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ANTARCTIC MARINE
FREE-LIVING NEMATODES
OF THE
SHACKLETON EXPEDITION

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CONTRIBUTIONS TO A SCIENCE OF NEMATOLOGY¹

I

Nematodes are so frequent in the Shackleton collections as to prove the seabottoms of the farthest south to swarm with these little beings. Hundreds of them, male, female and young, were taken from a mere thimbleful of the dredgings. The same tale comes from stations wide apart. Countless myriads find sustenance in these cold dark depths, and must in their turn be devoured by larger forms, until the series culminates in herds of seal and schools of whale. "All that in them is," takes on added meaning!

Whence do these nematodes derive their sustenance? The stomachs of a number of the species contain diatoms with such regularity as to leave no doubt that these microscopic plants constitute a main food supply. The undigested frustules of the diatoms are voided and go to make up the permanent sea floor, so that the interesting little creatures whose portraits follow, or at least a part of them, assist in building what some future epoch may disclose as dry land formations of diatomaceous earth as remarkable as those of the United States or those of Tripoli. Some of the other species appear to be predacious, though none belong to the truly carnivorous group of the *Enoplidae*. No doubt the greater part of the species are vegetarian.

These antarctic species are on the whole somewhat smaller than those of warmer seas, but one of them, that mentioned last, is a veritable

¹*Nematology*—a contraction of Nematodology. The founding of this branch of science, on a par with Entomology for example, is fully justified by the fact that the Nematodes constitute such a distinct and highly characteristic group of organisms, containing an enormous number of species readily susceptible of division into definite Orders, some of which are of great economic importance.

giant of its kind. Seven tropical *Monhystera* taken at random from the writer's collections prove to average hardly 50 per cent longer than the average of the seven polar *Monhystera* here described.

There is little evidence that these polar species are less fecund than those found elsewhere. It is hardly conceivable that the body temperature of the marine polar species is higher than that of the water in which they live, namely, near the freezing point of fresh water, and yet, in spite of the freezing temperature, and the long polar night, nematode protoplasm seems to glide on through its mitosis dance to much the same purpose as if bathed in equatorial light and ensconced in the warm pools of tropical reefs.

Through long residence and much travel in Pacific regions the writer has had unusual opportunity to become acquainted with their charac-

teristics, and having at times paid particular attention to the marine nematodes of these regions (map), is able from personal observation to say concerning the nematodes Lieutenant Shackleton's expedition brought from the far South, that in nothing are they more remarkable than in the striking resemblance they bear to forms found in the warmer parts of the water hemisphere.

Their nearest known relatives are found in New Zealand and the islands off the coast of the south end of South America. Nearly all of

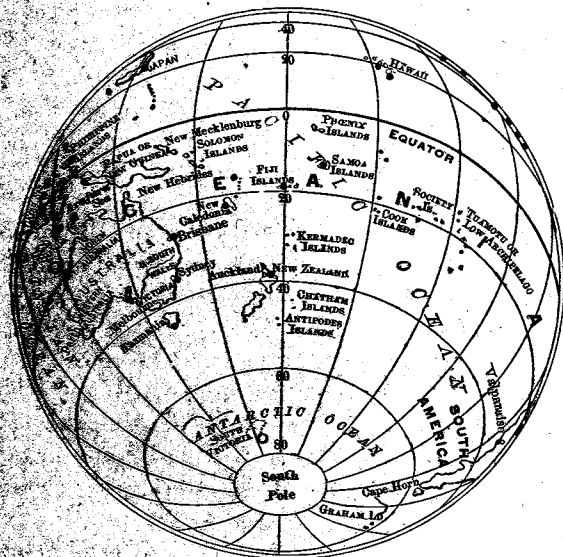


Fig. 1. Marks indicate about twenty of the author's Nematode Stations—North American, Asiatic, Australasian and Oceanic—at the great majority of which he has made personal examinations, and with the nematode fauna of which the Shackleton nematode collections are compared.

the Shackleton species belong to known genera, and the two new genera are nearly related to genera already known, *Aplectus* to the known *Plectus* and *Austronema* to the known *Monhystera*.

The spermatogenesis of *Terschellingia polaris*, n. sp. presents some very interesting features which are noted in connection with the description. Recently it has been suggested that of the two kinds of spermatozoa Boveri and Schleip have shown to exist in the males of the free-living generation of *Rhabdias bufonis*,² one kind, supposedly that producing males, becomes functionless, thus accounting for the succeeding generation consisting solely of "parthenogenetic females," found in frogs' lungs. The spermatozoa of *Ascaris equorum*³ and (?) *Cystidicola farionis*,⁴ have been shown also to be of two sorts. In all these cases the two kinds of spermatozoa are very similar to each other, so much so that the differences were long overlooked by keen observers. In *Terschellingia polaris* the differences in the male generative cells are of an extremely striking character, and seem to lend countenance to the earlier suggestion of the writer, that spermatocytes may in their reduction division produce polar bodies or their true homologues, abortive spermatozoa. We realize now that there has been too large a degree of assumption in taking it for granted that all four of the spermatozoa quartette are equivalent simply because they are similar in form and size. A careful examination of their structure is revealing important differences.

Very possibly it is a comparatively minor phenomenon that the polar bodies of eggs remain attached to their larger functional companion cell. Taking this view, three of the four companion-spermatozoa may, without violence, be regarded as homologues of the "polar bodies." Whether they are functional or not is a matter that may be considered quite apart from their history or structure. Generally speaking we know little or nothing about their relative "potency." That all, or any definite fraction of them are functional is more or less pure supposition. What we know is that some of them are functional—perhaps all, perhaps not.

Though these things are thus far outside our field of experience, they constitute problems that seem certain soon to be attacked from the experimental side, by following the history of specific members of the spermatid quartette; and one object of this note is to call attention to the fact that the free-living nematodes offer an attractive field for such work.

² *Rhabdias bufonis* (Schrank 1788) S. and H. 1905 = "*Rhabditis nigrovenosa*."

³ *Ascaris equorum* Goeze 1782 = "*Ascaris megaloccephala*."

⁴ (?) *Cystidicola farionis* Fischer 1798 = "*Ancriyacanthus cystidicola*."

Incidentally there is raised the very interesting question whether *Terschellingia polaris* may not be the free-living form of a dimorphic species having a parasitic stage in some higher antarctic form. It is the writer's impression, based on a very considerable amount of observation, that numerous free-living nematode forms, marine as well as land and fresh water, belong to such dimorphic species.

The following diagram illustrates the nature of the formula used in the tabulation of the various necessary measurements:

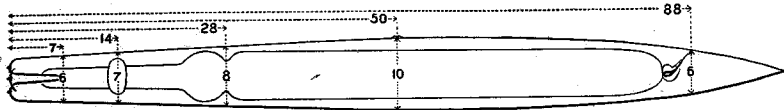


Fig. 2. Diagram of the descriptive decimal formula used for nematodes; 6, 7, 8, 10, 6 are the transverse measurements, while 7, 14, 28, 50, 88 are the corresponding longitudinal measurements. The formula in this case is:

$$\frac{7. \quad 14. \quad 28. \quad 50. \quad 88.}{6. \quad 7. \quad 8. \quad 10. \quad 6.}$$

The unit of measurement is the hundredth part of the length of the body, whatever that may be. The measurements become, therefore, percentages of the length. The absolute length is given in millimeters as a final non-paired term.

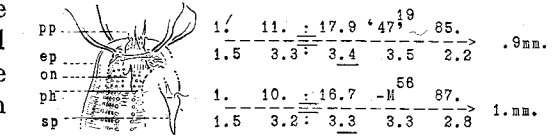
The measurements are taken with the animal viewed in profile; the first are taken at the base of the pharynx, the second at the nerve-ring, the third at the cardiac constriction or end of the neck, the fourth at the vulva in females and at the middle (*M*) in males, the fifth at the anus. The formulae represent the average of several specimens.

When the specimens were received from Mr. James Murray, the biologist of the Shackleton Expedition, they were in formalin. They were next treated with cold concentrated solution of mercuric chloride, then stained with Mayer's acid carmine and finally examined in balsam. It is well to bear these facts in mind in reading the measurements, as both the relative and absolute measurements vary somewhat with various methods of fixation and preservation. The number of specimens and their state of preservation is noted at the end of each description, and from the data a rough guess may often be made as to the abundance of the species and the relative frequency of the sexes.

By the use of suggestive conventional signs the formulae are made to convey considerable additional information. Thus the formula on p. 7 indicates that the cuticle is traversed by rather coarse transverse striae,⁵

⁵ Formula line of short dashes. See table, p. 7.

which are resolvable into rows of dot-like markings⁶ modified on the lateral fields,⁷ where there are distinct wings to the cuticle,⁸ one on each side of the lateral lines. The excretory pore is located near the lips,⁹ and the tail end is armed with caudal glands and a spinneret.¹⁰



The oesophagus has a posterior or cardiac bulb two-thirds as wide as the base of the neck.¹¹ The two ovaries are symmetrically arranged, reflexed, and occupy 19 per cent of the length of the body.¹² And, similarly, the male internal sexual organ is single and outstretched, and occupies 56 per cent of the length of the body.

Among the dredgings at Ross Island were three containing nematodes which furnished material for this report. These three were marked: (1) "Bay, Cape Royds, in 10 to 20 fathoms of water, May 31, 1908;" (2) "Cape Royds, in 25 to 50 fathoms of water, July, 1908;" (3) "Bay, in 13 fathoms of water, April 30, 1908." These are referred to in the following descriptions as, (1), Bay, Cape Royds; (2), Cape Royds; and (3), Bay.

Terminology relating to Striation of Cuticle.

Term	Numerical value	Graphic representation
Very coarse	about 100 to the mm., or less	_____
Coarse	" 250 " " "	-----
Rather coarse	" 500 " " "	- - - - -
Rather fine	" 750 " " "
Fine	" 1000 " " "
Very fine	" 1500 " " " or more
None		_____

The camera lucida sketches are all made to the same scale, namely, a magnification of 750 diameters, except in the case of *Thoracostoma*, which was drawn at 400 diameters. The sketches may be relied upon as accurate. Information in the keys is not repeated elsewhere.

⁶ Dots above and below the line between the second and third terms.

⁷ Modified dots outside those just mentioned in 6.

⁸ Lines above and below the formula line between the second and third terms.

⁹ Oblique line near the pharyngeal terms of the formula.

¹⁰ Angular mark at right-hand end of formula.

¹¹ Underscoring the third diametral measurement, thus indicating the presence of a bulb. Length of mark indicates the size of the bulb.

¹² Curved marks before and after 47, and 19 used as an exponent figure.

NOTE: Absence of any particular mark indicates the absence of that particular feature so far as at present known.

KEY, BASED ON CHARACTERS NOT EMPHASISED ELSEWHERE

		<u>25 New Species and 2 New Genera</u>	
<u>TAIL CONOID, THEN CYLINDROID, AT LEAST IN FEMALES</u>			
<u>Posterior(cardiac)oesophageal bulb present</u>			
Bulb oblate	-m-f	<i>Terschellingia polaris</i>	5
Bulb pyriform			
Musculature of bulb broken into 2 parts; striae resolvable into elongate markings			
Wings (interrupted striae) inconspicuous	f'	<i>Chromadora meridiana</i>	14
Wings " " pronounced	-m f'	<i>Spilophora edentata</i>	16
Musculature of bulb unbroken; striae resolve into dotlike markings, at least on head			
Striae difficult of resolution		<i>Spira septentrionalis</i>	1
Striae easy to resolve			
Cardiac bulb three-fourths as wide as neck ..-	m f'	<i>Spilophora antarctica</i>	17
Cardiac bulb one-half as wide as neck	-m f'	<i>Aplectus antarcticus</i>	3
<u>Posterior(cardiac)oesophageal bulb none</u>			
Amphids almost invisible transverse slits	-m	<i>Anticoma subsimilis</i>	2
Amphids circular, usually easy to see			
Pharynx Plectoid, long, resembling oesophagus ..-	m f'	<i>Aplectus antarcticus</i>	3
Pharynx short, often small			
Intestinal cells clearly reticulated		<i>Sabateria antarctica</i>	4
Intestinal cells not clearly reticulated			
Oesoph. trifle larger fm. behind nerving ..-	m f	<i>Austronema spirurum</i>	6
Oesophagus plain			
Renette distinctly developed			
Somatic setae as long as body is wide	-m-	<i>Monhystera pilosa</i>	7
Somatic setae none or inconspicuous	-m f	<i>Monhystera uniformis</i>	8
Renette inconspicuous or none			
Chromatin bodies, 1 in front of each amphid ..-	m f	<i>Monhystera frigida</i>	9
Chromatin bodies nr. amphids none or faint			
Contour crenate, esp. ventral side of tail ..-	m f	<i>Monhystera polaris</i>	10
Contour entire	f	<i>Monhys. septentrionalis</i>	11
<u>TAIL CONOID, NO PART CYLINDROID</u>			
<u>Posterior(cardiac)oesophageal bulb present</u>			
Bulb elongated, not clearly subdivided; renette cell probably ellipsoidal	-m f	<i>Laxus septentrionalis</i>	23
Bulb pyriform, musculature broken into unequal parts; renette cell elongated			
Contour on ventral side of male tail serrate ..-	m f'	<i>Spilophora serrata</i>	18
Contour entire			
Renette cell $\frac{1}{4}$ wide as long; Phar. bulb faint ..-	m	<i>Chromadora polaris</i>	15
Renette cell $\frac{1}{8}$ " " " " pronounced ..-	m f'	<i>Euchr. septentrionalis</i>	19
<u>Posterior bulb none (12, 13), or a mere swelling</u>			
<u>Striae of minute more or less elongate elements</u>			
Dorsal tooth with no minute dental opponents ..-	m f'	<i>Euchromad. antarctica</i>	20
Dorsal " with 1 (22) or 2 (21) Subm. " "			
Tail regular, terminus about $\frac{1}{2}$ wide as base .	f'	<i>Euchromad. denticulata</i>	21
Tail \pm suddenly narrowed on Vent. side nr. anus ..-	m f'	<i>Euchromadora meridiana</i>	22
<u>Striae appear impossible of further resolution</u>			
Lips strong, chitinous, acute, conoid, eversible .		<i>Axonolaimus polaris</i>	24
Lips not acute, \pm mobile but not eversible			
Cardiac region conspicuously non-staining ..-	m f	<i>Monhystera meridiana</i>	12
Cardiac region of average nature			
Unicellular lateral glands and pores absent ..-	m f	<i>Monhystera antarctica</i>	13
Unicellular lateral glands and pores present ..-	m f'	<i>Thoracostoma polare</i>	25

KEY, BASED ON MALE CHARACTERS

		<u>19 New Species and 2 New Genera</u>	
<u>PRE-ANAL SUPPLEMENTARY ORGANS PRESENT</u>			
Suppl. organs 10, submedian, in 2 rows of 5 each ..-	m f'	<i>Thoracostoma polare</i>	25
<u>Supplementary organs in a single ventral row</u>			
<u>Organs 3 (or 1 in <i>Anticoma</i>), faint in <i>Sp. serrata</i></u>			
Form tubular, $\frac{1}{5}$ as wide as long			
Length $\frac{2}{5}$ body Diam.; just in front of spicula ..-	m	<i>Anticoma subsimilis</i>	2
Length $\frac{1}{5}$ " " ; Ant. Org. 1 tail-Egth. frm. anus ..-	m f'	<i>Aplectus antarcticus</i>	3
Form companulate, very minute, deep as wide			
Organs 7, equidistant, faint in <i>Sp. edentata</i>		<i>Spilophora serrata</i>	18
<u>Form cup-like, as deep as body wall is thick</u>			
Cardiac bulb present	-m	<i>Chromadora polaris</i>	15
Cardiac bulb reduced to a faint swelling	-m f'	<i>Euchromad. antarctica</i>	20
Form papilloid, row 3 body-widths long	-m f'	<i>Spilophora edentata</i>	16
<u>PRE-ANAL SUPPLEMENTARY ORGANS ABSENT</u>			
<u>Accessory pieces to spicula absent or faint</u>			
Spicula suddenly hookshaped at proximal end ..-	m f	<i>Austronema spirurum</i>	6
Spicula of usual form, cephalated by expansion			
Form arcuate, proximate ventral to body axis ..-	m f'	<i>Spilophora antarctica</i>	17
Form somewhat L-shaped, Prox. dorsal to Bdy. axis ..-	m f	<i>Monhystera meridiana</i>	12
<u>Accessory piece or pieces to spicula present</u>			
<u>Apophysis to accessory piece bending backward</u>			
Proximal ends of spicula not cephalated	-m f	<i>Terschellingia polaris</i>	5
Proximal ends of spicula cephalated			
Cephalated by constriction	-m f	<i>Monhystera antarctica</i>	13
Cephalated by more or less expansion			
Form more or less L-shaped			
Structure rather robust	-m f	<i>Monhystera polaris</i>	10
Structure " frail	-m f	<i>Monhystera frigida</i>	9
Form nearly straight, or arcuate			
Spicula nearly straight	-m-	<i>Monhystera pilosa</i>	7
Spicula arcuate			
Lgth $2\frac{1}{2}$ times anal body diameter	-m f	<i>Monhystera uniformis</i>	8
Lgth $1\frac{1}{2}$ " " " " "not very slender ..-	m f	<i>Laxus septentrionalis</i>	23
<u>Apophysis to accessory pieces absent</u>			
Spicula cephalated by contraction	-m f'	<i>Euchromadora meridiana</i>	22
Spicula cephalated by expansion			
Cephalum set off by a constriction	-m f'	<i>Euchr. septentrionalis</i>	19
Cephalum not set off by a constriction	-m f'	<i>Spilophora antarctica</i>	17

KEY TO SIGNS

f', ovaries 2, symmetrical, reflexed. -m-, testes 2, one extending each way.
-f, " 2 " outstretched. -m, " 2, one only outstretched.
-f, ovary 1, outstretched forward. -m, testis 1, outstretched forward.

Abbreviations

lb, lip or lipregion	pp, labial papillae	st, cephalic setae
on, pharyngeal tooth	ph, pharynx	sp, spinneret
am, amphid	oe, oesophagus	ep, excretory pore
lc, locule of cuirasse		pc, cordiform piece

DESCRIPTIONS OF THE SPECIES

CHARACTERS COMMON TO ALL THE SPECIES

Disregarding *Thoracostoma*, which is exceptional in the large size of the caudal glands, the possession of eye-spots, of distinct dermal pores and of oesophageal glands, and also in the possession of relatively very strong spicula with a compound framework, it may be said that the following characters are common to all the species here described:

There is no median oesophageal bulb, and no pre-rectum. The tail is of approximately the same form in both sexes, and in all cases is supplied with a rather simple spinneret, and with caudal glands—the latter confined to the tail. The eggs, so far as known, are smooth and comparatively thin-shelled, and are deposited before segmentation begins.

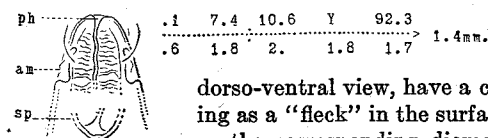
All known males have equal spicula of simple framework, and all are without bursa. There are no eye-spots. The cuticle is colorless, or nearly so, is without distinct pores, and is destitute of longitudinal striae except obscure indications in *Spilophora serrata* and *Chromadora meridiana*, where the secondary elements of the cuticle arrange themselves also to a certain extent in longitudinal lines.

The renette, when present, has its cell behind the cardiac constriction, except in *Anticoma*. Glands in the interior of the oesophagus have been seen only in *Thoracostoma*, and possibly, though these latter are of another character, in *Monhystera frigida* and *polaris*. The intestinal granules give rise to a tessellation only in *Anticoma* and *Laxus*. The spicula are arcuate, except in some *Monhystera*s; and cephalated except in *Anticoma*, *Terschellingia* and *Euchromadora antarctica*. There are no male papillae except in *Anticoma* and *Monhystera antarctica*. Male supplementary organs occur only in *Anticoma*, *Chromadora polaris*, *Euchromadora antarctica*, *Aplectus*, *Thoracostoma*, and in *Spilophora serrata* and *edentata*. The musculature of the oesophagus is fine except in *Thoracostoma* and *Monhystera polaris*, *frigida* and *pilosa*, though it is somewhat coarse in the bulb of *Laxus*.

If the reader will add these characters to those given under each species heading, and will utilize in a similar way the common characters given in the keys and generic descriptions, he will find himself in possession of a very detailed description of each species, covering a number of new and interesting anatomical features.

SPIRA, Bastian, 1865¹³

1. *Spira septentrionalis*, n. sp. The striae, invisible except near the head, are resolvable into rather irregular dots. The three lips are without papillae. The



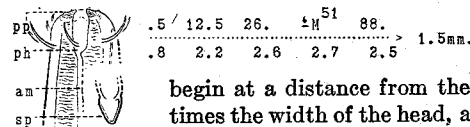
neck is cylindroid posteriorly, convex-conoid anteriorly. The amphids, seen thus far only in

dorso-ventral view, have a central elevation, probably appearing as a "fleck" in the surface view, and are about half as wide as the corresponding diameter of the head. The oesophagus is half as wide as the neck, and ends in a rather obscure bulb containing an indistinct valve, two-thirds as wide as itself. No distinct cardia was seen. The intestine, separated from the oesophagus by a collum about half as wide as the neck, becomes at once three-fourths as wide as the body; it is but a few cells in girth, and the cells contain few or no granules. The rectum is conspicuous, the posterior lip of the anus prominently elevated. From the anus the tail tapers for two-thirds of its length, then becomes cylindroid to the swollen terminus, which is one-fifth as wide as the base. The caudal glands were not clearly seen, but are apparently arranged in a loose tandem in the anterior third of the tail. The female reproductive organs are probably double and reflexed.

Habitat; remarks. Cape Royds. Described from a single somewhat shrunken specimen.

ANTICOMA, Bastian, 1865

2. *Anticoma subsimilis*, n. sp. The thin cuticle is almost invisibly striated. On each lateral line there is a row of five somewhat curved cervical setae,



each having a length equal to one-fourth the corresponding width of the neck. These two rows

begin at a distance from the anterior end equal to nearly three times the width of the head, and have a length equal to the corresponding diameter of the neck. The cuticle becomes thicker at the lips, which bear a circlet of six papillae. The oesophagus is cylindroid in the anterior part, but becomes conoid posteriorly. The mobility of the lips is proved by the nature of the ingested food. Seen dorso-ventrally the pharynx appears more nearly cylindroid than when seen laterally. Seen laterally it tapers so that finally it is one-fifth as wide as the corresponding part of the head. The lining is rather thin, but refractive. The cardia, one-half as wide as the neck, is conoid with a short cylindroid extension. The rather thick-walled intestine, separated from the oesophagus by a collum three-fifths as wide as the neck, becomes at once three-fourths as wide as the body, and is about six cells in girth. The intestinal cells contain numerous small, uniform, distinct granules. The posterior lip of the anus is elevated. The caudal glands are packed together

¹³ The abbreviations used in lettering the sketches, which represent the anterior and posterior extremities respectively, are explained near the foot of page 9. As a rule the information given in the sketches is not repeated elsewhere. As far as possible the sketches are derived from typical specimens.

in the anterior two-fifths of the tail. The elongated renette-cell, two and one-half times as long as the body-diameter, and one-fourth as wide as long, lies a little in front of the cardia, and is not reflexed. The excretory pore is somewhat behind the pharynx. Distinct nerve-cells, more numerous behind the ring, are arranged (at least in front of the ring), in six longitudinal groups. The cylindrical part of the tail is about one-tenth as wide as the base.

The slender, uniform, but rather strong spicula, as wide as the narrowest part of the tail, are twice as long as the anal body-diameter, and lie with their proximal ends dorsal to the body axis. The proximal eighth of each spiculum is separately more or less arcuate, so that one may speak of a curved cephalum or proximal end. Two separate accessory pieces, rather frail, bent at the distal end, one-sixth as long as the spicula and parallel to them, form a rather close collar round the distal ends of the spicula. On each side of the body there are four equidistant, ventro-submedian, pre-anal, papilla-like setae, one-sixth as long as the body-diameter, extending in a row from near the anus to near the supplementary organ. There are about three ventro-submedian post-anal setae on each side of the middle part of the tail.

Habitat; remarks. Cape Royds; Bay, Cape Royds. One adult and several immature somewhat shrunken specimens. This species differs from *A. similis* in having five pectoral hairs, longer setae, a sub-cylindroid pharynx, and an oesophagus without expansion behind the nerve-ring.

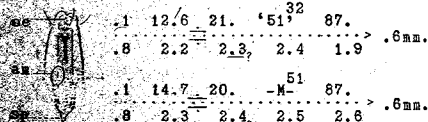
APLECTUS, new genus

Species of this newly proposed genus have the general form of *Plectus*, but have the pharynx less definitely developed, and the renette-cell farther back and not reflexed. They differ also in having nearly obsolete lips, and a nearly cylindroid oesophagus whose small cardiac bulb is without a three-fold striated valve. The spinneret also differs from that of *Plectus*, as shown in the sketch. The male supplementary organs in the two genera also differ materially. These facts together with the marine habitat and the relative abundance of the males of *Aplectus*, appear to make necessary a separate genus for the reception of this antarctic species. The following is the type species.

3. *Aplectus antarcticus*, n.g., n. sp. The rather thin cuticle is traversed by about 700 duplex striae, which give the contour an obscurely doubly crenate appearance.

Two wings, separated by a distance about equal to the width of an annule, begin near the middle of the neck and end near the middle of the tail. Cervical setae, similar to the cephalic setae, occur one or two

on each lateral line; and on the male tail there are setae, one-third to one-eighth as long as the body is wide. The lips are very small and difficult to observe. The pharynx, very inconspicuous and hard to distinguish, is probably double, the narrow, tubular, anterior part extending to a little behind the amphids, the posterior part, which closely resembles the oesophagus, extending nearly halfway to the nerve-ring where there is a break in the musculature. In the lateral view there are seen close behind the cephalic setae, under the cuticle, very minute



of an annule, begin near the middle of the neck and end near the middle of the tail. Cervical setae, similar to the cephalic setae, occur one or two

bodies that stain, of which those most clearly seen were the dorsal and ventral ones. Probably there is a circlet of these bodies. Just behind these stained bodies, that is, a little behind the setae, there is an appearance as if of a small quadrate cavity, one-third as wide as the head. This is not a cavity, however. Its posterior limits are a trifle more than a head-width from the anterior end. The amphids are variable in size and form, being considerably larger and slightly more elongated in the male. The posterior border appears interrupted. The slender cylindroid oesophagus, is probably very obscurely Rhabditoid, and ends posteriorly in an obscurely rhomboidal to pyriform bulb or swelling, three-fifths to two-thirds as wide as the neck. The cylindroid cardia, one-fourth as wide as the body, and twice as long as wide, is really a modified part of the intestine, and is composed of small strongly staining cells. The thick walled intestine, separated from the oesophagus by a collar one-fourth to two-fifths as wide as the neck, is few, probably four, cells in girth. These cells contain numerous, indistinct, rather fine and uniform granules.

The tail, tapering from the anus, is cylindroid in the posterior two-fifths and ends in an almost imperceptibly swollen apiculate terminus one-third to one-half as wide as the base. The caudal glands are arranged in loose tandem in the anterior half of the tail; their ampullae are distinct and no wider than the ducts, but stain more strongly. The elongated renette-cell, which is difficult to observe, is as long as the body is wide, and one-fifth as wide as long, and occurs at a distance behind the neck equal to eight times the width of the body. The very slender duct, invisible except where stained, empties through a pore apparently opposite the nerve-ring. The nerve-ring surrounds the oesophagus rather squarely and is accompanied by somewhat distinct nerve-cells rather definitely grouped. From the inconspicuous, small continuous vulva the small vagina leads inward halfway across the body to the straight uteri. The rather elongated eggs are two to two and one-half times as long as the body is wide, and fully one-third as wide as long. The broad ovaries, cylindroid, but tapering near the extremities, reach three-fourths of the way back to the vulva, and contain about twelve ova, arranged rather irregularly. The spermatozoa in the uterus are of such a size that it would take at least seven or eight side by side to equal the body-diameter.

The arcuate, rather strong, sub-slender, sub-acute spicula, one and one-fourth times as long as the anal body-diameter, are slightly cephalated by expansion, the cephalum being set off by a broad shallow constriction, and lie with their proximae dorsal to the body-axis. There are two rather strong, sub-slender, slightly bent accessory pieces, parallel to the spicula then bending away, the applied part being one-fourth as long as the spicula. The receding part is arcuate in the same direction as the spicula, and from its end there passes a strand of muscle to the ventral body-wall behind the anus. The ejaculatory duct is one-fourth, the vas deferens and cylindroid testes one-half as wide as the body. The blunt blind ends of the testes are two-thirds of the neck's length from the cardia and one and one-half times the tail's length from the anus, respectively.

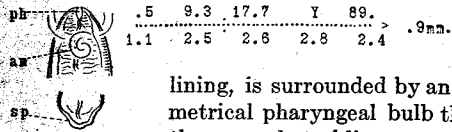
The protrudable, sub-equidistant supplementary organs are separated by a distance equal to nearly one and one-fourth times the body-diameter, and the posterior one is located at a distance in front of the anus equal to twice the anal body diameter. They are rather straight but have the distal third bent ventrally, and the distal end flattened and pulled out posteriorly into a spur, or

toe, which always remains outside the body. The entire profile contour is like that of a high boot with its leg bent backward. The projecting part is twice as long as the diameter of the tube, and is roughened at the end with ten or twelve exceedingly minute striae or warts. The proximal ends of the organs are rounded and not cephalated.

Habitat; remarks. Bay, Cape Royds. About fourteen females and six males, in good condition. The sketch is that of a female.

SABATIERIA, de Rouville, 1903

4. *Sabatieria antarctica*, n. sp. Striae about 800, resolvable with great difficulty into dot-like markings. There are no lips. The tubular pharynx, extending to opposite the posterior borders of the amphids, as shown

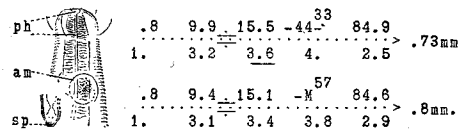


by a slight accentuation of the lining, is surrounded by an almost imperceptible, slightly unsymmetrical pharyngeal bulb three-fourths as wide as the head. At the somewhat oblique nerve-ring the oesophagus has a diameter equal to one-third the width of the corresponding part of the neck, but swells posteriorly to two-thirds the width of the base of the neck. The rather cylindrical cardia is one-third as wide as the neck, and one and one-half times as long as wide. The thick-walled intestine, separated from the oesophagus by a collum two-thirds as wide as the body-diameter, soon becomes three-fourths as wide as the body and is about two cells in girth. From the elevated posterior lip of the anus the rather prominent rectum extends inward and forward a distance equal to the anal body-diameter. From the anus the tail tapers for three-fourths of its length, then becomes cylindrical to the slightly swollen terminus. The caudal glands are probably small and near the anus.

Habitat; remarks. Cape Royds. Described from a single young specimen in fair condition.

TERSCHELLINGIA, de Man, 1888

5. *Terschellingia polaris*, n. sp. The cuticle is traversed by about 700 striae, plainly visible near the extremities only. Narrow double wings, having a width about equal to that of two annules of the cuticle, begin near the middle of the neck. The central raised body, or "fleck," of the amphid stains about as strongly as the nuclei elsewhere in the body. Very minute, inconspicuous papillae, probably six in number, occur on the confluent lips. The vestibule is very minutely longitudinally striated. About halfway to the amphids there is a break in the musculature of the oesophagus; the pharynx probably extends to this point. The conoid neck contains a cylindrical oesophagus, which, near the nerve-ring, is one-third as wide as the neck, but ends in a bulb five-sixths as wide as the base of the neck. The lining of the oesophagus is distinct, its most prominent optical expression being a single refractive line. The cardiac valve causes a slight, simple modification in the lining, one-eighth as wide as the bulb. The more or less thick-walled in-



testine is separated from the oesophagus by a cardiac collum one-sixth as wide as the neck, and soon becomes two-thirds as wide as the body. The first few cells of the intestine, at the cardiac region, are very small, with relatively large nuclei that stain strongly. The intestine is separated from the rectum by a pyloric collum one-fourth as wide as the corresponding portion of the body. From the anus, whose posterior lip is elevated, the chitinized rectum leads inward and forward a distance equal to the length of the anal body-diameter. The granules of the intestinal cells are small and scarce.

The tail tapers from the anus and ends in a slightly swollen terminus. A few small, stiff, cylindrical, blunt caudal setae are to be seen, mostly about one-fourth as long as the terminus is wide. The broadly saccate caudal glands, arranged in a loose tandem in the anterior fourth of the tail, empty through distinct ducts and elongated, narrow ampullae. What appears to be an irregularly ellipsoidal renette-cell is located at a distance behind the neck equal to the width of the body; it is half as long as the body is wide, and three-fourths as wide as long. The nerve-ring, which surrounds the oesophagus more or less obliquely, is accompanied by distinct nerve-cells definitely grouped, both in front of it and behind, and extending backward to near the cardiac bulb. From the small and inconspicuous, but more or less elevated vulva, the conoid, non-chitinized vagina leads inward at right angles to the ventral surface two-fifths the way across the body. The eggs have a length nearly one and three-fourths times that of the body-diameter, appear about half as wide as long, and have been seen in the uterus one at a time. The medium sized, more or less tapering ovaries contain fifteen to twenty developing ova, for the most part flattened and arranged single file.

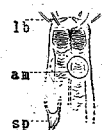
The more or less slender, sub-acute, uniform, slightly yellowish spicula have a simple and rather strong framework, and are one and one-fourth times as long as the anal body-diameter. The proximal ends appear to lie opposite the body axis. The triangular, blunt accessory pieces have a simple and rather frail framework; the part applied to the spicula is one-fourth as long as they, while the tapering apophyses lie a little backward and end opposite the body-axis. The ejaculatory duct is one-fourth, and the testis one-half, as wide as the body. The comparatively few (about a dozen) primary spermatocytes occur in the testis in single file, then come three pairs double file—these latter relatively huge. That is to say, the primary spermatocytes increase much in size and then divide transversely into very unequal parts, a small distal part and a large proximal part, and these two unequal parts divide almost simultaneously in the longitudinal direction. Thus there appear four cells arranged in two pairs side by side, a small strongly staining pair with inconspicuous nuclei, and a large pair which do not stain except in their relatively small nuclei which show about seven small more or less globular chromosomes. These two divisions represent the usual reduction divisions, and give rise to spermatozoa of very different size and appearance. The phenomenon is reminiscent of the formation of the polar bodies. In some specimens the smaller cells, those that in their appearance remind one of polar bodies, appear as if divided a second time, but there is uncertainty about this. It is the writer's intention to prepare a separate report on this species and its spermatogenesis.

Habitat; remarks. Cape Royds; Bay, Cape Royds. Numerous specimens, mostly somewhat shrunken.

AUSTRONEMA, new genus

The single species for which this new genus is proposed has many of the characters of *Monhystera*, but differs in so many important respects as to call for separate classification. The principal differences of generic value are the possession by *Austronema* of an oesophagus altered in the posterior half, a well developed ventral gland, special lateral cells, hamate spicula without accessory pieces, and glandular (?) organs associated with the spicula. Other minor differences exist, such as the occurrence of the special group of setae near the middle of the tail. The following is the type species.

6. *Austronema spirurum*, n. g., n. sp. The cuticle is traversed by exceedingly minute transverse striae. The lips are confluent. The conoid neck contains a



15	.2	8.8	15	-55	²⁵ 88.4	.9mm.
	.8	1.5	1.7	1.9	1.4	
am	.3	10.5	18	-M ⁴⁹	87.3	.8mm.
sp	.9	1.9	1.8	2.4	2.2	

cylindroid oesophagus, whose diameter measured near the nerve-ring is one-half as great as that of the corresponding portion of the neck, but which finally becomes two-thirds as wide as the base of

the neck. There is a break in the musculature of the oesophagus just behind the nerve-ring, and behind this break the refractive nature of the lining is somewhat different, and, moreover, in many of the preserved specimens the diameter of the oesophagus from this point onward is suddenly somewhat greater. There is a conoid to cylindroid cardia about one-half as wide as the base of the neck. The very thick-walled intestine, two to four cells in girth, becomes at once three-fourths as wide as the body. For a short distance behind the cardiac collum, namely, for a distance about equal to two-thirds the body width, the tissues of the intestine do not stain. The lining of the intestine is refractive and distinct, so that the almost imperceptibly zigzagged lumen can be readily followed. The intestine is separated from the oesophagus by a collum two-fifths as wide as the base of the neck. The size of the numerous, yellowish, uniform granules contained in the intestinal cells varies in the different parts of the intestine; they are much coarser posteriorly than anteriorly. From the anus, the posterior lip of which is elevated, the chitinized rectum extends inward and forward a distance equal to the anal body diameter.

The tail tapers in such a manner that at the middle its diameter is about half as great as at the base. Its terminus is about one-fifth as wide as its base. The ellipsoidal caudal glands are arranged in a loose tandem in the anterior third of the tail. Very short, stiff, inconspicuous, ventrally submedian caudal setae occur on each side of the tail, two on the anterior half of the tail, and three near the middle and close together, and finally, one or two on the cylindroid, narrow, posterior half. The pyriform to ellipsoidal granular renette-cell is located at a distance behind the base of the neck equal to one and one-half body-diameters. It is one and one-half times as long as the body is wide, and one-third as wide as long, and presses the intestine considerably to one side. It does not appear to have any companion cell. The medium sized nerve-ring surrounds the oesophagus somewhat squarely, and is accompanied by distinct nerve-cells extending well back toward the base of the neck. From the rather small, but rather con-

spicuous, elevated vulva, the well developed, tubular, muscular vagina extends inward and obliquely forward. It is about twice as long as the corresponding body-diameter, and about two-thirds as long as the uterus. The eggs are about as long as the body is wide, and three-fourths as wide as long, and have been seen two or three at a time in the uterus. The ovary is of medium size, and tapers so as to become narrow. It contains many ova, arranged single file—somewhat irregularly so near the uterus.

The slender, more or less uniform spicula taper from the middle toward the proximal ends, and present the striking peculiarity of being strongly curved at the distal extremity, forming a hook across which there is a thin, transparent membrane. They are one and three-fourths times as long as the anal body-diameter, and are so arranged that their proximal ends appear as if lying to the dorsal side of the body axis. Their yellowish framework is rather strong, and the proximal two-thirds may sometimes be seen to be nearly straight. At the extreme end the spicula have a very minute recurved apiculum or point. Two (?) pairs of ellipsoidal granular unicellular glands (?) occur some distance in front of the spicula. This species has the head of a *Monhystera* but differs in having the oesophagus altered in the posterior half, a well developed ventral gland, special lateral cells, hamate spicula without accessory pieces, and the tail with a group of small setae near the middle.

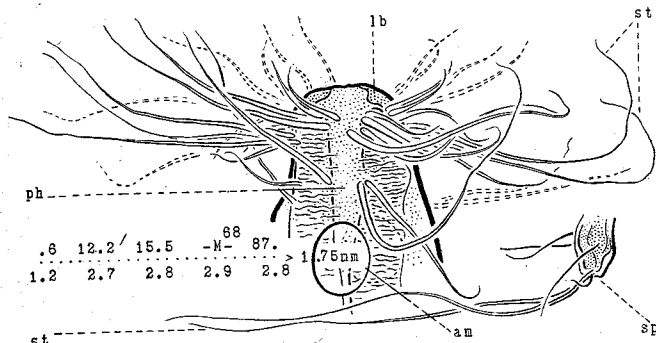
Habitat; remarks. Cape Royds. The five females and five males examined were in fair condition.

MONHYSTERA, Bastian, 1865

The following are characters common to all the species of *Monhystera* here described.

Cervical and somatic setae none or scattered and short, except in *M. pilosa*. Neck conoid, but cylindroid in the posterior half in *M. pilosa*, and *M. meridiana*. Tail tapering from the anus or a little in front of it. Oesophagus somewhat cylindroid without swellings of any kind, for the most part about half as wide as the neck, but finally three-fifths to three-fourths as wide as the base of the neck. Cardia present, except in *M. frigida*, hemispherical to cylindroid, and one-fourth to one-half as wide as the base of the neck. Intestine separated from the oesophagus by a collum one-third to one-half as wide as the neck, becoming almost at once about three-fourths as wide as the body, its walls thick and two to four cells in girth, and the lining usually so refractive that the lumen is a rather distinct feature. Granules of the intestinal cells numerous, fine and uniform. Rectum of about the same length as the anal body diameter. Caudal setae none or inconspicuous except in *M. pilosa*. Lateral fields one-third, more rarely one-half, as wide as the body. Renette unknown except in *M. pilosa* and *M. uniformis*. Nerve-ring of medium width, surrounding the oesophagus rather squarely, the nerve cells in its vicinity usually rather diffusely arranged. Vulva small or of medium size and in these species not very conspicuously elevated except in *M. uniformis*. Vagina one to two times as long as the body is wide, and extending inward and forward.

7. *Monhystera pilosa*, n. sp. Striae about 1700. There are numerous long, very slender, flexible cervical and somatic setae, often arranged in pairs, one member of



the pair in front of the other, on the sub-median lines. There are probably three lips, bearing six minute setose papillae arranged in a single circlet. The lining of the oesophagus is very distinct, and the musculature

rather coarse. The granules of the intestine are yellowish brown. Toward the posterior extremity, for some distance in front of the anus, there is a strong development of lateral cells, which do not appear to exist elsewhere in the body. These cells extend forward toward the middle of the body, and have been traced no farther. Their size, which is variable, is such that two or three occur side by side in the lateral fields. The tail is cylindroid in its posterior three-fifths, with a width there one-eighth as great as that of its base, and has a slightly swollen terminus. The caudal ducts, of which two were seen, are narrow and distinct. From the excretory pore at the end of the third fifth of the neck there leads inward a very narrow duct whose length is nearly equal to the thickness of the cuticle. The duct leading thence back to the renette cell is, however, of considerable width—about one-fourth as wide as the oesophagus—and is readily traced back to a point opposite the anterior part of the intestine, where the renette cell pushes the intestine to one side. The spicula are uniform, with a width near the distal extremity one-sixth as great as the corresponding body width. The single accessory piece, parallel to and close to the distal thirds of the spicula, has an apophysis tapering to an obscure and slightly recurved point. This apophysis lies at right angles to the spicula, and then curves forward a little. The ejaculatory duct is one-third as wide as the body, the vas deferens considerably wider. The blind end of the anterior, larger testis is disposed in one or two coils.

Habitat; remarks. Bay, Cape Royds. The single specimen examined was in good condition.

8. *Monhystera uniformis*, n. sp. Apparently there are three very obscure confluent lips. The amphids when seen in the dorso-ventral view seem to be well chitinized, and appear deepest in the anterior part, where they are one fifth as deep as the head is wide. The cardia is twice as long as wide. The cylindroid part of the tail is one-third to one-fourth as wide as the base.

Broadly saccate caudal glands are found in the anterior half of the tail. At a distance behind the neck equal to three to four body-widths there is an ellipsoidal renette cell with a large nucleus. This gland-cell is one and one-half times as long as the body is wide and half as wide as long. The location of the excretory pore has not been made out with certainty;

st	.9	13.2	20.	83	34	87.	
am	1.3	2.4	2.6	2.6	2.		.44mm.
sp	.9	12.8	20.	54	85.		.46mm.
	1.3	2.3	2.5	2.5	2.3		

possibly it is just behind the nerve-ring. The small, weak, tubular, non-chitinized vagina leads into a uterus which is five times as long as the body is wide. The eggs are about four times as long as the body is wide, and one-fifth as wide as long. The medium sized cylindroid ovary contains about twenty-five ova, arranged somewhat irregularly. The tail of the male is like that of his mate except that it is conoid nearly to the terminus. The very slender uniform spicula are two and one-half times as long as the anal body diameter. Their framework is simple, and the proximal ends lie somewhat dorsal to the body axis. The single accessory piece is frail, its framework simple; the applied part being one eighth as long as the spicula, the blunt, backward pointing apophysis being one-fifth as long as the anal body diameter and having its proximal end opposite the body axis. The ejaculatory duct is one-third, the testis two thirds, as wide as the body.

Habitat; remarks. Cape Royds. Six females and three males, in fairly good condition.

9. *Monhystera frigida*, n. sp. About 1400 striae give to the margin a crenate contour. The very inconspicuous lips are probably three in number. The amphids appear circular, but are really regular spirals of one and one-half winds, having a raised transverse ridge extending part way across. A deeply staining nucleus, of the same size and character as the

lb	.3	9.7	18.1	57	36	83.6	
sp	.8	1.4	1.6	1.9	1.3		.9mm.
am	.3	10.2	19.3	65	85.8		.85mm.
	.8	1.4	1.5	1.5	1.6		

nuclei of the nerve cells near the ring, occurs immediately in front of each amphid. In the posterior end of the oesophagus there are two, possibly three, elongated, granular gland-cells, quite as long as the body is wide. The rectum is prominent. The vagina is small and weak. The eggs are about four times as long as the body is wide. The rather narrow, cylindroid ovary contains twenty or more ova, arranged mostly in single file. The uniform slender, frail, sub-acute spicula are one and one-half times as long as the anal body diameter and lie with their proximae opposite the body axis. The very inconspicuous, very slender and frail accessory piece is bent so that the applied part is one-third to one-fourth as long as the spicula, while the uniform backward bending part is one-fifth as long as the anal body diameter. Its proximal end lies to the ventral side of the body axis. The ejaculatory duct is one-third, the testis two-thirds, as wide as the body.

Habitat; remarks. Cape Royds. The single female and the two males examined were in fair condition.

10. *Monhystera polaris*, n. sp. The 600 striae give to the margin a minutely crenate contour, most plainly to be seen just behind the anus. The three double, more or less distinct lips are fairly developed. Two innervated papillae occur on each of the lips, six papillae in all. The amphids are sunken, but usually show a well stained projecting margin two-thirds as wide as the amphid. A little in front of each amphid is a single somewhat spherical nucleus, one-fourth as wide as the oesophagus, containing granules,

pp	1.	12.	21.	64	41	85.	
ph	1.5	2.5	2.6	3.4	2.1		1.1mm.
sp	1.	11.	21.	60	84.		
am	1.5	2.5	2.8	2.9	2.3		1.1mm.

thirds as wide as the amphid. A little in front of each amphid is a single somewhat spherical nucleus, one-fourth as wide as the oesophagus, containing granules,

as do the ganglion cells near the nerve-ring. These two nuclei probably indicate the presence of two nerve cells. They are best seen in the dorso-ventral view. The refractive elements of the lining of the oesophagus, especially in certain aspects of the head, appear to extend into the pharynx in a peculiar way, as shown in the sketch. The rectum is more or less prominent, and in the male the anus is raised. The tail tapers in such a manner that at the middle it is one-third as wide as at the anus. Its terminus is slightly swollen. Caudal setae appear on the base of the tail.

The vagina extends inward nearly at right angles to the body wall, about half way across the body. The uterus, three to four times as long as the body is wide, contains spermatozoa one fifth as wide as the body. The posterior, rudimentary branch of the uterus, nearly twice as long as the width of the body, also contains spermatozoa. The eggs are nearly twice as long as the body is wide, and one-third as wide as long. The broad tapering ovary contains about twenty ova arranged single file, and as many more packed irregularly in the distal fourth.

The brownish, rather slender, uniform, acute spicula are one and one-third times as long as the anal body diameter. The framework of the spicula is more or less strong, and the proximal ends lie opposite or a little dorsal to the body axis. The single, rather straight and rather frail accessory piece is of a simple character, and has a backward pointing apophysis one-sixth as long as the anal body diameter. The male presents the peculiarity of possessing two testes, an uncommon thing in *Monhystera*. They are rather wide and of unequal size, the anterior, more or less cylindroid one being considerably the wider. The blind end of one testis is at the cardia, that of the other about one tail-length in front of the anus.

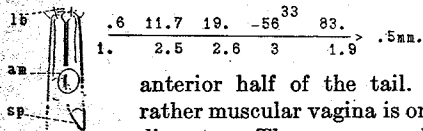
Habitat; remarks. Cape Royds; Bay, Cape Royds; Bay. Seven females and six males, somewhat shrunken. The specimens from the various localities differ slightly in (1) the size and form of the cephalic setae, (2) the length and width of the spicula, (3) the prominence of the amphids, (4) the prominence of the striae on the tail. Diatoms and other unicellular organisms were seen in the intestine.

11. *Monhystera septentrionalis*, n. sp. The lips are confluent. The lining of the oesophagus is rather prominent, and one-fifth as wide as the oesophagus itself.

The small and inconspicuous, somewhat ellipsoidal caudal glands are arranged in a loose tandem in the anterior half of the tail. The anus is continuous. The conoid, rather muscular vagina is one and one-half times as long as the body diameter. The eggs are elongated, twice as long as the body is wide, and less than half as wide as long. About thirty ova occur in single file in the gently tapering ovary.

Habitat; remarks. Bay, Cape Royds. Seven good female specimens. The amphids are often a little farther back than illustrated.

12. *Monhystera meridiana*, n. sp. The striae, about 1000 in number, are responsible for a somewhat crenate contour, more noticeable near the tail. The strongly developed cardiac region, set off by a constriction on each side, is as wide as the intestine, and forms a small but distinct segment of the alimentary canal. The vulva is elevated. Eggs twice as long as the body



lb	.6	11.7	19.	-56 ³³	83.	.5mm.
an	1.	2.5	2.6	3	1.9	

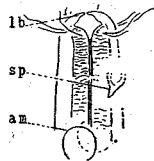
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anterior half of the tail. The anus is continuous. The conoid, rather muscular vagina is one and one-half times as long as the body diameter. The eggs are elongated, twice as long as the body is

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lb	.4	7.6	14.5	-49 ²³	74.	1.1mm.
an	.9	1.3	1.6	1.9	1.1	
sp	.4	7.5	14.3	-M ⁵¹	70.	1.1mm.
an	.9	1.4	1.4	1.6	1.5	

is wide, and one-third as wide as long, occur in the straight uterus. Toward its blind end the narrow, tapering ovary is one-fourth as wide as the body. The tail of the male is conoid in such a fashion that at a distance from the anus equal to four times the anal body diameter it has a width equal to one-fourth the anal body width; thence it tapers very gradually to the terminus, whose width is considerably less than that of the spicula. The slender, uniform, acute spicula are one and three-fourths times as long as the anal body diameter. The ejaculatory duct and vas deferens are one-fourth as wide as the body. Apparently there are two tapering testes, but the end of the posterior one was not definitely seen; it appeared, however, to be eight to twelve body widths in front of the anus. Spermatozoa occur in single file near the end of the anterior testicle.

Habitat; remarks. Bay, Cape Royds. One female and three males in a somewhat shrunken state.

13. *Monhystera antarctica*, n. sp. The cephalic setae are very minute and difficult to see. Six excessively minute forward pointing papillae occur, one on each lip. Apparently the pharynx is traversed near its middle by a transverse ridge, and this is the reason why it appears in optical section as if armed with two teeth. From the anus, the posterior lip of which

st	.6	9.	13.6	-89 ⁶⁰	92.7	.9mm.
an	1.2	2.7	2.9	3.7	2.9	
sp	.6	8.5	13.4	-M ⁶⁷	91.	.9mm.
an	1.2	2.3	2.5	3.	2.5	

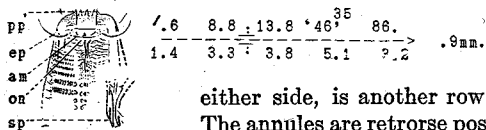
is elevated, the rather prominent, chitinized rectum leads inward. Anal glands are present. The rather large and conspicuous nuclei of the intestinal cells are arranged about a body-width apart. The terminus of the tail is one-fourth as wide as the base. The broadly saccate caudal glands, of which two are larger than the third, are arranged in close tandem in the anterior half of the tail; their ampullae are distinct. The lateral fields are one-half as wide as the body. At a distance behind the base of the neck equal to four times the width of the body there is frequently to be seen in the female a large cell, one-half as wide as the body, with a prominent nucleus. This cell occurs in females only. Though its connections have not been definitely made out, it sometimes seems to empty through a pore a little in its rear. The straight uterus, five to six times as long as the body is wide, contains elongated eggs, as long as the body diameter, and half as wide as long. The cylindroid ovary contains ova arranged in double file—irregularly so toward the blind end.

The tail of the male is a little stouter than that of his mate. The rather frail, slender, uniform, sub-acute spicula, one and one-half to one and three-fourths times as long as the anal body-diameter, lie with their proximae dorsal to the body axis. The single accessory piece, parallel to the distal third of the spicula, and then bending back in a thumb-shaped apophysis, lies with its proximal end opposite the body axis. On the tail there are very faint inconspicuous setose papillae—one ventro-submedian on each side, at the end of the anterior fourth, and two or three sub-ventral just behind the middle of the tail. The ejaculatory duct is one-fourth to one-third, the vas deferens and tapering testis one-half, as wide as the body.

Habitat; remarks. Bay, Cape Royds. Numerous slightly shrunken specimens.

CHROMADORA, Bastian, 1865

14. *Chromadora meridiana*, n. sp. Among the secondary elements into which the 600 transverse striae are resolvable there are two longitudinal rows that stand out along the lateral fields a little more prominently than the others. Outside these, on either side, is another row almost imperceptibly emphasized.



The annules are retrorse posteriorly, and the reverse anteriorly, the change taking place opposite the vulva on the female. The few very short cervical and somatic setae to be seen scattered here and there are one-half to one-third as long as the body is wide, though a few nearer the head are considerably longer than the cephalic setae. There appear to be twelve subdistinct lips, each bearing a single papilla. The conoid neck contains a cylindroid oesophagus, which, measured at the nerve-ring, is one-third as wide as the corresponding portion of the neck. The oesophagus ends posteriorly in a bulb three-fourths as wide as the base of the neck, containing an inconspicuous elongated valve one-third as wide as itself. The musculature of the bulb is broken into two very unequal parts. There is no cardia. The wall of the intestine varies from thick to somewhat thin, and is six to eight cells in girth. The intestine becomes at once about three-fourths as wide as the body. Its lumen is distinct, and about one-fourth as wide as itself. The rather numerous granules to be seen in the cells of the intestines are uniform and small. From the anus, which is depressed, the chitinized rectum leads inward and forward a distance equal to the length of the anal body-diameter.

The arcuate tail tapers from in front of the anus, but is usually cylindroid in the posterior fifth, and has a terminus one-sixth as wide as its base. The broadly sacate caudal glands are packed together in the anterior fourth of the tail, and empty through distinct narrow ducts. The length of the few, scattered, straight caudal setae is about equal to the width of two annules of the cuticle. The lateral fields are one-third as wide as the body. The granular renette cell, which is somewhat longer than the body is wide, and one fourth as wide as long, is located at a distance from the base of the neck equal to the width of the body, and empties by means of a slender duct, through the excretory pore located at the lips. It has a smaller companion cell in its rear. The nerve-ring surrounds the oesophagus somewhat squarely. The cells in its vicinity are distinct in character, and many of them have narrow connections directed forward. From the obscurely depressed somewhat conspicuous vulva, the small tubular vagina leads inward at right angles to the ventral surface one-third the distance across the body. The eggs are about as long as the body is wide, and usually about three-fourths as wide as long, and have been seen in the uterus one to three at a time. The spermatozoa seen in the females are one-eighth as wide as the body. The tapering ovaries reach about three-fourths the distance back to the vulva, and contain each about fifteen mostly discoid ova, arranged more or less single file.

Habitat; remarks. Bay, Cape Royds. Five females in fair condition.

15. *Chromadora polaris*, n. sp. This species closely resembles *Chromadora meridiana* from the same region, but differs in having narrower dimensions, more

slender oesophagus, bulb and intestine, a more strictly conoid tail, and a somewhat thinner cuticle, the striations of which are even less modified on the lateral fields. There are about four hundred and fifty transverse striae. The cuticle is hardly perceptibly modified on the lateral fields in the anterior half of the body, but in the posterior half, especially opposite the copulatory muscles, there is a distinct modification, which at its widest part is nearly twice as wide as one of the corresponding striae. The modification becomes less pronounced behind the anus, and disappears near the terminus. The renette cell occurs at a distance behind the neck equal to twice the diameter of the body.

The stoutish, somewhat tapering, rather blunt, yellowish spicula are one and one-fourth times as long as the anal body diameter, and at their widest point one-sixth as wide as the body. They are almost imperceptibly cephalated by expansion and lie with their proximae a little ventral to the body axis. The frame has a median piece from near the middle onward. The two arcuate, slender, rather strong accessory pieces are three-fifths as long as the spicula and lie parallel to them. The seven chitinized supplementary organs, separated from each other by a distance equal to the diameter of one of the organs, occupy a space about equal to one and one-half times the body diameter, the posterior one occurring about opposite the proximal ends of the spicula. These organs are very much like those of *Chromadora minor*. The ejaculatory duct and vas deferens are one-fourth, the broad cylindroid testis one-half as wide as the body. Copulatory muscles extend forward somewhat beyond the supplementary organs.

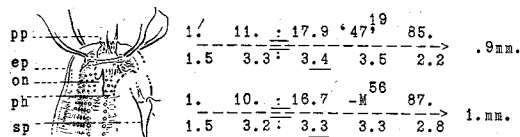
Habitat; remarks. Bay, Cape Royds. Two good specimens, both male.

SPILOPHORA, Bastian, 1865

The following are characters common to all the species of Spilophora here described.

Cuticle with two lateral wings, beginning near the head and ending on the tail. Neck conoid. Tail tapering from somewhat in front of the anus. The lips are small and often indistinct, but when decipherable can usually be seen to be twelve in number, each with a single forward-pointing papilla. Throughout most of its length the oesophagus is more or less cylindroid, but ends posteriorly in a pyriform bulb two-thirds to four-fifths as wide as the base of the neck, and containing a fusiform valve (sometimes obscure) one-fourth to one-half as wide as itself. There is no distinct cardia. The intestine is separated from the oesophagus by a distinct broad constriction about one-third as wide as the corresponding part of the body. The more or less prominent chitinized rectum, about as long as the anal body diameter, leads inward and forward. The caudal setae are small and scattered. The nerve-ring is of medium size and surrounds the oesophagus rather squarely, and is accompanied by distinct nerve cells. The vulva is more or less elevated and conspicuous and from it the vagina leads inward at right angles to the ventral surface about half way across the body. So far as known the eggs are ellipsoidal. The rather slender, blunt spicula are about one and one-fourth times as long as the anal body diameter. The arcuate accessory piece is parallel to, and half to three-fourths as long as, the spicula. The testis is relatively wide.

16. *Spilophora edentata*, n. sp. Striae about 600, producing a crenate contour, interrupted by the two lateral wings which are so formed as to appear somewhat



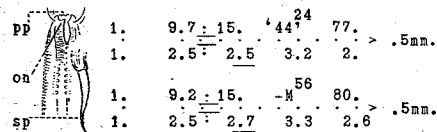
like the keel and ribs of a boat. Four sub-cephalic setae occur opposite the base of the pharynx. There are few submedian somatic setae, each about one-third

as long as the body is wide. There appears to be no distinct dorsal pharyngeal tooth, but possibly an exceedingly minute more or less ventral one,—unless indeed this appearance be due to the optical effect of one of the striae that exist separately in the posterior part of the pharynx. The musculature of the bulb is broken into two very unequal parts. The rather thin-walled intestine becomes at once two-thirds as wide as the body and is about six cells in girth. The cells contain numerous very small, uniform, colorless granules. The cylindrical part of the tail of the female is about one-fourth as wide as the base. The broadly saccate caudal glands are arranged in a loose tandem in the anterior half of the tail, and are connected with the spinneret by distinct but very narrow ducts with no clearly visible ampullae. The lateral fields, one-third as wide as the body, contain small scattered nuclei, as well as others less numerous and twice as large. The granular ellipsoidal renette cell, which presses the intestine to one side, a little behind the neck, is about half as long as the body is wide, and one half as wide as long. The duct is hardly half as wide as one of the annules, and the ampulla, opposite the base of the pharynx is almost invisible. The excretory pore is at the lips. The nerve cells are arranged in rather indistinct groups, better seen behind the ring.

The male tail appears to be more nearly conoid throughout, and has a spinneret only about one-eighth as wide as its base. The tapering spicula in their widest part are one-sixth as wide as the corresponding part of the body, and are cephalated by a very inconspicuous constriction. The accessory pieces are slender and rather frail. The testis is about half as wide as the body. Rather distinct, well spaced, oblique copulatory muscles are present in front of the anus for a distance equal to one and one-half tail-lengths. Apparently pairs of male glands, emptying into the cloaca, are present as in *Euchromadora* and *Chromadora*, but the details remain unknown.

Habitat; remarks. Bay, Cape Royds. A single female and four males, all in fair condition.

17. *Spilophora antarctica*, n. sp. Striae about 400, producing a somewhat crenate contour, and interrupted by two lateral wings separated by a distance



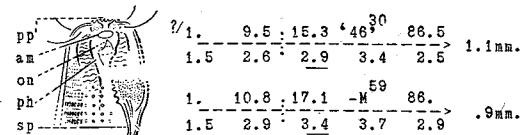
equal to one-fifth the body diameter. Cervical setae occur—at least near the head. The cardiac valve is simple in structure. The relatively somewhat thick-walled intestine soon becomes two-thirds

as wide as the body, and is about two cells in girth, these latter containing scattered, rather uniform, colorless granules. The posterior lip of the anus is more or less elevated. The cylindroid part of the tail is one-fifth as wide as the base, or somewhat less. The renette cell

has not been clearly seen, but the intestine is pushed to one side as if a small one were present, a little behind the neck. The nerve-cells extend past the base of the neck, especially on the ventral side. The eggs occur one at a time in either uterus. The rather broad, tapering ovaries, which extend two-thirds of the way back to the vulva, contain few ova, arranged single file. The testis is one-half to three-fifths as wide as the body.

Habitat; remarks. Cape Royds; Bay, Cape Royds. Six females and three males, in a somewhat shrunken state.

18. *Spilophora serrata*, n. sp. Striae about 500, interrupted by the lateral wings, which occupy a space equal to one-fourth the body diameter. The secondary elements of the cuticle



appear as dots on the head, and produce a punctate appearance there. Four rather irregular pairs of sub-cephalic setae, like the cephalic setae, but shorter, mated one in front of the other, occur at a distance from the lips equal to twice the width of the head. There are few cervical setae. The vestibule of the pharynx is longitudinally striated. This is one of the few species of *Spilophora* in which the amphids can be plainly seen. The rather thick-walled intestine soon becomes three-fourths as wide as the body, and is ten to twelve cells in girth, the cells containing numerous uniform, colorless granules nearly equal in diameter to the width of one of the annules of the cuticle. The posterior lip of the anus is elevated. The terminus of the tail is about one-sixth as wide as its base. The two broadly saccate caudal glands are arranged in close tandem opposite the anus and in the anterior fourth of the tail. Their ampullae are not distinct. The third caudal gland (?), just behind the anus, is a strongly staining cell, with a duct, or connection, that reaches to near the terminus. The non-granular renette cell, one body-width behind the neck, twice as long as the body is wide, has a small companion-cell in its rear. The excretory pore is probably near the lips. Opposite the renette cell there are two, and probably three, ellipsoidal cells in each lateral field, each cell being one-third as long as the body is wide, and one-third as wide as long. These cells constitute two pairs,—or three. The eggs are about one and one-half times as long as the body is wide, and two thirds as wide as long, and occur in the uteri one at a time. Each of the medium sized, tapering ovaries reaches half way back to the vulva, and contains about fifteen ova arranged single file.

The strong, rather uniform, colorless spicula are cephalated by a constriction and are obliquely truncated at the distal end, where there are two or three exceedingly minute teeth. The subsleender, rather strong and simple accessory pieces recede a little from the spicula. Of the slightly elevated, somewhat protrudable supplementary organs, whose width is about equal to that of two annules, the hindmost is near the anus. They are farther apart anteriorly, the distance between the first and second equaling one-third of the body width, that between the second and third, one and one-half times the body width. The ejaculatory duct is one-third as wide as the body—the vas deferens and testis one-half. At least one pair of glands of the kind seen in the males of *Euchromadora* occurs nearly twice as far in front of the anus as the terminus is behind it; each gland-cell is

fusiform, one-half as long as the body is wide, and one-half as wide as long. Both of the males examined had a ventral swelling near the center of the tail, as long as the corresponding body diameter.

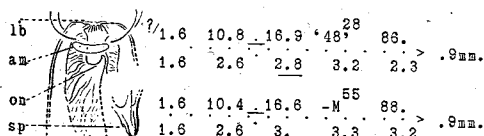
Habitat; remarks. Bay, Cape Royds. The two females and two males studied were in good condition.

EUCHROMADORA, De Man, 1886

The following are characters common to all the species of *Euchromadora* here described.

The neck is more or less cylindroid in the posterior part, but usually slightly conoid anteriorly. The tail tapers from in front of the anus, and has no terminal swelling. Cervical setae none or small and scattered, except in *E. septentrionalis*, somatic setae none or very inconspicuous. Caudal setae none or inconspicuous, except in *E. denticulata*. Each of the six lips is double, so that there appear to be twelve more or less alike. These are usually distinct when the mouth is open, but so folded together when the mouth is closed as to become less distinct, and to impart to the then narrow vestibule a longitudinally striated appearance. Labial papillae twelve, in a single circle, forming the apices of the lobes of the lips. The pharyngeal region of the oesophagus is swollen, so as to form a faint pharyngeal "bulb," rather obscurely pyriform or elongated in form. The oesophagus is cylindroid in the anterior half, and conoid or perhaps clavate in the posterior part, but is without a true cardiac bulb except in *E. septentrionalis*. Oesophageal lining distinct, often increased posteriorly. There is no distinct cardia. The rather thin walled intestine becomes almost at once three-fifths to three-fourths as wide as the body and is from six to nine cells in girth. It is separated from the oesophagus by a distinct collum one-fifth to one-third as wide as the corresponding part of the body. The chitinous rectum, as long as the anal body diameter, leads inward and forward from the more or less elevated anus. The caudal glands are found in the anterior fourth of the tail (and in *E. meridiana* also a short distance in front of anus), and empty through ducts devoid of ampullae, except in the case of *E. denticulata*. The lateral fields are about one-third as wide as the body. The elongated, granular renette cell, one to two body-widths behind the neck, has one or two smaller companion cells in its rear. The medium sized nerve-ring surrounds the oesophagus rather squarely. From the somewhat elevated but rather inconspicuous vulva the vagina leads inward at right angles to the ventral surface about halfway across the body. The reflexed, tapering ovaries reach half to two-thirds the way back to the vulva, and contain a dozen or more developing ova, arranged more or less irregularly, especially toward the blind end. The more or less slender spicula are sub-acute, and accompanied by arcuate parallel accessory pieces half as long as themselves. The single testis is cylindroid and about half as wide as the body.

19. *Euchromadora septentrionalis*, n. sp. The 600 striae, very difficult to see except at the extremities, are resolvable into minute elongated elements, which



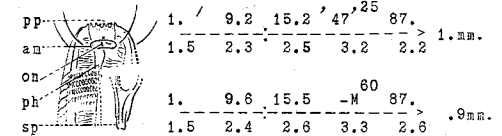
are interrupted by very narrow and inconspicuous lateral wings, beginning near the head and ceasing near the end of the tail. Two sub-cephalic setae, nearly as long as the cephalic

setae, occur one in front of the other on each sub-median line, at a distance from the head end equal to one and one-fourth times the head width. The cervical setae, more numerous on the anterior part of the neck, are sometimes longer than the cephalic setae. The lips, otherwise typical, have successive rings of elements surrounding the interior of the vestibule. The oesophagus is one-third as wide as the neck, but swells posteriorly into a true cardiac bulb, containing a fusiform valve one-third as wide as itself. The intestinal granules are scarce and colorless. The elongated caudal glands are arranged in a close tandem, and have distinct ducts. The renette cell, three times as long as the body is wide, empties through a very inconspicuous pore at the base of the lips. Strongly staining, elongated, distinctly granular bodies are found in the lateral fields behind the neck. They are one-half as long as the body is wide, and two-thirds as wide as long, and they occur as rights and lefts, i. e. are paired. The first pair is one body-width behind the neck, and the successive pairs, continuing to the anus, are separated from each other by a distance three times as great as the radius of the body.

The tail of the male is a little stouter than that of his mate. The uniform, slender, frail spicula are as long as the anal body diameter, and one-twelfth as wide as long. There are two strong grooved accessory pieces, twice as wide as the spicula, bearing excessively minute teeth at their blunt distal ends. There are at least five unicellular clavate glands on the dorsal side, extending in front of the anus for a distance equal to the length of the tail. First, anteriorly there is a pair, then a second pair, then apparently a single one, all with slender ducts. They were not very well seen, and this enumeration may not be exact.

Habitat; remarks. Cape Royds; Bay, Cape Royds. Numerous specimens, somewhat shrunken.

20. *Euchromadora antarctica*, n. sp. The cuticle is traversed by about 550 transverse striae, resolvable into dots near the head, and into basketwork-like markings on the neck and elsewhere. These striae are of such a size as to give rise to an obscurely crenate contour line. There is a simple, very obscure cardiac valve, one-third as



wide as the base of the oesophagus. The cells of the intestine contain numerous rather small, colorless, uniform granules. The ellipsoidal caudal glands are arranged in a loose tandem, and empty through very narrow ducts. The renette cell is about as long as the body is wide, and one-third as wide as long, and presses the intestine somewhat to one side. The nerve-cells around the oesophagus are of a distinct character, but are scattered so as to exhibit no very systematic arrangement. The prolate to ellipsoidal eggs are considerably longer than the body is wide, and three-fourths as wide as long. They have been seen in the uterus one at a time. The tapering ovaries contain upwards of a dozen ova.

The slender, uniform spicula have a more or less frail framework, and are about twice as long as the anal body-diameter. They are not cephalated, but the proximal parts are somewhat wider. This wider part lies a little to the ventral side of the body-axis, that is, it appears to do so when the animal is viewed in profile. The single, slender accessory piece has a framework that is more or less frail, and has its proximal end opposite the body-axis. The supplementary organs are

spread along a distance about equal to five or six body-diameters, the distance between the adjacent organs being about equal to the radius of the body. These organs are of such a nature that when the body is stretched out they hardly disturb the ventral contour, but when the tail end is incurved, as is often the case, they become slightly raised, so that the altitude is about equal to one-half the width of one of the annules of the cuticle. In this contracted condition of the ventral surface of the body the distance between the organs is about equal to their own diameter. The ejaculatory duct is one-fourth, the vas deferens three-fourths, and the testis two-fifths as wide as the corresponding portions of the body. The testis is cylindrical. Rather distinct, oblique copulatory muscles are found coextensive with the supplementary organs.

Habitat; remarks. Cape Royds; Bay, Cape Royds. Numerous specimens, somewhat shrunken.

21. *Euchromadora denticulata*, n. sp. Striae about 400, resolvable into basket-work-like markings of a rather obscure character on the anterior part of the neck. The lips are sub-distinct. At the nerve-ring the oesophagus has a diameter equal to two-fifths the corresponding diameter of the neck, but swells posteriorly to three-fourths the corresponding diameter. In the posterior swelling the lining is somewhat expanded.

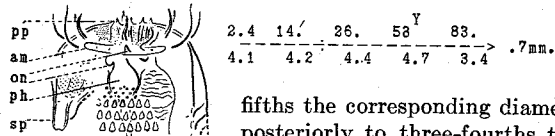
The dimly seen pyloric collum is one-third as wide as the body. Intestinal granules are scarce. The ellipsoidal caudal glands occur in a close tandem opposite the anus and in the anterior fourth of the rather massive tail. The caudal setae, six ventro-submedian, and six dorso-submedian, are slender, stiff, somewhat cylindrical, sub-acute, and one-sixth as long as the anal body-width. The renette-cell, two-thirds as long as the body is wide and one-third as wide as long, empties through a pore opposite the nerve-ring. In both the specimens examined there appears a slender seta-like appendage (?) at the mouth of the excretory pore. The female reproductive organs are double and symmetrical, and probably reflexed.

Habitat; remarks. Cape Royds. Two females, in fair condition.

22. *Euchromadora meridiana*, n. sp. The cuticle is much like that of *Euchromadora vulgaris*, (Bast.) de Man. 400 striae, retrorse posteriorly and the reverse anteriorly, make the contour obscurely crenate.

The oesophagus, cylindrical anteriorly, conoid posteriorly, has several breaks in its musculature, the most prominent being at the beginning of the final fifth of the neck.

The numerous intestinal granules are small, uniform, and indistinct. The rather ellipsoidal caudal glands are arranged in an open tandem. Immediately behind the anus the tail has a diameter equal to three-fourths the anal body-diameter; thence onward it tapers but very slightly to the middle, where it begins to taper more rapidly to the terminus which is one-third as wide as the anal body-diameter. The lateral fields are somewhat distinctly cellular. The renette-cell, which pushes



ring the oesophagus has a diameter equal to two-

fifths the corresponding diameter of the neck, but swells posteriorly to three-fourths the corresponding diameter.

In the posterior swelling the lining is somewhat expanded.

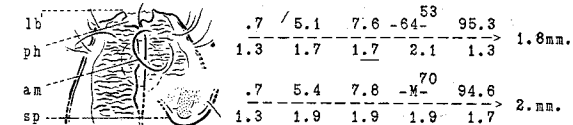
the intestine to one side, is twice as long as the body is wide, one-fourth to one-fifth as wide as long. Just behind the nerve-ring there is a large ampulla as long as the body is wide, and one-third as wide as long. In all the specimens examined there appears a slender seta-like appendage at the mouth of the excretory pore somewhat longer than the cuticle is thick. The ovaries are broad.

The male tail is like that of the female, but more uniformly tapering, with less of a diminution just behind the anus. The strongly arcuate, sub-slender, rather strong and tapering spicula, somewhat cephalated at the tapered distal ends, are one and two-thirds times as long as the anal body-diameter, and lie with their proximae slightly ventral to the body-axis. There are two, more or less separate accessory pieces, each in two parts, one behind the spicula; the other in front or alongside, the front part being like a reduced spiculum. The ejaculatory duct is one-fifth, the vas deferens one-half as wide as the body.

Habitat; remarks. Cape Royds; Bay. About a dozen somewhat shrunken specimens, the two sexes occurring in about equal numbers.

LAXUS, Cobb, 1894

23. *Laxus septentrionalis*, n. sp. There are upwards of 1000 plain, transverse striae so small as to be difficult of resolution. The three subdistinct, more or less bluntly conoid lips are united by a membrane, and form a circle around the mouth, very difficult to see, except when the mouth is open.



Only when the mouth is open can the connecting membrane be seen. It is probable that the pharynx contains an obscure dorsal tooth. The structure which gives rise to this supposition is of fair size, and thinly covered with chitin. The cylindrical to conoid neck contains a cylindrical oesophagus, which, measured near the nerve-ring, is one-half as wide as the corresponding portion of the neck. Though the amphids appear circular, they are in reality spiroidal. The pharynx is situated in the midst of an almost imperceptible elongated pharyngeal swelling, two-thirds as wide as the head. The thick walled intestine, six cells in girth, soon becomes five-sixths as wide as the body. It has a distinct lumen, and is separated from the oesophagus by a collum hardly one-third as wide as the base of the neck. For a distance about equal to the length of the body-diameter the cells of the intestine are comparatively free from granules. Thereafter they are uniformly packed with yellowish granules having a width a little greater than that of one of the striae of the cuticle. From the continuous anus the prominent, chitinized rectum extends inward and forward a distance three-fourths as great as the length of the anal body-diameter.

The tail tapers from the anus to a terminus one-third as wide as its base. Apparently the ellipsoidal caudal glands are packed together somewhat behind the middle of the tail. Their ampullae, near the terminus, are more or less distinct. The lateral fields, which are one-third as wide as the body, are margined by refractive lines, at least in balsam specimens. The renette has not been clearly seen, but is supposed to be located at a distance behind the neck equal to the

radius of the body, and to be about one-half as long as the body is wide, and one-half as wide as long. It empties by means of a short duct, and a rather structureless ampulla half as wide as the oesophagus, through the excretory pore near the nerve-ring. The vulva is more or less continuous, and rather inconspicuous. The elongated eggs are one and one-half times as long as the body is wide, and one-third as wide as the body. They have conspicuous nuclei. Of the narrow ovaries the posterior one is only one-third to one-half as long as the anterior, which contains twenty developing ova, arranged single file, while the posterior one contains only about fifteen.

The slender, uniform spicula have a more or less frail framework. The single accessory piece, also more or less frail, presents a stoutish, uniform, blunt apophysis one-half as long as the anal body-diameter, arranged at right angles to the part which is applied to the spicula. This latter is one-third as long as the spicula. The vas deferens is one-third, the tapering testes about one-half as wide as the body. These latter, however, finally become very narrow. The blind end of the posterior testis lies in front of the anus a distance about equal to six times the length of the tail.

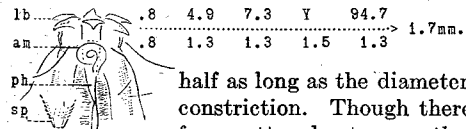
Habitat; remarks. Bay, Cape Royds; Bay. Four females and two males, slightly shrunken.

AXONOLAIMUS, de Man, 1889

24. *Axonolaimus polaris*, n. sp. The striae of the thin cuticle are very difficult to resolve and are best seen on and near the tail. One is left in doubt as to whether

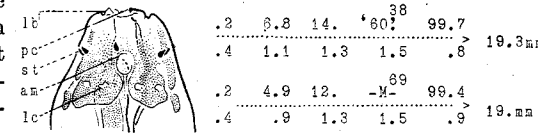
the contour is plain, or very minutely crenate. Apparently there are six subcephalic setae, each half as long as the diameter of the head measured at the labial constriction. Though there are no somatic setae there are a few scattered setae on the neck, generally somewhat shorter than the subcephalic setae. The conoid neck contains a conoid oesophagus, whose diameter near the nerve-ring is two-fifths as great as that of the corresponding part of the neck, and which finally becomes two-thirds as wide as the base of the neck. There is no distinct cardia. The thick walled intestine is two to three cells in girth, and becomes at once three-fourths as wide as the body, being separated from the oesophagus by a collum three-fifths as wide as the base of the neck. On account of the food contained in it the lumen of the intestine is distinct. The intestinal cells contain very fine, scattered, colorless granules in the middle of which the nucleus appears as a distinct feature in stained specimens. From the raised anus the chitinized rectum extends inward and forward a distance equal to the anal body-diameter. The tail tapers from the anus, bears very minute hairs near the end, and contains broadly saccate caudal glands packed in its anterior third. The nerve-ring surrounds the oesophagus squarely, is of medium size, and is accompanied by obscure nerve-cells, which are not very distinctly grouped.

Habitat; remarks. Bay, Cape Royds. Single young specimen, in fair condition. In the sketch the lips are shown partly everted.



THORACOSTOMA, Marion, 1870

25. *Thoracostoma polare*, n. sp. The thick yellow cuticle is traversed by minute, transverse striae difficult of resolution, and in its deeper layers, at least near the head, by fine oblique striae crossing each other at an angle of about forty-five degrees. Subcephalic setae, like the cephalic in form and size, occur in groups of three or four together, near the border of the "cuirasse," and a little farther back. Similar cervical setae occur on the anterior part of the neck singly and separated by a distance one-fourth to one-third as great as the diameter of the neck measured at the middle. The remaining cervical setae as well as the somatic setae are reduced to papillae. All these setae are arranged in more or less irregular lateral and submedian lines. The head is furnished with a chitinous, faintly yellowish "cuirasse," extending back to opposite the base of the pharynx, and divided longitudinally into six lobes by as many sutures. Each of these lobes is perforated near the posterior margin by two oblique, irregular locules, each a little more than half as long as the amphids are wide. The three amalgamated lips are nearly obsolete. Six forward pointing, inconspicuous, innervated papillae form a single circlet on the front of the head. The simple, rather narrow, more or less irregularly pyramidal, well chitinized pharynx is as long as the head is wide, and is somewhat narrowed posteriorly, where the two ventrally submedian oesophageal glands empty into it. The third oesophageal gland, ventral in position, empties into the lumen of the oesophagus a little more than halfway back to the eye-spots. When shut the pharynx rather closely resembles the lumen of the oesophagus, which possesses a well developed chitinous lining. The only armature of the pharynx is the dorsal, labial, two-lobed cordiform piece of chitin just at the mouth opening, arranged much as described by Dr. de Man for *Thoracostoma antarcticum*, v. Linst. Two faint refractive lines close together lead backward from the posterior part of each amphid. The two rather widely separated eye-spots are located at a distance from the anterior extremity equal to four times the width of the head, and are one-sixth as wide as the corresponding part of the neck, and about as long as wide. These are somewhat heart shaped, and are composed of compactly arranged brownish granules. There are obscure indications of a refractive body, or "lens," in the hollowed out front part of each eye-spot. The conoid oesophagus is about half as wide as the neck, and presents a faint, elongated pharyngeal swelling. The cylindroid cardia is one-fifth to one-fourth as wide as the base of the neck. The thick-walled intestine, separated from the oesophagus by a collum one-third as wide as the base of the neck, becomes at once three-fifths as wide as the body, and is about six cells in girth. The intestinal cells contain numerous uniform, colorless granules. The posterior lip of the anus is slightly elevated.



The hemispherical-conoid to convex-conoid tail tapers from the anus and ends in a very broad, bluntly rounded terminus. The spinneret is a very slightly depressed pore with a suggestion of yellowish color, arranged a little unsymmetrically, so that it empties somewhat toward the ventral side, and not axially. It

is unarmed, though a little in front of it there are a very few papilla-like setae. The three more or less elongated saccate caudal glands extend in a loose tandem in front of the anus a distance five times as great as the corresponding body-diameter. Their distinct and somewhat tortuous ducts widen to three separate ampullae so as to fill the middle of the tail. The vulva is slightly depressed and is rather inconspicuous. The vagina extends inward at right angles to the ventral surface about halfway across the body. Both before and behind the vulva there are well developed unicellular glands. Each of the two straight uteri is about seven times as long as the body is wide, and contains a row of five or six eggs in the specimens examined. The rather thick-shelled eggs are three-fourths as long as the body is wide, and nearly as wide as long. Owing to their pressure on each other the eggs take on a more or less rectangular contour. The broad ovaries reach two-thirds the way back to the vulva, and contain scores of discoid ova, arranged more or less in single file.

The anus of the male is broadly elevated. The tail of the male has a complicated sexual armature. Near the anus on the anterior fourth of the tail there are six stout, stiff, conoid, somewhat blunt, ventrally submedian setae on each side, the longest of which, those nearest the anus, are nearly as long as the cuticle is thick, and the smallest of which, the hindmost, are very small. The pre-anal setae are arranged in ventrally submedian rows, of which the individual setae are much nearer together posteriorly than anteriorly. Between the anus and the single ventral median supplementary organ there are ten of these setae; between the latter and the posterior member of the ventrally submedian rows of supplementary organs there are two of these setae; between the ultimate and the penultimate members of the submedian series there are also two. Thence forward between any two members of the submedian series there is but a single seta. In all, therefore, there are about seventeen of these setae on each submedian line in front of the anus. In addition there are two very inconspicuous, papilloid, tapering, acute, lateral setae near the terminus. The lateral fields, one-third to two-fifths as wide as the body, are composed of several rows of cells among which are placed glandular, saccate cells, of two or three times as great diameter, connected with the exterior by means of pores in the cuticle. The relative number and position of these glandular cells may be judged to a certain extent from the fact that in the female near the vulva three of these large saccate cells are separated from each other by spaces about equal to their own diameter. These cells are entirely similar to those described by Jaegerskiöld, de Man, and other authors, who have made observations on species of *Thoracostoma*. The distinct cells connected with the more or less broad and oblique nerve-ring are arranged into rather distinct groups, and are a prominent feature of the middle half of the neck.

The stout, blunt, yellowish spicula, cephalated by a very slight constriction, are arcuate in the distal half, and are one and three-fourths times as long as the anal body-diameter. At the widest part, a little in front of the middle, they are about one-fourth as wide as the corresponding part of the body. From the widest part they taper gradually to the distal ends, but taper more suddenly toward the proximal ends, which lie opposite the body-axis and have a width when viewed in profile about twice as great as the thickness of the adjacent cuticle on the dorsal side of the body. The difference between the anterior and pos-

terior parts of the spicula is greater than in *Thoracostoma setosum*, Linst. The strong, chitinous framework is strengthened by a middle piece in the distal three-fifths. The two separate, strong, rather stout accessory pieces are bent a very little, and are half as long as the spicula. They are of somewhat irregular width, but appear when seen in profile about twice as wide as the dorsal cuticle is thick. They lie parallel to the spicula, but their cephalated proximal ends, a little wider than those of the spicula, are bent away a little and lie somewhat to the dorsal side of the body-axis.

The elevated, mammiform supplementary organs, about one-sixth as wide as the body and half as high as wide, are arranged in ventrally submedian rows one and two-thirds times as long as the body is wide, the posterior members being located a distance in front of the anus equal to one and two-thirds times the length of the spicula. They are a little farther apart posteriorly than anteriorly, the longest space being about equal to the length of the radius of the body as seen in profile at the corresponding part. In addition to these two rows of five organs each there is a single ventral organ a little in front of the middle of the spicula, similar in size and form to the others, but manifestly of a different structure. Sometimes there is an appearance as if a rudimentary sixth ventrally submedian organ is present in front of the fifth. Oblique copulatory muscles are arranged close together coextensive with the supplementary organs. The ejaculatory duct is about one-fifth as wide as the corresponding part of the body.

Habitat; remarks. Bay, Cape Royds; Cape Royds. Three females and two males, in good condition.