenia parva, n.sp.

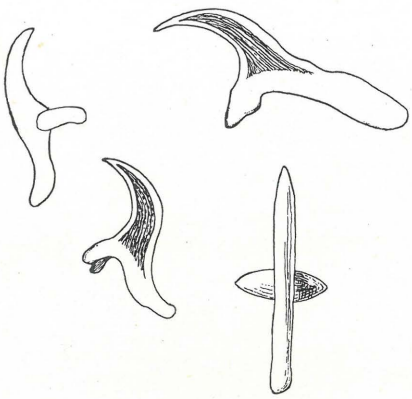


Fig. 42.

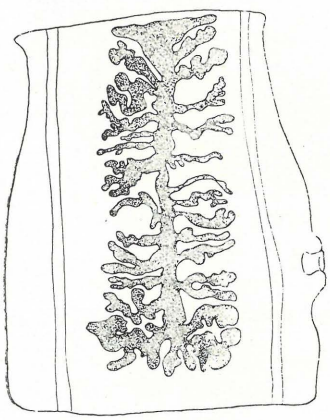


Fig. 43.

Taenia hyaenae, n.sp.