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Journal of the
Royal Microscopical Society

CONTAINING ITS TRANSACTIONS AND PROCEEDINGS

AND

A SUMMARY OF CURRENT RESEARCHES RELATING TO

ZOOLOGY AND BOTANY

(principally Invertebrata and Cryptogamia)

MICROSCOPY, &c.

EDITED BY

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Minimis partibus, per totum Naturæ campum, certitudo omnis innititur
quas qui fugit pariter Naturam fugit.—*Linnæus*.

FOR THE YEAR

1914

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VI.—*British Enchytræids.*

By The Rev. Hilderic Friend, F.R.M.S.

(*Read February* 18, 1914.)

Figs. 15 to 19.

VI. *New Species and Revised List.*

During the past year my researches into this interesting group of microscopic Annelids have been diligently continued by the aid of a Government grant, and with the valued co-operation of Mr. H. Hillman, of Nottingham, who has, both in that county and in Jersey, discovered many interesting species, two of which I propose to name after him in recognition of his invaluable aid.

In the last paper which I had the honour to submit to this Society (*1*),* I gave a brief outline of Enchytræid characters, and it will suffice if the reader turns to page 255 (Vol. for 1913) for such details as he may require to enable him to follow the present descriptions. The progress made in this study renders it necessary to bring our knowledge of the group to a focus, and it is proposed in the present paper to deal in the first place with such new species as have been added to the family, or whose definition requires criticism, and then to tabulate results and give a revised catalogue of species known to Britain.

Since, however, the red-blooded Enchytræids (*Marionina* and *Lumbricillus*) still await careful revision, and the family is now so extensive, it will be necessary for the present to confine attention entirely to the genera with colourless blood. It must not, however, be thought that the colour of the blood is taken as a generic character, since we occasionally find red, pink, and yellow blood outside the range of the two genera (*Marionina* and *Lumbricillus*) in which red is the normal colour. Several of the genera possessing white blood have yielded good results during the year. I have personally explored some new localities as well as many old ones, and during my brief vacation spent some time in Germany and Belgium; but these countries did not yield much of special interest which was not already known to me at home. The truth is that Great Britain is peculiarly rich in Enchytræids, and though Bretscher, Issel, and others have found a goodly number in Switzerland and

* The figures in brackets refer to the Bibliography at the end of the paper.

Italy, England seems to be at present considerably ahead of other countries in the number of known species.

Owing to the uncertainty which still prevails in reference to the genus *Enchytræus*, it has been thought desirable to omit consideration of that group also for the present. This leaves us with eight genera for our present study, viz. *Achæta*, *Fridericia*, *Buchholzia*, *Henlea*, *Bryodrilus*, *Mesenchytræus*, *Grania*, and *Chamædrilus*. *Stercutus*, *Hydrenchytræus*, *Michaelseni*, *Distichopus*, *Hepatogaster*, and *Chirodrilus* are at present unknown in Great Britain.

I.—SPECIES NEW TO SCIENCE.

a. The Genus Buchholzia.

In the year 1900, when Michaelsen published his Oligochæta (*4*), two species only of *Buchholzia* were known to science, and these differed from each other so widely that one could hardly see how they could both be members of the same genus. The intervening years have brought other species to light which must for the present be spoken of as members of the genus *Buchholzia*; but they still further illustrate the difficulty of finding true generic characters. One of the new species about to be described is evidently a connecting link between this and other genera, and might well have been named *intermedia*, but that when a further revision is required such a name would be robbed of much of its significance.

1. *Buchholzia focale* sp. n.

Length, 8–10 mm. Segments number about 45. While the chloragogen cells often give it a dark appearance, it is white and transparent. Setæ 2–3 in posterior region of body, 3 dorsal and 4 ventral as a rule in anterior bundles; not arranged as the setæ of *Fridericia* are, with the shortest in the middle of the bundle, but sigmoid and *fallax*-like, i.e. the shortest near the middle line. Setæ persisting on the girdle segment to a late period. Chloragogen cells very large, almost black under the lens, commencing in segment 6. Cœlomic corpuscles varying in size and shape, from round to oval or discoid, pointed, brownish, nucleated. Three pairs of septal glands normal in shape and position. Blood sometimes yellowish in colour. Body frequently glandular, and segments annulated. Nerve chord enlarged in front. Brain about $1\frac{1}{2} \times 1$, concave before and behind, Henlean in type. The origin of the dorsal vessel also in 12/13 is Henlean. Three specimens carefully examined all agreed in this peculiarity as in every other. Girdle normal on the 12th segment, extending over 12 and half 13, with fairly large cells. Sperm funnel about 2×1, with long

slender duct arranged frequently like coils of vermicelli. Spermathecæ as usual, one pair opening in 4/5 with or without glands; duct about equal in length to ampulla, short, stout, gourd-like in outline (see fig. 15). The most striking peculiarity, however, is the presence of a pair of glands (possibly aborted salivaries) apparently issuing from the posterior of the pharynx, and looking like the two ends of a clergyman's bands or cravat. Hence the specific name *focale*. The nephridia were not studied.

It will be observed that the position of the girdle and sperm-funnel, the point of origin of the dorsal vessel, and the peculiar glands, differentiate it from *B. appendiculata* and *B. fallax*, while the spermathecæ show it to be unlike *B. parva*—a species not yet found in Britain. The brain, salivaries, spermathecæ, and origin

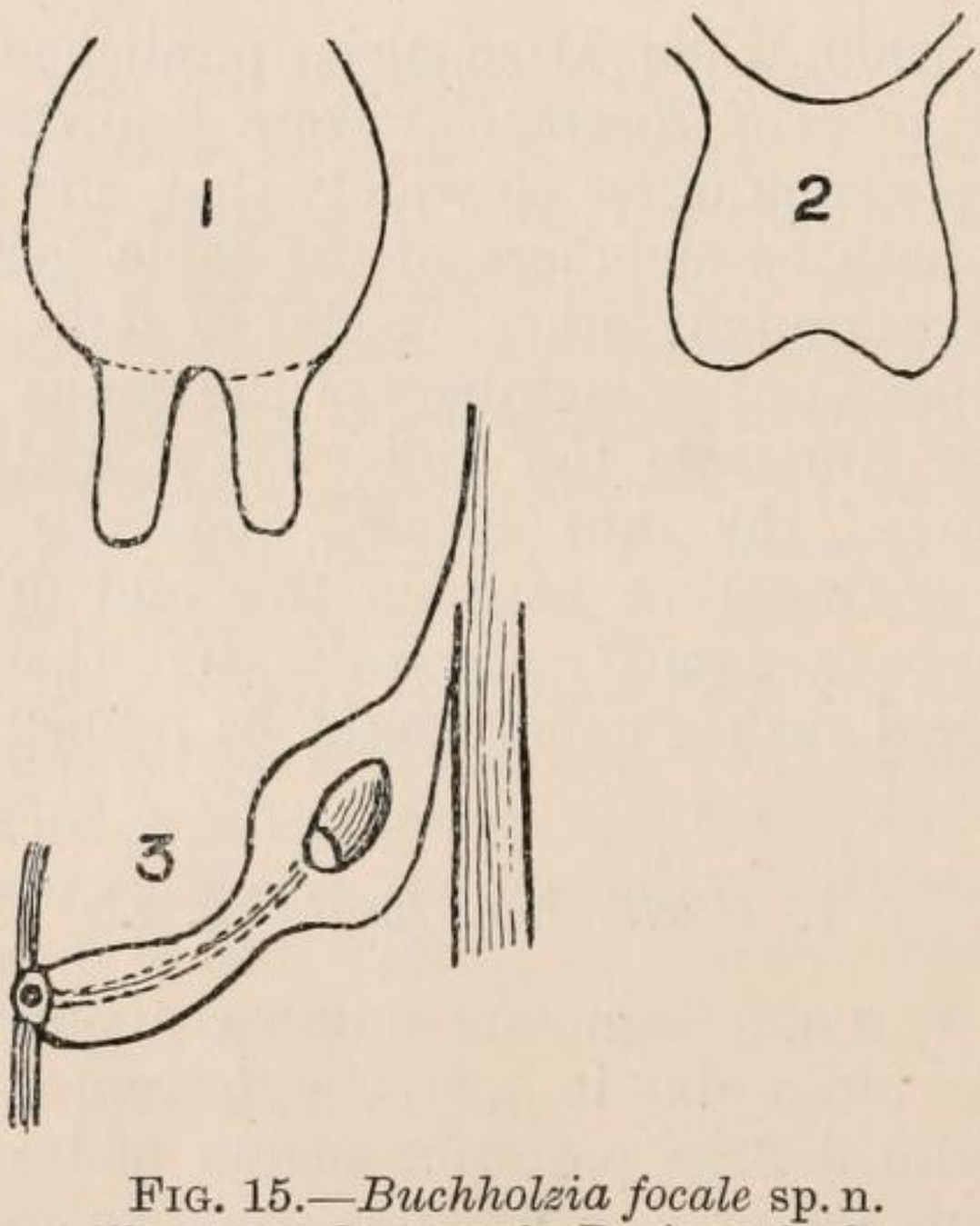

Fig. 15.—*Buchholzia focale* sp. n.
1. Cravat-like appendages. 2. Brain. 3. Spermatheca.

of the dorsal vessel also serve to make its dissimilarity from the next clear.

Habitat.—Alexandra Park, Hastings. Collected December 21, 1911; described from living material March 7, 1912; but the details now published for the first time, for reasons given under the next.

2. *Buchholzia tenuissima* sp. n.

Very slender. Length 8–10 mm. Segments 35–50. Setæ gradually decreasing in number posteriorly, from five in anterior to two in posterior segments; slightly sigmoid, wanting on segment 8. The most arresting external character is the girdle, which ex-

tends in the fully adult worm from the setæ of segment 7 to those of segment 9, and includes the whole of the 8th segment. Here the blind sac is situated internally from which the dorsal vessel takes its rise. The œsophagus suddenly emerges in this segment into the enlarged intestine. The brain is about as long as broad, varying somewhat under tension; slightly convex in front; straight, or slightly convex when strained; not incised, but nearly straight behind. Sperm-funnels rather large, about 2 × 1, somewhat mobile and variable, with fairly stout ducts, opening into a moderately large atrial gland-pore on segment 8. Large nephridia-like salivary glands in segment 4. Nephridia seen in 8/9 and later as in *Chamædrilus*, but not observed in the anterior segments. Duct a continuation of the postseptal. Cœlomic corpuscles of two kinds, larger and smaller. Very characteristic sperma-

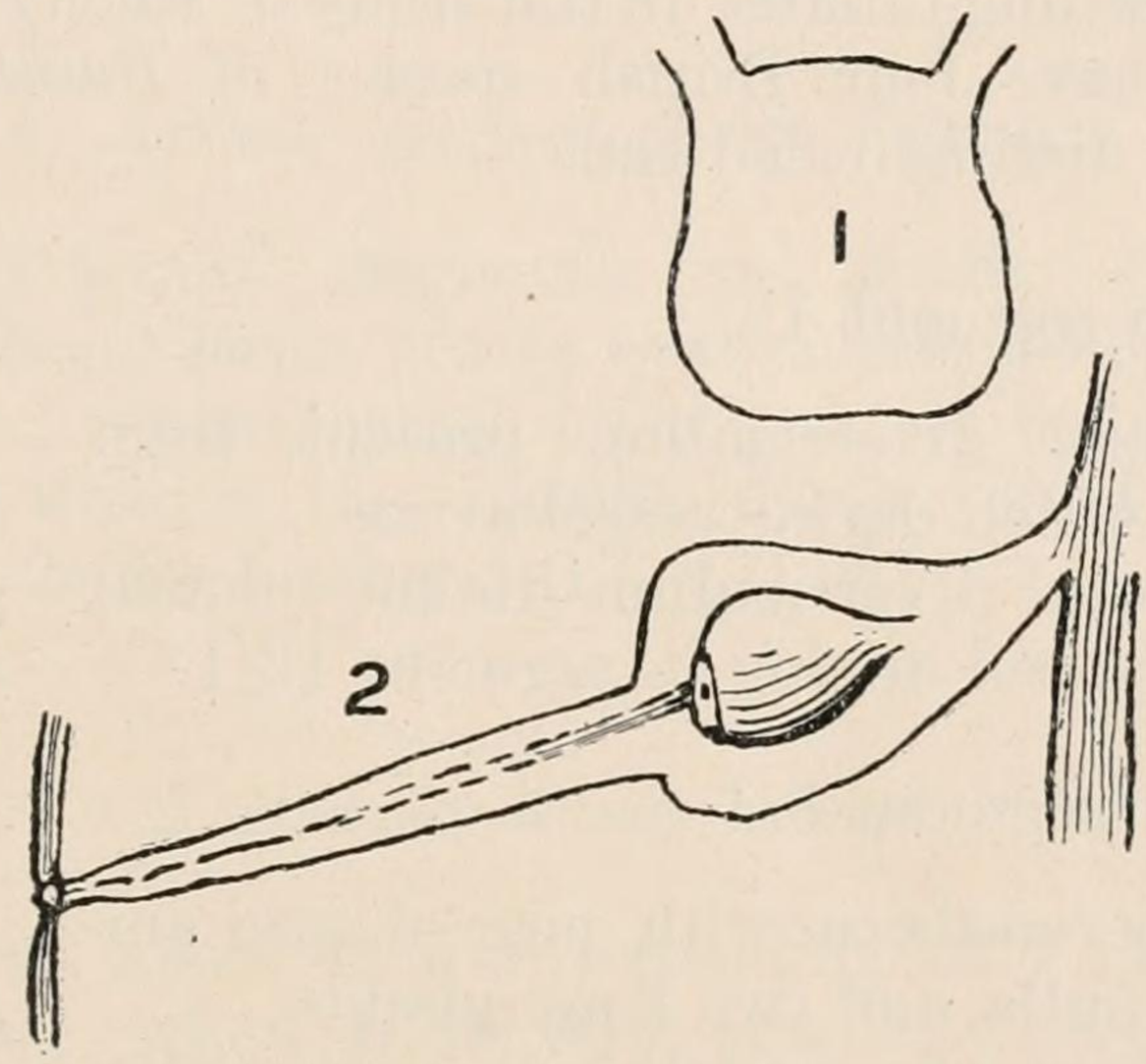

FIG. 16.—*Buchholzia tenuissima* sp. n.
1. Brain. 2. Spermatheca.

thecæ (fig. 16), with bulbous ampulla attached to œsophagus, and stout duct tapering to 4/5 opening without glands.

Five specimens were examined, of which three were adult and agreed in all particulars. The details respecting their length and number of segments may not be without interest.

	Length	Segments
1. Immature . .	6 mm.	35
2. „ . .	8 „	35
3. Mature . .	10 „	50
4. „ . .	8 „	45
5. „ . .	6 „	36

There is thus a difference of fourteen segments and 4 mm. even in the adults. The length usually agrees with the number of segments.

The position of the girdle and other organs allies this species with *B. appendiculata*, from which it differs in the shape of the brain, diverticulum, spermathecæ, sperm-funnel, and other particulars. While *B. appendiculata* is stout, the new species is attenuated, whence its trivial name.

Habitat.—Under moss in the Alexandra Park, Hastings. Collected at the end of June 1912 ; described February 13, 1913, but the details now published for the first time. When *B. focale* was examined, I was daily expecting to be called to Hastings again on domestic business, and hoped to be able then to obtain new material. It was not till six months after my former visit, however, that I was able to examine the spot, and the results are noteworthy. In December I found *B. focale*, in June *B. tenuissima*. Such striking facts are continually coming under one's observation, and are of exceeding interest in the study of Enchytræid bionomics.

We now have four British species of *Buchholzia* on record, which may be distinguished thus :—

1. Girdle on segment 12.

(i) Dorsal diverticulum present, from which dorsal vessel arises . .	*B. fallax*
(ii) Dorsal diverticulum absent ; dorsal vessel arising in segment 12/13 .	*B. focale*

2. Girdle on segment 8.

(iii) Spermathecæ with pear-shaped ampulla, and two large glands .	*B. appendiculata*
(iv) Spermathecæ with bulbous ampulla, destitute of glands . . .	*B. tenuissima*

The members of this genus are not, so far as our present knowledge goes, common in this country, and deserve a little further study. I first reported *B. fallax* Mich. as British in the Irish Naturalist for 1898, as having been taken on the shores of Lough Neagh in June 1896, and, about the same time, at Lodore and Lowther in Cumberland. My later records are Ledbury Churchyard, April 17, 1911 ; Eel-traps on Sutton Broad, August 19, 1911 ; Cauldwell, near Burton-on-Trent, June 11, 1912 ; Dundrum Road, Dublin, March 7, 1913 ; Blenheim Park, Oxon, April 14, 1913. The species seems liable to a good deal of variation. *B. appendiculata*, however, seems more fluid still, and presents many problems which I have not yet been able to solve. I first found and figured it April 21, 1892. It was first recorded as British, however, by Southern (*6*) in 1909. The type and varieties have been found

by me at several places in Derbyshire between February 1911 and July 1912; at Hastings, June 1912; and Sedlescombe, Sussex, August 16, 1913.

β. The Genus Achæta.

This interesting genus is characterized by the absence of setæ. In some instances setæ sacs still remain in the form of cœlomic processes slightly attached to the body-wall, while in others these vestiges have entirely disappeared. Michaelsen (*4*) has three species only, known to science in 1900, all of which are British. Bretscher (*8*) in 1902 added a fourth, which has not yet been found in these Islands. Southern (*5*) has described an Irish species, and to these I am now able to add two others.

1. *Achæta spermatophora* Friend.

Length about 8 mm. Segments from 35–40. Setæ sacs present dorsally. Brain large, nearly oval, convex before and behind, about $1\frac{1}{2}$–2×1. Characterized by a pair of bodies resembling spermatophores, whence the specific name. First described in Irish Naturalist for September 1912, p. 174.

2. *Achæta incisa* Friend.

Length at rest about 5 mm., extending to 7 or 8 mm. when stretching eagerly, when it is very slender. Segments 35–40. Destitute of setæ, but possessing dorsal setæ sacs. Owing to the presence of large opaque cœlomic corpuscles and chloragogen cells, it resembles *Enchytræus nigrinus* under the Microscope. Sperm-funnels 2 or $2\frac{1}{2}$ times as long as broad, with long sperm duct, medium atrium and pores. Three pairs of septal glands, but no salivary glands observed. Dorsal vessel arises in segment 7 and pulsates in front, especially in segment 6. Nephridia in 6/7, 7/8 with very large postseptal. Behind the girdle the nephridia show the postseptal narrowing into a duct. Spermathecæ bottle-shaped, with neck opening into the œsophagus; not like those of *A. bohemica*. Brain about 2–3 times as long as broad, sometimes incised behind, suggesting the specific name. The brain (fig. 17) was found, after this specific name had been given, to be variable, but the name is retained as the other characters are sufficiently definite to ensure recognition.

Habitat.—Sandy soil, Mansfield, Notts, May 8, 1912. See Trans. Notts Nat. Soc., 1911–12, pp. 58–9. No figures were

supplied, as it was intended at an early date to publish the diagnosis in one of the scientific journals.

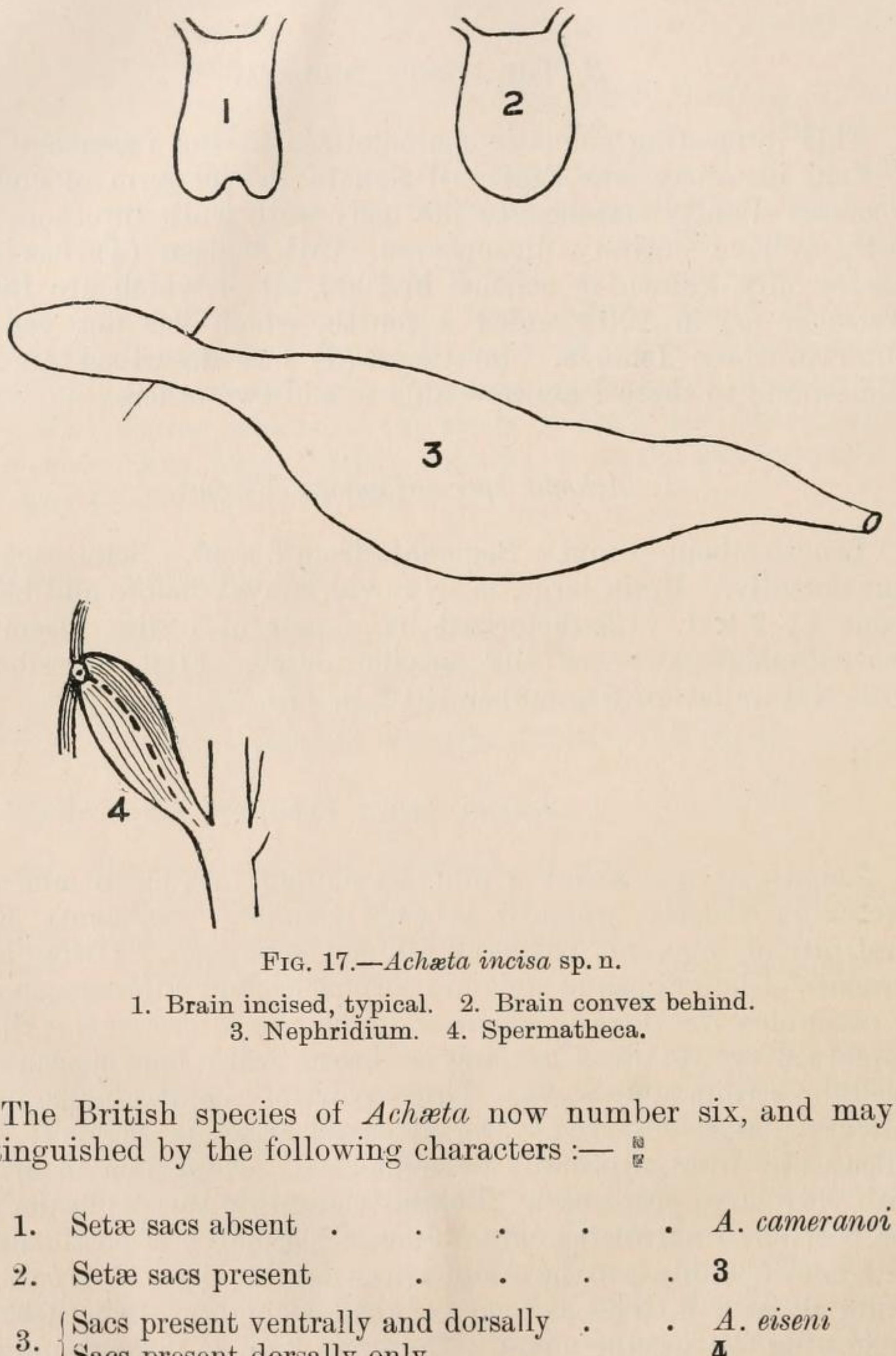

FIG. 17.—*Achæta incisa* sp. n.

1. Brain incised, typical. 2. Brain convex behind.
3. Nephridium. 4. Spermatheca.

The British species of *Achæta* now number six, and may be distinguished by the following characters :—

1.	Setæ sacs absent	*A. cameranoi*
2.	Setæ sacs present	3
3.	Sacs present ventrally and dorsally . .	*A. eiseni*
	Sacs present dorsally only . . .	4
4.	Brain concave behind	*A. incisa*
	Brain convex or oval :	
	a. Spermathecæ with pear-shaped ampulla	*A. bohemica*
	β. Spermathecæ like spermatophores .	*A. spermatophora*
	γ. Spermathecæ simple ducts . .	*A. minima*

γ. The Genus Henlea.

On more than one occasion in the past this important genus has received attention in these pages. It is therefore unnecessary here to do more than describe those species which have been recently added to our indigenous Annelid fauna.

1. *Henlea glandulosa* Friend.

Resembles, in some respects, *H. marina*. First described in Irish Naturalist, January 1913, pp. 9–10; at the time when my paper on Henleas was in the hands of the Sec., R.M.S. (See Zoologist, March 1913).

2. *Henlea bisetosa* sp. n.

A very small transparent worm. Length 3–4 mm. Segments about 30. Setæ 2 throughout. Often a young one may be found growing beside the regular pair, but never three fully formed. Bulbous enlargement of intestine in segment 8, with dorsal vessel originating in 7/8. No œsophageal glands; but it might be possible to regard the bulb as an unpaired gland. Cœlomic corpuscles large, clear, not granular. Special glands (salivaries probably) between the second and third pair of septals (similar to *H. inusitata*). Septals of rather unusual form, three pairs in normal position. Intestine yellowish, chloragogen cells rare. Nephridia begin in 6/7, with long slender duct originating behind the septum.

Though not adult, this species is readily distinguished from all other British forms by the number of setæ and the shape of the septals. The position of the salivary glands is unusual, and allies it with *H. inusitata*.

Habitat.—Canal side, Dublin. Found by myself March 11, 1913, and recorded in Irish Naturalist, September 1913, p. 172; but now described for the first time. Also recorded for Nottingham, April 1913 (*2*)

3. *Henlea hillmani* sp. n.

Length 5–6 mm. Segments 30–36. Yellowish-white, rather a squatty form. Ventral setæ 2–4, usually two dorsally, largest in posterior end. When four are present the innermost pair is shortest. Three pairs of septals, the hind pair with globular processes behind; otherwise normal in position and shape. Dorsal vessel arising about thirteenth or fourteenth segment; in one traced to 12/13, in another to 14/15, pulsating forward to segment 5. Brain incised behind, somewhat longer than broad, of

Henlean type. Cœlomic corpuscles not horny, of two kinds, the larger granulated. No œsophageal glands or bulb; the œsophagus going gradually into the intestine. Strong gizzard extending from segment 2 to 4. Rather long, narrow salivaries, with tips slightly budding, or branching freely. First nephridia in 7/8; duct not always issuing from the same part of the postseptal. In the hindermost segments the duct tends to spring from the posterior portion.

Habitat.—Collected at Scarrington, Notts, June 10, 1913, by Mr. H. Hillman, after whom it is named in recognition of the splendid service he has rendered by his intelligent and indefatigable collecting.

4. *Henlea insulæ* Friend.

Collected in June 1913 by Mr. Hillman in Jersey, and first described in Zoologist, December 1913, p. 460.

5. *Henlea inusitata* Friend.

First regarded as a variety of *H. dicksoni*, but found to be a true species. Length variable (unless again two species are included); 5–15 mm. Segments 25–45. Setæ *Fridericia*-like; i.e. shortest in the middle of the bundle, three to six in posterior bundles, five to eight in front, rarely in the most adult reaching nine in a set. Brain typical, incised, concave or sometimes straight or convex behind, according to tension.

Nephridia begin in 5/6 or 6/7, duct as long as postseptal, from the middle of which it usually springs. Spermatheca usually a simple duct, occasionally with glands at the 4/5 opening. Bulb in segment 8, and dorsal vessel in 8/9. Salivary glands between the second and third pair of septals. First described in Zoologist, March 1913, p. 85.

Habitat.—Frequently found, and formerly recorded as *H. dicksoni* in part. Definite records for the new species are Rolleston Junction, Notts, March 26, 1912; Cauldwell near Burton-on-Trent, June 11, 1912, and again on April 7, 1913; Dundrum Road, Dublin, March 7, 1913; Oxford Botanic Garden, April 15, 1913.

6. *Henlea minima* Friend.

Length 5–6 mm. Segments 25. Brain slightly concave behind, converging forwards, of the usual Henlean type. Spermathecæ like an Indian club or champagne bottle, without ampulla or

glands. Septals three pairs, small (in front), medium, and large. No œsophageal glands. Girdle 12 to half 13. Cœlomic corpuscles large, clear, oval to round. Setæ about six in front, shortest in the middle of each bundle, as in *Fridericia*, 4–5 behind, larger and nearly equal. Œsophagus merges suddenly into intestine in 7/8, dorsal vessel arises in 10/11. Four pairs of large nephridia in pre-clitellar segments (6/7–9/10). Duct of nephridia equalling post-septal in length, and usually arising from the middle portion. Sperm-duct in girdle segment very fine, coiled.

Related to *H. dicksoni*, but much smaller, and possessed of specific characters, such as origin of dorsal vessel, shape of spermathecæ, and size of brain.

Habitat.—Stream at Netherseal, near Ashby-de-la-Zouch, 1911. First described as a new species in Zoologist, March 1913, p 84.

7. *Henlea multispinosa* Friend.

Length 23 mm., fairly stout. Segments 40–50, transparent. Spermathecæ consisting of narrow ducts, sometimes varying in diameter, with small glands (apparently 2 to 4) at the 4/5 opening. Salivary glands present, slender, forked or branched (resembling those of certain species of *Fridericia*); three pairs of septals, normal in shape, size and position. First nephridia in 4/5 large; duct emerging from behind the septum, and exceeding post-septal in length. Bulb in 7, dorsal vessel arising in 8th segment. Setæ very numerous; 4–6 in posterior region, 8 in the middle, rising to 10–12 in front. Very few known Enchytræids ever exceed 10 setæ per set. *H. dicksoni*, which the new species resembles, may possess 8 setæ, and *H. puteana* may have 8–10.

Habitat.—Under moss, overflow from Canal, Nottingham City, December 16, 1912. Formerly regarded as a variety (*multispinus*) of *H. dicksoni*. See Trans. Notts Nat. Soc., 1911–12, p 55. Described for the first time as a distinct species in Zoologist, March 1913, p. 83.

8. *Henlea quadrupla* Friend.

Length 10–12 mm. Segments 45–50. Four pairs of septal glands, whence the specific name. One pair of œsophageal glands in segment 8, with dorsal vessel in 8/9. Large sac-like salivaries in front of first pair of septals. Setæ somewhat variable, 3–4 dorsally, 4–5 ventrally, but sometimes as few as two per set. Cœlomic corpuscles not of the horny type. Brain not much longer than broad; not rigidly outlined, but varying with tension. Postseptal about three times as large as anterior portion of nephridium; duct arising near posterior end, or as a continuation thereof, short.

Spermathecæ in the perfect adult with short duct, large ampulla and 4/5 glands, as shown in illustration (Fig. 18).

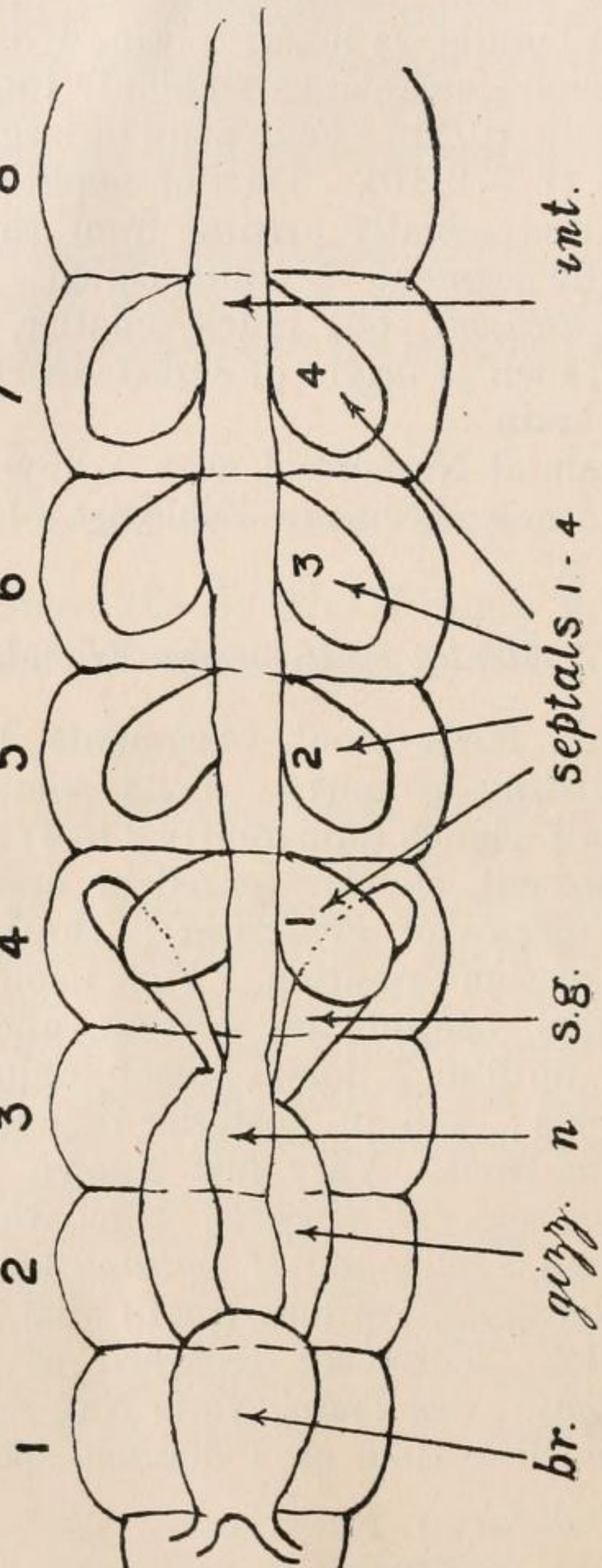

FIG. 18.—*Henlea quadrupla* sp. n.
1. Diagram showing brain, gizzard, nerve, salivary glands, four pairs of septals, and intestine.
2. Spermatheca, with glands.

Habitats.—Overseal, November 1911; Netherhall, November 22, 1912; Midway, January 30, 1913. These localities are all between Burton-on-Trent and Ashby-de-la-Zouch. First described in Zoologist, March 1913, p. 85.

9. *Henlea trisetosa* Friend.

Length 5–6 mm. Segments 35–40. Setæ sigmoid, three in each set throughout. Like the last, it has four pairs of septal glands, but no œsophageals, nor any salivaries. The dorsal vessel arises in 9/10. First described in Zoologist, March 1913, p. 86.

10. *Henlea tubula* sp. n.

Length 10–12 mm. Segments up to 45. The most striking feature is the bulb, which seems to be made up of tubes (whence the trivial name), and is capped with very dark cells. No œsophageal glands, three pairs of septals of normal type; setæ unequal in length, as if some had fallen out from one side of the *Fridericia*-like bundles. Usually 3–4 dorsal and 4–5 ventral; seldom, if ever, exceeding five. Bulb in segment 7 with dorsal vessel in intersegment 6/7 in front of the black cap and tubules. Sperm-funnel $1\frac{1}{2} \times 1$, the long coiled duct ending in an atrial gland half as large as the funnel. Cœlomic corpuscles not horny or clear, but granulated, in healthy worms embedded in a thick cœlomic fluid. Brain incised behind, rather longer than broad, Henlean in character. Large sac-like salivaries in front of first pair of septals. Spermathecæ with distinct duct and ampulla, with or without 4/5 glands. Posterior of nephridia merging in short duct. Large interspaces between the girdle cells.

Habitat.—Several localities in and around Dublin: Canal Side, Dundrum Road, Balls Bridge, and St. Doulough's, March 1913; now first described. See Irish Naturalist, September 1913, p. 172, for the first record.

10. *Henlea mariona* Friend.

Length 10 mm., stout. Segments about 50. Setæ up to eight in front and behind; those in anterior bundles *Fridericia*-like, i.e. shortest in the middle of each set. Only two pairs of septals; front pair very large, second pair smaller, with spermathecæ between them. No œsophageal glands. Sperm-funnel small, $1\frac{1}{2}$–2×1, with fine irregularly coiled duct; large atrial glands and pores on segment 12. Bulb-like enlargement in 9 or 10, with the dorsal vessel arising in 10/11, pulsating forward. Girdle extending from setæ of segment 11 to setæ of 13. First pair of

nephridia in 4/5; postseptal large, duct not proceeding from posterior extremity. Brain incised behind, length about 1½ width. Spermathecæ very unusual, appearing to combine dorsally so as to form an unpaired ampulla. Cœlomic corpuscles oval, not horny.

The characters are intermediate between those of *Marionina* and *Henlea*, on which account the specific name has been chosen. 1912, Friend, in Trans. Notts Nat. Soc., pp. 59–60. Found between Burton Joyce and Lowdham, December 16, 1912.

Owing to the large number of species of *Henlea* now found in Great Britain, I have found it desirable (*9*) to divide them into two groups, reserving the name *Henlea* for those which possess œsophageal glands, and calling the others, which are destitute of such glands, *Henleanella*.

δ. The Genus Fridericia.

The members of this genus are very numerous, and in most instances can be readily distinguished from other genera by their setæ and spermathecæ. When the setæ number four or more per set, the innermost are the shortest. In many cases the spermathecæ are possessed of diverticula, and the brain is almost invariably convex behind. To differentiate the species, however, is by no means an easy task, since their number is now rapidly approaching a hundred. In Great Britain alone we have now some forty known species, and every year the number grows. I have already in this Journal (*1*) shown how they may be conveniently tabulated.

Fridericia arborea sp. n.

Length 6–8 mm. Segments 35–40. Front setæ two, rarely three dorsally, 3–4 ventrally, small; three stronger ones in the middle and two in the final segments. Brain of the typical shape, but in some cases tending to concave behind, with underlap. Salivary glands extending to 5/6 with long forked ends. First pair of nephridia in 6/7. Dorsal vessel arising about the 15th segment. Cœlomic corpuscles of two kinds, the larger oval. Three pairs of septal glands. Girdle on 12 to half 13. Spermathecæ with duct roughly covered with small cellular outgrowths. I found two forms. The first has the brain slightly concave behind, and the duct of the anterior nephridia short; while the second has the brain convex before and behind, and long ducts to the nephridia, opening by large glandular pores. The species belongs to the *bulbosa* group. The members of this section are numerous and not easy to distinguish on paper, though presenting very clear characteristics under the Microscope when alive. The first was found in a decaying tree trunk at Zouch Mills, Notts, April 2; the second form at Mapperley, May 14, 1913.

Fridericia bretscheri Southern.

When Southern created this species he assumed that it was already known as *F. parva* Bret.; and as the name *parva* had already been appropriated, he changed the name. But *F. parva* Bret. is quite distinct from *F. bretscheri* Southern, and both are British. I draw attention to the point here, and will refer to Southern's own works (*5*, *6*) for his definition. Bretscher's species will be discussed later.

Fredericia bulbifera sp. n.

Length 5–10 mm; slender. Segments 35–40. Setæ four unequal in segments 2–16 or thereabouts, and two equal thence to end. Brain egg-shaped, largest behind. Spermathecæ with duct about twice as long as bulbous ampulla and the posterior attachment; glands at 4/5 present or absent. Salivaries long, often extending back to 5/6 unbranched. Nephridia in anterior segments, with bulbous anteseptal and distinct duct; those behind with pointed anteseptal and postseptal merging into a duct. Girdle 12 to half 13, with large gland-cells. Sperm-funnels small. Dorsal vessel arising in or near segment 16. Three pairs of septals, the posterior pair sometimes having forward processes, so that at first sight there appear to be four pairs of glands. Another member of the *bulbosa* group.

First taken at Portobello, Dublin, March 10, 1913. Oxford Botanic Garden and Blenheim Palace in April, and frequently in Notts in May to July 1913.

Fridericia coronata sp. n.

Length 15, stretching to 20 mm. Segments 50, opaque, yellowish, and resembling *Henlea dicksoni* in appearance. A stout worm, difficult to study alive. Setæ never exceed four in front; in the middle and posterior usually one dorsal, and one, two, or three ventral setæ present. The larger setæ strongly curved within, and tending to a central bulb or bulging. Brain convex before and behind, with underlap. Salivary glands much branched behind. Spermathecæ very characteristic; with long, somewhat slender duct, and a coronet of small glands around the ampulla (fig. 19). Girdle in normal position, with large male pores. Funnel about 4 × 1, rather long and narrow, with long irregularly-coiled duct. Dorsal vessel arising in or behind segment 16. Characteristic nephridia, with medium anteseptal, large postseptal with a lobe or indentation behind, and duct much exceeding postseptal in

length. Duct springs from just behind the septum. Cœlomic corpuscles of two kinds, the larger oval, nucleated and granular. Large dorsal pores and conspicuous guard cells. Altogether a well-defined species. The crown of glands on the spermathecæ recalls *hegemon* and *microcara*, but the differences are well marked.

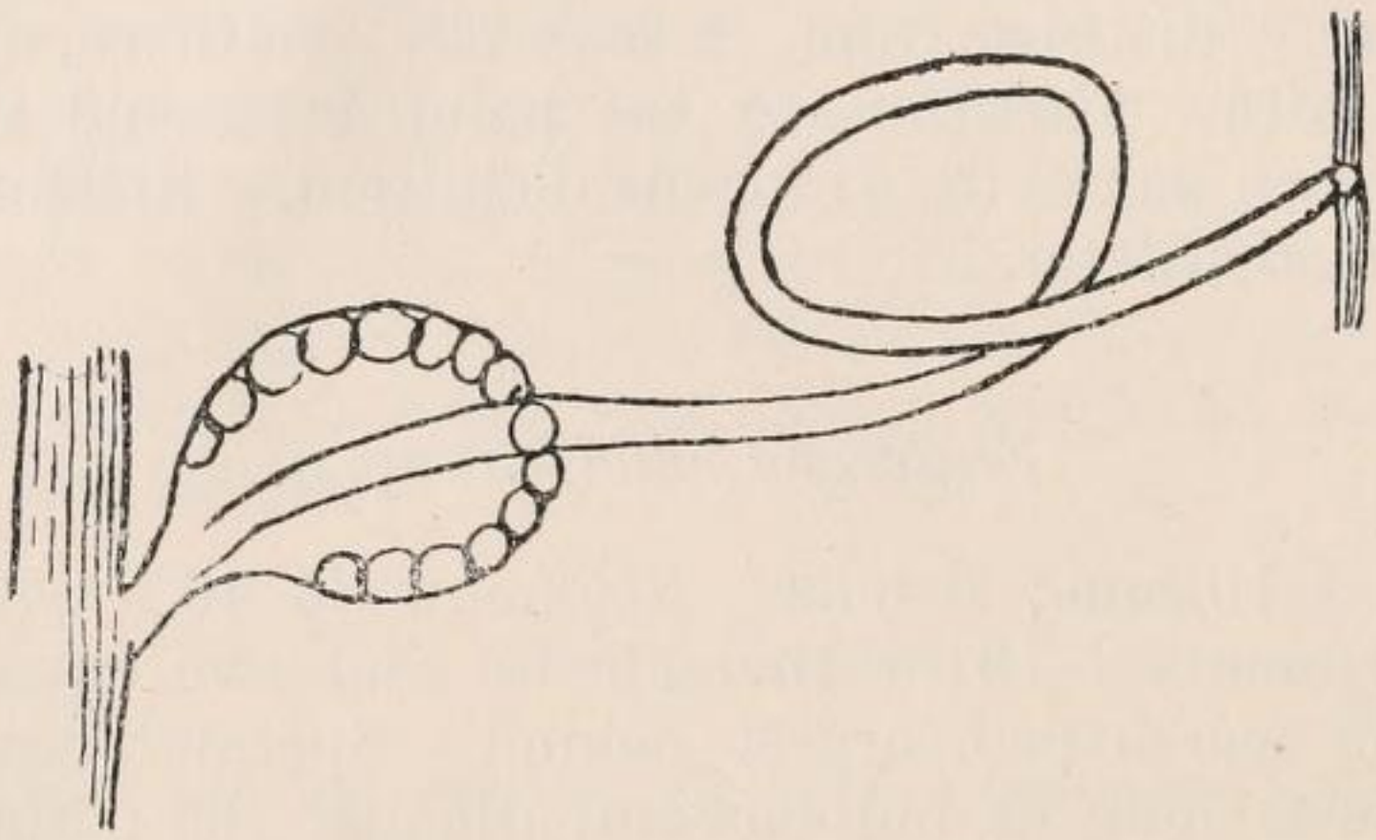

FIG. 19.—*Fridericia coronata* sp. n. Spermatheca.

Habitat.—Blenheim Park, April 14, 1913. Examined in June, after keeping the material nearly three months; worms were then fully adult.

Fridericia parva Bret.

Some of Bretscher's descriptions are very imperfect, but of this he distinctly says that it has two setæ in each bundle; hence it cannot be the same as *F. bretscheri* Southern. The *F. parva* of Moore has been referred to *F. bulbosa* Rosa. I am not so sure that they are one and the same, but my record in Naturalist, August 1898, was made before we dreamed that the genus was so extensive, and later research has not cleared the matter up.

Fridericia hillmani Friend.

Described in Zoologist, December 1913, p. 462.

Fridericia rotunda sp. n.

Length 15–20 mm. Segments 55–60. Dense, opaque; dirty white or yellowish in colour. Setæ usually 4–6 dorsal, and up to eight ventral in anterior bundles, and, as a rule, four or three behind, very stout. Brain almost spherical, whence the name. Spermathecæ with short stout duct, two glands at 4/5 opening, and five or perhaps six sessile diverticula. The whole organ quite the stoutest I have seen in the genus. Girdle thick, including half 11 to half 13, or perhaps the whole of the latter segment when perfectly

developed; gland cells small. Three pairs of very large septals. Slender sperm-ducts, with large atrial glands and male pores. Ampullæ 3–4 × 1, with collar absent or small. Dorsal vessel about the 19th segment. Though seven distinct specimens were examined, no nephridia could be seen. Salivary glands branched. The brain and spermathecæ serve to separate this from every other known British species.

Habitat.—Rough place by the wall of Woodboro' Hall Gardens, Notts, December 18, 1912.

I have notes of other species which it is impossible at present to determine.

II.—A REVISED LIST.

So great has been the increase in the number of Enchytræids known to Britain since the Government aided me in my researches, that the time has come when a complete list should be prepared for the guidance of zoologists. The present contribution to that revised list contains the names of all known British genera and species, except *Enchytræus* and the red-blooded group which consists of the two genera *Lumbricillus* and *Marionina*. These will form the subject of a later communication.

For facility of reference, the genera and species will be alphabetically arranged, and the references will, as far as possible, relate to the original memoirs or principal monographs. Wherever possible the first British record will be cited, and any additional information given which may be deemed necessary for purposes of identification or further research. The *Oligochæta* volume (Das Tierreich) of Michaelsen is indispensable.

Achæta Vejd.

Setæ wanting; setæ sacs sometimes wanting. Salivary glands unpaired, dorsal. Spermathecæ free, not attached to the œsophagus.

1. *A. bohemica* Vejd. 1879, *Anachæta bohemica* Vejdovsky, in Zool. Anzeig., ii. p. 183. Michaelsen, Das Tierreich, p. 103. August 28, 1911, Kew Gardens; See Bulletin of Mis. Inf., xii. p. 374. November 7, 1911 and March 2, 1912, Nottingham, Trans. Notts Nat. Soc., 1910–11, p. 38. March 11, 1913, Dublin, Irish Nat., 1913, p. 171.

2. *A. cameranoi* Cognetti. 1889, *Anachæta camerani* Cogn. in Boll. Mus. Torino, xiv. No. 354, p. 2; Michaelsen, Das Tierreich, p. 103; July 2, 1911, Acresford near Ashby-de-le-Zouch; Friend, in The Naturalist, December 1911, p. 413.

3. *A. eiseni* Vejd. 1877, *Achæta eisenii* Vejdovsky, in SB.

Böhm. Ges., p. 300; Michaelsen, Das Tierreich, p. 103. 1909, Southern, in Proc. Roy. Ir. Acad., xxvii. p. 165. Limerick, Ireland.

4. *A. incisa* Friend. 1912, Friend, in Trans. Notts Nat. Soc., p. 58; Mansfield, Notts, May 8, 1912. Vide supra, p. 133.

5. *A. minima* Southern. 1907, Southern, in Irish Naturalist, xvi. p. 77. Lambay, Ireland.

6. *A. spermatophora* Friend. 1912, Friend, in Irish Naturalist, xxi. p. 174. Poyntzpass, Armagh, Ireland.

Bryodrilus Ude.

Setæ present, sigmoid. Blind sacs on œsophagus in segment 6. Spermathecæ simple, destitute of diverticula, communicating with œsophagus.

7. *Bryodrilus ehlersi* Ude. 1892, Ude, in Zool. Anzeig., xv. p. 344; Michaelsen, Das Tierreich, p. 71. 1909, Southern, in Proc. Roy. Ir. Acad., xxvii. p. 147. *B. ehlersi* Ude. var. ? Powerscourt, Wicklow, Ireland. 1911, Netherhall, near Burton-on-Trent, Derbyshire.

Buchholzia Michaelsen.

Setæ present, sigmoid [œsophagus widens suddenly in segment 7. Dorsal vessel arises in diverticulum]. Spermathecæ communicating with œsophagus.

8. *B. appendiculata* Buch. 1863, *Enchytræus appendiculatus* Buchholz, in Schr. Ges. Könisb., iii. Abh. p. 96; Michaelsen, Das Tierreich, p. 72. 1892, April 21, Suburbs of Bradford, Yorkshire. 1909, Southern, in Proc. Roy. Ir. Acad., xxvii. p. 148. Co. Dublin, Ireland. 1911, February 10, Woodville. July 11, Cauldwell, Derbyshire. 1912, Hastings and Sedlescombe, Sussex.

9. *B. fallax* Mchln. 1887, Michaelsen, in Arch. Mikr. Anat., xxx. p. 374. 1896, June 4, Antrim, Ireland; Friend, in Irish Naturalist, vii. 1898. 1911, April 17, Ledbury, Herefordshire; Sutton Broad, Norfolk. 1913, Dublin, Ireland, Irish Naturalist, xxii. p. 171; Blenheim Park, Oxfordshire, April 14.

10. *B. focale* sp. n. Supra, p. 129. Hastings, Sussex, December, 1911.

11. *B. tenuissima* sp. n. Supra, p. 130. Hastings, Sussex, June, 1912.

Chamædrilus Friend.

Setæ present, sigmoid. No preclitellian nephridia or salivary glands; girdle on segment 9. Spermathecæ with large 4/5 gland but without diverticula, not free in cœlom. Origin of dorsal vessel postclitellian.

12. *C. chlorophilus* Friend. 1913, Friend in J.R.M.S., p. 257 et seq. 1912, November 23, Netherhall, Derbyshire; December 3, Hastings, Sussex; Smisby, Newhall, Hathern, Oxford and elsewhere. Jersey, June. Zoologist, December, 1913, p. 457.

Chirodrilus Verril.

Not yet known as British.

Distichopus Leidy.

Not yet known as British.

Hepatogaster Cejka.

Not yet known as British.

Enchytræus Henle.

Reserved for later treatment.

Fridericia Michaelsen.

Setæ present, not sigmoid, innermost shortest. Dorsal pores present, also salivary glands. Spermathecæ frequently with diverticula and glands. (N.B. The order is alphabetical.)

13. *F. agricola* Moore. 1895, Moore, in Proc. Ac. Phil., p. 342. Michaelsen, Das Tierreich, p. 97. Carlisle, January 1898, and frequently since. My large accumulation of notes and specimens suggests the need of revision and clear definition. 1899, Friend in Zoologist, p. 264. Gardeners' Chronicle, June 1899.

14. *F. alba* Moore. 1895, Moore, in Proc. Ac. Phil., p. 344. 1898, Friend in The Naturalist. p. 20. Carlisle, January 1898. A record which needs confirmation, owing to the great advances in our knowledge of the genus.

15. *F. anglica* Friend. 1912, Friend in J.R.M.S., p. 24. Near Ashby-de-la-Zouch in March, and Swadlincote, Derbyshire, April 1911.

16. *F. arborea* sp. n. Supra, p. 140. Notts, April and May, 1913. A similar Annelid from St. Doulough's, Dublin, March 12, and near Blenheim Palace (Kiddington, Oxon), April, 1913.

17. *F. aurita* Issel. 1905, Issel, in Zool. Jahrb., xxii. p. 468–70. 1907, Southern, in Irish Naturalist, xvi. p. 74. Bray Head, Wicklow, and Lambay, Dublin. New records are Dublin Canal side, collected by myself March 11; Stretton-en-le-field, May 12; Isle of May, collected by Mr. Evans, June 6, 1913. In most instances they varied somewhat from Issel's description, but could be referred to no other species.

18. *F. beddardi* Bret. 1900, Bretscher, in Rev. Suisse Zool., viii. p. 29; 1904, ibid., xii. p. 265; 1909, Southern, Proc. Roy. Ir. Acad., xxvii. p. 164. Newton Moss, near Penrith, Cumberland; collected March, kept alive and examined August 11, 1911. See *F. ratzeli* infra.

19. *F. bisetosa* Lev. 1884, Levinsen, in Vid. Meddel. 1883, Michaelsen, Das Tierreich, pp. 96–7. I have a large collection of bisetose material which shows that the group must be carefully revised. Bretscher (1900, Rev. Suisse Zool., viii. p. 27) erroneously places here a form with four setæ. I simply record the species as British, and await an opportunity to sift and edit.

19A. *F. bretscheri* Southern. 1907, Southern, in Irish Naturalist, xvi. p. 73. 1909, Proc. Roy. Ir. Acad., xxvii. p. 160. Not to be confused with *F. parva* Bret. or *F. parva* Moore. Dublin, Edinburgh, frequent in Notts and elsewhere, 1913.

20. *F. bulbifera* sp. n. Supra, p. 141. To be compared with *bulbosa*, *glandifera*, and others.

21. *F. bulbosa* Rosa. 1887, *Neoenchytræus bulbosus* Rosa, in Boll. Mus. Torino, ii. No. 29, p. 2. Michaelsen, Das Tierreich, p. 96, places *F. parva* Moore here. One of the most widely distributed of British species. Already I have divided my material and made two or three new species, but more remains to be done. Friend, in J.R.M.S., 1912, pp. 14–15. Trans. Notts Nat. Soc., 1910–11, p. 40.

22. *F. callosa* Eisen. 1878, *Neoenchytræus callosus* Eisen in Ofv. Ak. Förh., xxxv. No. 3, p. 76. Michaelsen, Das Tierreich, p. 99; Friend, in J.R.M.S., 1912, p. 19. In April 1913 I found in the gardens at Blenheim Palace, along with specimens of *F. michaelseni* and *F. leydigi*, a worm which approaches this species most nearly, though there are differences between my own notes and Eisen's description. Trans. Notts Nat. Soc., 1911–12, p. 62.

23. *F. clara* Friend. 1913, Friend, in J.R.M.S., p. 267. I have nothing to add to the description and record there given.

24. *F. connata* Bret. 1902, Bretscher, in Rev. Suisse Zool., x. p. 20. 1907, Southern, in Irish Nat., xvi. p. 75. 1909, Proc. Roy. Ir. Acad., xxvii. p. 161. 1912, Friend, in J.R.M.S., p. 17. Belongs to the bisetose group, and often needs careful study to distinguish it from *diachæta*, *bisetosa*, and related forms. More accurate diagnosis is needed in this large and interesting section, in the light of my recent gleanings. Trans. Notts Nat. Soc., 1910–11, pp. 34, 40; ib., 1911–12, p. 56.

25. *F. coronata* sp. n. Supra, p. 141. A clearly-defined species. 1913, Blenheim Palace.

26. *F. densa* Friend. 1912, Friend, in Trans. Notts Nat. Soc., p. 61. Collected in Notts December 16, 1912, and stated in a footnote to be possibly a variety only of *F. michaelseni*. But

Mr. Hillman collected a form at Rolleston, Notts, on May14, 1913, which leads to the suspicion that *densa* may be a true species. It has not yet been carefully described.

27. *F. diachæta* Bret. 1900, Bretscher, in Rev. Suisse Zool., viii. p. 451. 1902, ib., x. pp. 23–4. See No. 24 above. First British record in Trans. Notts Nat. Soc., 1910–11, p. 41. Frequently found in Notts since. 1913, Pocklington, Yorkshire, December 1.

28. *F. galba* Hoffm. 1843, Hoffmeister, in Arch. Natur., xci. p. 194; Michaelsen, Das Tierreich, p. 101; Friend, in J.R.M.S. 1912, pp. 12–13. Recently found in Notts and elsewhere. See Southern, Proc. Roy. Irish Acad., xxvii. p. 163.

29. *F. glandifera* Friend. 1913, Friend, in J.R.M.S., pp. 263–5. Separated from *bulbosa* and *bulbifera*; characters permanent. Trans. Notts Nat. Soc., 1910–11, p. 40.

30. *F. glandulosa* Southern. 1907, Southern, in Irish Nat., xvi. p. 76. 1909, Proc. Roy. Ir. Acad., xxvii. p. 162; Dublin and Edinburgh. 1911, Friend, in Trans. Notts Nat. Soc., 1910–11, p. 41.

31. *F. hegemon* Vejd. 1887, *Enchytræus hegemon* Vejdovsky, in SB. Böhm. Ges., p. 303; Michaelsen, Das Tierreich, p. 101. The earliest British record is doubtful. See Friend, in J.R.M.S. (1912) p. 15. 1909, Southern, in Proc. Roy. Irish Acad., xxvii. pp. 164–5.

32. *F. helvetica* Bret. 1896, Bretscher, in Rev. Suisse Zool., iii. p. 516. 1899. ib., vi. p. 407; Michaelsen, Das Tierreich, p. 98. 1911, Friend, in Naturalist, p. 291. Frequent records during the past three years awaiting revision.

32A. *F. hillmani* Friend. 1913, Zoologist, December, p. 462. Jersey.

33. *F. humilis* Friend. 1911, Friend, in Naturalist, August, p. 291. 1912, J.R.M.S., pp. 20–1. Smisby, near Ashby-de-la-Zouch, January 31, 1913.

34. *F. leydigi* Vejd. 1877, *Enchytræus leydigii*, Vejdovsky, in SB. Böhm. Ges., p. 303; Michaelsen, Das Tierreich, p. 97. 1912, Friend, in J.R.M.S., comp. 1907, Southern, in Proc. Roy. Ir. Acad., xxvii. pp. 161–2. Several gleanings from various parts of England and Jersey show the need of further revision here.

35. *F. lobifera* Vejd. 1879, *Enchytræus lobifer* Vejdovsky, Enchytræidæ, p. 57. Michaelsen, Das Tierreich, p. 98. 1907, Southern, in Proc. Roy. Ir. Acad., xxvii. p. 163. 1911, Friend, in Trans. Notts Nat. Soc., p. 41. 1912, J.R.M.S., p. 12; ib., 1913, p. 268, for var. *minor*. So fluid are some of the forms that it seems at times absolutely impossible to fix the species.

36. *F. maculata* Issel. 1905, Issel, in Zool. Jahrb., xxii. pp. 466–8. Fields between Swadlincote and Overseal, Derbyshire, April 12, 1912.

37. *F. magna* Friend. 1889, Friend, in Zoologist, ser. 4, iii p. 262; Michaelsen, Das Tierreich, p. 97. 1907, Southern, in. Proc. Roy. Ir. Acad., xxvii. p. 165, footnote; Friend, in J.R.M.S., 1912, pp. 15–16. After losing sight of the species for nearly a quarter of a century, I rediscovered it, May 13, 1913, in a shrubbery at Stretton-en-le-Field.

38. *F. michælseni* Bret. 1899, Bretscher, in Rev. Suisse Zool., vi. p. 410; Michaelsen, Das Tierreich, p. 100. 1909, Southern, in Proc. Roy. Ir. Acad., xxvii. p. 163. 1912, Friend, in J.R.M.S., p. 18. Quite distinct from *F. galba*. Widespread and very variable. Here again my large collection of material needs careful revision.

39. *F. microcara* Friend. 1912, Friend, in J.R.M.S., p. 23. Sutton Broad, August 22, 1911. I brought away from the Broads a quantity of the Enchytræid soil, and, in June 1912, re-examined the material. This species was again present, and my diagnosis was confirmed.

40. *F. minuta* Bret. 1900, Bretscher, in Rev. Suisse Zool., vii. p. 33. 1907, Southern, in Proc. Roy. Ir. Acad., xxvii. p. 162. 1912, Friend, in J.R.M.S., p. 17.

41. *F. nigrina* Friend. 1913, Friend, in J.R.M.S., p. 266. Hastings, Sussex; and Stretton-en-le-Field, near Ashby-de-la-Zouch.

42. *F. obtusa* Friend. 1913, Friend, in J.R.M.S., p. 267; Trans. Notts Nat. Soc., 1911–12, p. 61.

43. *F. oligosetosa* Nusb. 1895, Nusbaum, in Biol. Centrabl., xv. p. 27; Michaelsen, Das Tierreich, p. 99. Collected Hastings, June 1912.

44. *F. paroniana* Issel. 1904, Issel, in Atti Soc. Lig., xv. p. 3. 1905, Zool. Jahrb., xxii. p. 416. 1907, Southern, in Proc. Roy. Ir. Acad., xxvii. p. 161. 1912, Friend, in J.R.M.S., p. 18. Dublin, in Ireland; Acresford, near Ashby-de-la-Zouch, July 1911. Naturalist, December 1911, p. 413.

45. *F. parva* Bret. and *F. parva* Moore are named here because they have been recorded in earlier days as British. The growth of our knowledge, however, makes those records doubtful, and the material must be re-examined.

46. *F. perrieri* Vejd. 1877, *Enchytræus perrieri* Vejdovsky in SB. Böhm. Ges., p. 302; Michaelsen, Das Tierreich, p. 98. 1898, Friend, in Irish Nat., p. 196. 1912, Friend, in J.R.M.S., p. 15. Earliest record somewhat doubtful; frequently found of late years, resulting in large masses of notes and material awaiting careful analysis.

47. *F. peruviana* Friend. 1911, Friend, in J.R.M.S., xxviii. p. 734. Kew Gardens, May 12, 1911.

48. *F. polychæta* Bret. 1900, Bretscher, in Rev. Suisse Zool., viii. p. 450. 1907, Southern, in Irish Nat., xvi. p. 75. 1912,

Friend, in J.R.M.S., p. 17. Kerry, Dublin, and Donegal in Ireland; Derbyshire, Notts, Jersey, and elsewhere.

49. *F. pulchra* Friend. 1912, Friend, in J.R.M.S., pp. 21–2. Kew Gardens, 1911. Naturalist, December 1911, p. 415.

50. *F. ratzeli* Eisen. 1872, *Enchytræus ratzeli* Eisen, in Ofv. Ak. Förh. xxx. No. 1, p. 123; Michaelsen, Das Tierreich, p. 100. 1897, Friend, in Irish Nat., vi. p. 206. 1907, Southern, in Proc. Roy. Ir. Acad., xxvii. p. 164. 1912, Friend, in J.R.M.S., p. 14. A difficult species, concerning which I have much material for future study.

51. *F. reversa* Friend. 1911, Friend, in Trans. Notts Nat. Soc., p. 41. 1913, J.R.M.S., p. 265. Since found in several new localities.

51. *F. rotunda* Friend. 1912, Friend, in Trans. Notts Nat. Soc., p. 62. Supra, p. 142. Found at Woodboro' Hall, Notts, December 17, 1912. In looking over my notes I find that this species has been taken by me elsewhere, but entered under other names. An accurate account of its distribution as at present known can only be written when the genus has been carefully brought up to date.

52. *F. striata* Lev. 1884, *Enchytræus striatus* Levinsen, in Vid. Meddel., 1883, p. 236; Michaelsen, Das Tierreich, p. 96. 1898, Friend, in Zoologist, p. 121. 1907, Southern, in Irish Nat., xvi. p. 73. 1909, Proc. Roy. Ir. Acad., xxvii. pp. 159–60. 1912, Friend, in J.R.M.S., p. 13. A well defined species, widely distributed in England.

53. *F. ulmicola* Friend. 1898, Friend, in Irish Nat., p. 195. 1912, J.R.M.S., p. 13. Ireland, Malvern, Jersey. Cf. Zoologist, December 1913, p. 460.

54. *F. variata* Bret. 1902, Bretscher, in Rev. Suisse Zool., x. pp. 19–20. 1907, Southern, in Irish Nat., xvi. p. 73. 1912, Friend, in J.R.M.S., p. 22. Very nearly related to *F. bulbosa*, as are also *F. bulbifera*, *F. glandifera*, etc. Sometimes, however, they appear to be quite distinct. Here again much remains to be done.

It will be clear from the foregoing notes that even yet our knowledge of this genus is far from satisfactory. In spite of careful study, accurate diagnoses and diagrams, and constant reference to authorities and types, I find it frequently impossible to satisfy myself. The number of setæ, shape of the spermathecæ, presence of glands, and arrangement of diverticula, the point of origin of dorsal vessel and duct of nephridia, to mention no more of the specific characters, are often very variable and uncertain. Only by the examination in detail of large numbers of specimens, and most careful diagnosis and description, can we hope eventually to place the subject on a satisfactory and scientific basis. Towards that end I am devoting almost all my leisure time.

Grania Southern.

Setæ present, straight and thick, but absent from anterior region; habitat marine. 1913, Southern, in Proc. Roy. Ir. Acad., xxxi. No. 48, pp. 8–12.

55. *G. maricola* Southern. 1913, Southern, as above. Clew Bay, Blacksod Bay, and Dingle Bay, Ireland. Regarded by the author as related to *Enchytræus monochætus* Mich.

Henlea Michaelsen, em. Friend.

Setæ straight or sigmoid. No dorsal pores. Œsophagus frequently enters the intestine by a bulbous enlargement in segments 7, 8, or 9. Spermathecæ simple, devoid of diverticula.

N.B.—The discovery of many new species which do not agree with the old generic definition makes revision necessary. As a first step towards this the genus is divided for the present into two sections. § 1. *Henlea*, possessing œsophageal glands. § 2. *Henleanella*, destitute of such glands. It would be advisable to make a third group for those species which show a gradual emergence of the œsophagus into the bulbous enlargement. These will in due course probably constitute a new genus. Many details will be found in my previous contributions to this Journal, as well as to the pages of the Zoologist and other scientific magazines or the records of various Natural History Societies.

§ 1. Henlea Mich. Œsophageal glands present.

56. *H. attenuata* Friend. 1912, Friend, in J.R.M.S., p. 592; Southwell, Notts, March 26; Overseal, Derbyshire, April 12, 1913. Friend, in Trans. Notts Nat. Soc., 1910–11, p. 39.

57. *H. fragilis* Friend. 1912, Friend, in J.R.M.S., pp. 588–9. Hastings, Sussex, December 21, 1911.

58. *H. fridericioides* Friend. 1912, Friend, in J.R.M.S., p. 587. Hastings with the foregoing, December 21, 1911.

59. *H. heterotropa* Friend. 1912, Friend, in J.R.M.S., p. 589. Hastings, as before.

60. *H. hibernica* Southern. 1907, Southern, in Irish Nat., xvi. p. 70. 1909, Proc. Roy. Ir. Acad., xxvii. p. 146. Lambay, Ireland. Also counties Kerry and Meath. 1913, Notts (first English record, April 25, received from Mr. H. Hillman, who also collected it for me in Jersey); Sedlescombe, Sussex, August 16, 1913.

61. *H. nasuta* Eisen (= *H. leptodera*). 1878, *Archienchytræus nasutus* Eisen, in Ofv. Ak. Förh., xxxv. No. 3, p. 72. Michaelsen, Das Tierreich, p. 69. *Schandinella henleæ* Nusbaum, in Zool. Anzeig., ix. pp. 46, 57. 1896, Friend, in Naturalist, p. 298. 1909, Southern, in Proc. Roy. Ir. Acad., xxvii. p. 146. Yorkshire, Co. Dublin, and elsewhere. Friend, in Naturalist, Sept 1, 1911, p. 319. J.R.M.S., 1912, p. 580.

62. *H. pusilla* Friend. 1913, Friend, in J.R.M.S., p. 270. Notts, September 1912. A similar worm found in Derbyshire, November 22.

63. *H. quadrupla* Friend. 1913, Friend, in Zoologist, No. 861, p. 85. Separated from *H. tenella*: see ib. 1911, p. 468. Acresford, near Ashby-de-la-Zouch, November 28, 1911, and later at Netherhall, Bretby, and Overseal, Derbyshire. Supra, p. 137.

64. *H. triloba* Friend. 1912, Friend, in J.R.M.S., p. 596. Hastings, December 21, 1911.

65. *H. ventriculosa* Udek.? 1837. *Enchytræus albidus* (part). See for synonymy Michaelsen, Das Tierreich 69. 1896, Friend, in Naturalist, p. 298. 1907, Southern, in Irish Nat. xvi., p, 70. 1909, Southern, in Proc. Roy. Ir. Acad. xxvii., p. 147. 1911, Friend, in Zoologist, December, p. 464. The first record (Essex Naturalist, 1896, p. 298) is open to doubt. In those early days it was not suspected that so many new species awaited discovery.

§ 2. *Henleanella* Friend. Œsophageal glands absent.

66. *H. alba* Friend. 1913, Friend, in Zoologist, March 15, No. 861, p. 83. Netherhall, Derbyshire, November 22, 1912.

67. *H. arenicola* Friend. 1912, Friend, in J.R.M.S., p. 586. Hastings, December 21, 1911.

68. *H. bisetosa* Friend. 1913, Friend, in Irish Nat., xxii. p. 172. Supra, p. 135. Dublin, March 11, 1913, and Nottingham the following month.

69. *H. curiosa* Friend. 1912, Friend, in J.R.M.S., p. 588. Hastings, December 21, 1911.

70. *H. dicksoni* Eisen. 1878, *Archienchytræus dicksonii* Eisen in Ofv. Ak. Förh., xxxv. p. 70. Michaelsen, Das Tierreich, p. 68. 1907, Southern, in Irish Nat., xvi. p. 70; Proc. Roy. Ir. Acad., xxvii. p. 146. 1912, Friend, in J.R.M.S., p. 581. Ireland, Hastings, Nottingham.

71. *H. glandulosa* Friend. 1913, Friend, in Irish Nat., xxii. p. 9; J.R.M.S., July 1913, p. 270. Poyntzpass, Ireland, May 1912. Cauldwell, Derbyshire, June 1913.

72. *H. hillmani* sp. n. 1913, supra p. 135. Collected by Mr. Hillman, June 10, 1913, in Notts. Trans. Notts Nat. Soc. 1912–13.

73. *H. insulæ* sp. n. 1913, supra p. 136. Collected by Mr. Hillman, June 1913, in Jersey. Friend, in Zoologist, December 1913.

74. *H. inusitata* Friend. 1913, Friend, in Zoologist, March 15, No. 861, p. 83–4; see supra, p. 136. Rolleston Junction, Notts, March 26, and Cauldwell, Derbyshire, June 11, 1912.

75. *H. lampas* Eisen, enlarged by Friend. 1911, Friend, in Zoologist, December 15, p. 465; J.R.M.S. 1912, p. 584. St. Anne's-on-Sea, 1898. The species as enlarged has since been found at Hastings, Dublin, Notts, and elsewhere.

76. *H. marina* Friend. 1912, Friend, in J.R.M.S., pp. 589 *seq.* Hastings, Sussex, December 21, 1911.

77. *H. mariona* Friend. 1912, Friend, in Trans. Notts Nat. Soc. 1911–12, p. 59–60; supra, p. 139. Between Burton Joyce and Lowdham, Notts, December 16, 1912.

78. *H. minima* Friend. 1913, Friend, in Zoologist, No. 861, p. 84. See supra, p. 136. With *H. alba* at Netherhall, near Burton-on-Trent, autumn, 1911.

79. *H. minuta* Friend. 1913, Friend, in J.R.M.S., p. 268. Sutton Broad, by the landing stage, August 25, 1911.

80. *H. multispinosa* Friend. 1913, Friend, in Zoologist, No. 861, p. 80. See supra, p. 137. Canal, Notts, December 16, 1912. Reported as *H. dicksoni* var *multispinus*, in Trans. Notts Nat. Soc., 1911–12, p. 55 (cp. p. 59).

81. *H. perpusilla* Friend. 1911, Friend in Zoologist, pp. 466–7; also Naturalist, pp. 320-21; Cauldwell, Derbyshire, July 9, 1911; Worcester, October 23, 1912; St. Doulough's, Dublin, March 12, 1913, Irish Nat., xxii. p. 172. Careful revision of my material and notes leads to the conclusion that *H. parva* Friend may be identical with, or only a variety of *H. perpusilla*. But cf. Zoologist, December 1913, p. 461.

82. *H. puteana* Vejd. 1887, *Enchytræus puteanus* Vejdovsky, in SB. Böhm. Ges., p, 301. Michaelsen, Das Tierreich, p. 68. 1911, Friend, in Zoologist, p. 465. 1912, J.R.M.S., p. 583; Ledbury Churchyard, April 17, 1911.

83. *H. rhætica* Bret. 1903, Bretscher, in Rev. Suisse Zool., xi. p. 115. 1912, Friend, in J.R.M.S., pp. 593–5; Trans. Notts Nat. Soc., 1911–12, p. 59; Hastings, December 21, 1911; Notts, April 15, 1912; Dublin, March 1913; Irish Nat., xxii. p. 172. Widely distributed and very variable. For the present I include *H. variata* Friend (J.R.M.S., 1912, p. 592), but the material is not very homogeneous, and needs further revision.

84. *H. rosai* Bret. 1899, Bretscher, in Rev. Suisse Zool., vi. p. 412; Michaelsen, Das Tierreich, pp. 68–9. 1911, Friend, in Zoologist, pp. 465–6; Naturalist, p. 320. 1912, J.R.M.S., p. 583–4. Buxton, May 27, 1911; Eel-traps on Sutton Broad, August 19, 1911; Cauldwell, Derbyshire, June 11, 1912.

85. *H. tenella* Eisen. 1878, *Archienchytræus tenellus* Eisen in Ofv. Ak. Förh., xxxv. No. 3, p. 70; Michaelsen, Das Tierreich, p. 70. 1911, Friend, in Zoologist, pp. 467–8. 1912, J.R.M.S., pp. 585–6. Acresford, near Ashby-de-la-Zouch, November 28, 1911. 1913, Irish Nat., xxii. p. 172, a form found in Dublin at present referred to this species provisionally.

86. *H. trisetosa* Friend. 1913, Friend, in Zoologist, No. 861, p. 86. See supra, p. 139. In tree-stump with *H. quadrupla* Friend at Midway, between Ashby and Burton, January 30, 1913.

87. *H. tubula* Friend. 1913, Friend, in Irish Nat., xxii. p. 172. First described supra, p. 139. Balls Bridge, Canal Side, Dundrum Road, Dublin, and St. Doulough's, March 6 to 12, 1913.

It will be seen that the British Annelid fauna is peculiarly rich in *Henleas* and *Fridericias*. There are doubtless many more species yet to be discovered.

Mesenchytræus Eisen.

Setæ present, sigmoid, fewer in lateral than in ventral bundles. No salivary glands, no dorsal pores. Nephridia with small anteseptal.

88. *M. beumeri* Mich. 1896, *Pachydrilus* (*M.*) *beumeri*, Michaelsen. See Das Tierreich, p. 86. 1909, Southern, in Proc. Roy. Ir. Acad., xxvii. p. 155. County Kerry, Ireland.

89. *M. celticus* Southern. 1909, Southern, in Proc. Roy. Ir. Acad., xxvii. pp. 155–6; Montpelier, Dublin, December 1907; Edinburgh, February 1908.

90. *M. fenestratus* Eisen. 1878, *Neoenchytræus fenestratus*, Eisen, in Ofv. Ak. Förh. xxxv. No. 3, p. 74; Michaelsen, Das Tierreich, 85; see Ditlevsen, in Zeit. wiss. Zool., Bd. 77, 1904, p. 439. 1897, Friend, in Irish Nat., as having probably been found by Dr. Trumbull at Powerscourt, Wicklow. In poor condition; record not confirmed.

91. *M. flavidus* Mich. 1887, Michaelsen, in Arch. Mikr. Anat. xxx., p. 372. Das Tierreich, p. 35. Found June 11, 1912, at Swain's Park, Swadlincote, Derbyshire, and now recorded for the first time as British. Varies a little from Michaelsen's type.

92. *M. oligosetosus* Friend. 1913, Friend, in Zoologist, December, p. 462. Jersey, Collected by Mr. Hillman.

93. *M. setosus* Mich. 1888, Michaelsen, in Arch. Mikr. Anat. xxxi., p. 494; Das Tierreich, p. 85. 1907, Southern, in Irish Nat. xvi., p. 71. 1909, Proc. Roy. Ir. Acad. xxvii., p. 155. Cauldwell, Derbyshire, June 11, 1912. On August 8, 1913, I found it with other Enchytræids between Oberbieber and Braunsberg, Neuwied-am-Rhein.

MICHAELSENI Ude.

Not known in Great Britain.

STERCUTUS Mich.

Not reported as British hitherto.

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