ADDENDA AND ERRATA.

To complete the list of species recognized by Stål as belonging to this family, the following are appended, not from the belief that they belong here, but because there should be no hasty change made in the classification of the Homoptera until they have been more carefully studied.*

SUBFAMILY CENTROTINÆ, Stål.

LXVI. Tolania, Stål.

276. T. opponens, Walk.

1858. *Centrotus opponens.* Walk. List Hom. B. M. Suppl. 159.

1862. *Tolania opponens.* Stål. Öf. Vet.-Akad. Förh. 491.

Hab.—Mex. (*Walker*).

LXVII. † Æthalion, Latr.

277. A. gratus, Walk.

1858. *Æthalion gratum.* Walk. List Hom. B. M. Suppl. 169.

1864. *Æthalion dilatatum.* Stål, Hem. Mex. 73, 450.

1869. *Æthalion gratus.* Stål, Bid. Memb. Kän. 299, 14.

Hab.—Mex. (*Walker*).

278. A. nervoso-punctatus, Sign.

1851. *Æthalion nervoso-punctatum.* Sign. Ann. Ent. Soc. France, Sér. 2, ix, 679, 14, pl. 14, fig. 10.

1858. *Æthalion nervoso-punctatum.* Walk. List Hom. B. M. Suppl. 168.

1869. *Æthalion nervoso-punctatus.* Stål. Bid. Memb. Kän. 299, 12.

Hab.—Mex. (*Walker*).

---

*None of the species mentioned here have a prolongation of the prothorax backward, and they rightfully belong with the Jassidæ.

† There are 68 instead of 67 genera represented in this catalogue, and 282 species instead of 278, XIV., 41, 42, 43, and 44 being duplicated.

The following additional localities have been obtained since this catalogue was put in the printer's hands:

For numbers 7, 8, 140, 177, 203, 204, 205, 206, 211, and *Aconophora lanceolata*, Fairm., Guatemala (*Henshaw*); 14, 27, and 142, Me. and Mass. (*Henshaw*); 15, Ia. (*Osborn*), N. Y. (*Van Duzee*); 19, Mich. (*Cook*), Pa. (*Rathvon*), Me. (*Henshaw*); 21, N. Y. (*Lintner*); 14, 19, 22, 27, 28, 41, 53, 65, 71, 76, 85, 96, 107, 131, 216, 223, 261, Neb. (*Barber*); 28, Mich. (*Cook*), Me., Fla., Tex., Calif., and B. C. (*Henshaw*); 34, 44, 66, 91, 116, 122, 132, and 145, Mich. (*Cook*); 41, B. C. (*Henshaw*), Nev. (*Hillman*); 43, Miss. (*Weed*), Mich. (*Cook*); 46, Mass. (*Henshaw*), Mich. (*Cook*); 52, Mich. (*Cook*), Ia. (*Osborn*), Va. and Md. (*Henshaw*); 55, Mich. (*Cook*), Pa. (*Rathvon*), Ia. ? (*Osborn*), Me. (*Henshaw*); 57, Ill. (*Goding*); 65, 68, 75 (recorded as *jugata* Uhler, which is a MS. name), 131, and 261, Ia. (*Osborn*); 67, Mich. (*Cook*), Mass. and Me. (*Henshaw*); 72, Mass. (*Henshaw*); 73, 83, and 85, Ia. ? (*Osborn*); 86, Mass. and Pa. (*Henshaw*); 95, Pa. (*Rathvon*); 97, and 119, Ia. (*Osborn*), Mich. (*Cook*); 114, Mich. (*Cook*), Tex. (*Henshaw*); 121, Pa. (*Henshaw*); 136, and 192, Va. (*Henshaw*); 137, N. Mex. (*Townsend*), Col. (*Gillette*); 138, Col. (*Goding*); 188, Va., Tex., and Vict. (*Henshaw*); 194, Mass., Tex., Calif., Vict. (*Henshaw*); 198, Cent. Am. (*Henshaw*); 217, Me. (*Henshaw*); 223, Mich. (*Cook*), Anticosti, Mass., Pa., Md., Va., D. C., Oregon, and Wash. (*Henshaw*); 248, Tex. (*Henshaw*).

Page 391, line 19, for *Entomolgique* read *Entomologique*.

Page 393, for No. 5 substitute as follows: *

P. DISPAR, Fabr.

1803. *Darnis dispar.* Fabr. Syst. Rhyng. 32, 23.

1836. *Entylia dispar.* Burm. Silb. Rev. iv, 182, 2.

1869. *Parmula dispar.* Stål, Hem. Fabr. ii, 29, 1.

Hab.—Mexico (*Goding*).

Page 397, between lines 12 and 13 from bottom insert as follows: 1893. *Entilia sinuata.* Rice, Insect Life, v, 243.

Page 399, line 7, after "one" insert *female*.

---

* *P. munda*, Walk., belongs to Phatnoma (*Fide* Fowler).

Page 400, between lines 9 and 10 insert as follows: 1851. *Cyphonia rectispina.* Walk. List Hom. B. M. 597, 6; line 19, for *postfaciata* read *postfasciata.*

Page 401, line 4, for *bubalus* read *diceros.*

Page 402, at bottom of page add as follows:

1891. *Ceresa bubalus.* Fletcher, Rep. Ent. and Bot. Can. 191.

1892. *Ceresa bubalus.* Osb. Trans. Ia. Hort. Soc. 119, fig. 30.

1893. *Ceresa bubalus.* Osb. Fruit and Forest Tree Ins. 24, fig. 30.

Page 403, line 21, for the interrogation point substitute a period; between lines 2 and 3 from bottom insert as follows:

1892. *Ceresa taurina.* Osb. Trans. Ia. Hort. Soc. 119.

1893. *Ceresa taurina.* Osb. Fruit and Forest Tree Ins. 24.

Page 409, between lines 4 and 5 from bottom insert as follows: *Stictocephala gillettei*, ♂. Godg. Ent. News, iii, 200.

Page 411, line 2, for *nigripes*, Stål, read *munda*, Walk.; between lines 2 and 3 insert as follows: 1858. *Parmula munda.* Walk. List Hom. B. M. Suppl. 152; line 4, for Mex. (*Stål*), read Mex. and Guatemala (*Walk.*).

Page 412, between lines 11 and 12 from bottom insert as follows:

1892. *Thelia cratægi.* Osb. Trans. Ia. Hort. Soc. 119.

1893. *Thelia cratægi.* Osb. Fruit and Forest Tree Ins. 24.

Page 413, line 12 from bottom, and page 414, line 1, for *acuminata* read *acuminatus.*

Page 414, line 11, for *Hyphinæ* read *Hyphinoë.*

Page 416, line 3 from bottom, for *Telamona* read *Membracis.*

Page 417, line 1, for *1841* read *1851.*

Page 422, between lines 8 and 9 insert as follows: 1892. *Telamona mexicana?* Godg. Ent. News. iii, 108.

Page 424, line 9, for *top* read *tips.*

Page 425, line 6, dele "fig."; line 2 from bottom, for *galata* read *galeata.*

Page 427, line 4 from bottom, for *Membracis* read *Acutalis.*

Page 429, line 15, after "lower" insert *edge.*

Pages 435 and 436. *Note.*— An examination of the types shows that numbers 122 to 126 belong to Cyrtolobus.

Page 437. After the numbers 128, 129, and 130, for *A.* read *E.* *

Page 441, line 17 from bottom, for *V.* read *Amastris* †; line 4 from bottom, insert (?) before *V.*

Page 442, between lines 8 and 9 insert as follows: 1851. *Thelia expansa.* Walk. List. Hom. B. M. 563, 26; between lines 14 and 15 from bottom, insert as follows: *Thelia marmorata.* Walk. List. Hom. B. M. 555, 4.

Page 444, line 15 from bottom, after "scar" insert as follows: Apical cell much longer than in *marmorata,* the length exceeding the breadth more than twice, while in *marmorata* the cell is but a little longer than broad; line 14 from bottom, after "fuliginous" and "yellow" substitute semicolons for commas; line 7 from bottom, after "process," add as follows: in not being suddenly depressed a short distance before apex, in not having the median carina flat from this depression, and in being much more depressed anteriorly.

Page 445, line 8. *Note.*—Through the kindness of Rev. W. W. Fowler, of Lincoln, England, I have had the opportunity to examine Stål's type of the genus Optilete, and, as surmised, it proves to be a typical *marmorata,* Say. Between lines 16 and 17 from bottom insert as follows: 1851. *Hemiptycha longicornis.* Walk. List Hom. B. M. 569, 7.

Page 449, line 10 from bottom, *Note.*— Walker's *Darnis lineola* belongs to Phacusa (*Fide* Fowler).

Page 452, No. 181, for *prunitia,* Butler, read *hastata,* Stål (*Fide* Fowler).

---

* Ashmeadea being preoccupied, the name was changed to Evashmeadea.

† A more careful study of the species places it in Amastris.

ARTICLE VII.—*On an American Earthworm of the Family Phreoryctidæ.* By S. A. Forbes.

In 1843 W. Hoffmeister described in Germany (Wiegmann's Archiv f. Naturgesch., 1843) a peculiar, long, and very slender worm found in a well, giving it the generic name of *Haplotaxis*, and, after its discoverer, Menke, the specific name of *menkeanus*. Two years later this generic name was set aside by the same author for that of Phreoryctes, Haplotaxis having been already used in botany. In 1859 another species of the genus was found, also in Germany, by Schlotthauber and noticed as *Georyctes lichtensteinii* (Beitr. z. Helminthologie),—a name which has now given way to that of *Phreoryctes filiformis* (Claparède) Vejdovský. In 1888 the well-known helminthologist, Beddard, of England, published in the "Annals and Magazine of Natural History" a description of a worm from New Zealand which he assigned with some doubt to this genus under the name of *Phreoryctes smithii*, amending at the same time the definition of the genus (especially with reference to the sexual organs) to include this species. These three forms, two from continental Europe and a doubtful one from New Zealand, are thus the only examples of the genus and family hitherto reported.

In America these worms have been mentioned, previous to the discovery of the present species, only by Minot in the Standard Natural History (1885), where a general illustrated account of the genus is given with the remark that so far as the author knows, it has been found only in Germany.

In March, 1880, the writer hereof received from a well in McLean county, Illinois, and preserved in alcohol, without study, a very long and slender pale red worm, remarkable for its disposition to coil itself into seemingly inextricable knots. In April of the present year (1890) I received from Mr. G. W. McCluer, Assistant Horticulturist of the Agricultural Experiment Station at Champaign, a thick mass of fine roots

of the elm, taken from a tile in a farm drain. Here, in company with a large number of the ordinary blind crustaceans of the subterranean waters of this region (*Asellus stygius* and *Crangonyx mucronatus*), I found three living examples of the same worm as that received from the well ten years before, and these proved upon examination to belong unquestionably to the genus Phreoryctes, but to a species undescribed.

From the other Oligochæta the family Phreoryctidæ and its sole genus, Phreoryctes, are distinguished by the long and slender form, the great number of segments, the thick cuticle and weak longitudinal muscular layer; by the simple setæ, placed singly in four longitudinal rows, two ventral and two dorsal (the latter sometimes aborted); and by the convoluted nephridia imbedded in fat cells and opening to the surface before or behind the setæ. The ventral ganglia present two swellings or enlargements in each somite. The sexual glands are said to occur in segments nine to twelve, and the *receptacula seminis* in segments six to eight.

Phreoryctes emissarius, Forbes.*

This worm is allied to *P. menkeanus* by its great length, its pale red color and iridescent luster, and its subterranean habit, by the presence of ventral organs beneath the nerve cord, and by the three pairs of nerves from each ventral ganglion. It differs especially by the fact that the dorsal rows of setæ are obsolete except on a variable number of the anterior segments† and that the lateral vascular arches extend from the dorsal to the ventral vessel, instead of connecting only with the latter. The worm is at least seven or eight inches in length by about .6 to .7 mm. in thickness, and my longest specimen (an imperfect one) contains three hundred and seventy-five segments.

The head or prostomium is not transversely lobed, either without or within, and thin vertical transverse sections give no hint of a cephalic pore. The setæ (Pl. VI., Figs. 1 & 2) begin with very small dorsal and ventral pairs in the first post-oral

* Amer. Nat. May, 1890, v. xxiv., p. 477.

† None of my specimens are entire, and I am not able to give the characters of the posterior segments.

segment. The ventral setæ continue throughout the body, at first increasing in size backwards, and becoming very large and long and strongly recurved at tip. At the middle of the worm the imbedded part of the seta may extend into the cœlom two thirds the diameter of the body. The tips are obtuse and smooth, and a circular ridge surrounds the seta below the middle. The inserted portion is straight to the tip, from which very numerous distinct slender muscles radiate in all directions to the worms wall. The dorsal setæ diminish in size and disappear between the seventieth and eightieth segments, their occurrence becoming irregular towards the last. In the middle part of the body there is no trace of them nor of the glands for their development.

The large dorsal and subintestinal blood vessels are readily seen in the living worm, as well as the contorted vascular loops extending along the side of the intestine. The dorsal vessel is contractile, and valved at the posterior portion of each cœlomic space by four or five large, pale, nucleated cells, so shaped and attached as to yield to forward pressure but to close against backward. (Pl. VI., Fig. 3). This vessel divides just behind the cerebral ganglion, each branch passing outward and downward under the anterior end of the lateral commissure, and then forward under the lateral part of the cephalic ganglion, and upward and inward to the middle line in front of this ganglion, where the two branches from the opposite sides nearly touch. Each then turns directly backward upon itself and retraces the course just described, the direct and the recurrent portions of the artery running parallel, a short distance apart, until beneath the anterior end of the commissure again, where the vessel turns outward to the body wall.

The lateral branches of the dorsal vessel (Pl. VI., Fig. 4) are given off immediately in front of the posterior dissepiment of each somite, and just behind the valves of the dorsal vessel. Throughout the greater part of the body they run at first upward and outward to the body wall, then irregularly forward (forming as they go a broad, downward loop on the side of the intestine) to the front of the cœlomic space, where they turn directly downward across the intestine, and backward along its lower surface, again forming a broad, downward loop in the

ventral portion of the cœlom, in front of the ventral setæ. They terminate finally in the ventral vessel, on the same vertical plane as that of their origin. The anterior arches are less contorted,— the first, indeed, pursuing a nearly direct course from above downward. This vessel is no larger than the others, and is doubtless non-contractile. It is given off at the posterior end of the first segment (subœsophageal), and on the same vertical plane the ventral vessel takes its origin,— probably formed by the union of these arches. This vessel is supported by a vertical mesentery except in the anterior segments, where it is borne at the middle of a delicate transverse membranous partition, which disappears with the formation of the first dissepiment. It is also valved, but imperfectly, at a considerable distance behind the dissepiment.

The cerebral ganglion is transverse, slightly convex in front, and slightly three-lobed, the large anterior nerves going off from the anterior lateral angles by bulbous processes. Ganglion cells are most abundant on the anterior and dorsal surfaces, the inferior posterior surface being nearly free of them. Three pairs of nerves arise from the cephalic ganglion, the first and second large and the third small. The first go outward and downward from their origin to the cephalic wall; the second, arising just behind the first, pass directly downward; and the third, springing from the lateral part of the dorsal surface just before the origin of the commissure, pass directly upward. The commissures send each five nerves to the wall of the head, the four anterior arising in pairs, and the posterior and largest, given off just before the commissures meet in the subœsophageal ganglion, going singly outward. No branches to the pharynx were detected.

The subœsophageal ganglion is transversely oval in front, nearly cylindrical behind, very richly cellular on the lower surface, especially at the middle, and also posteriorly on the sides. The four anterior ventral ganglia are closely approximated and, including the subœsophageal, have but a single pair of branches each.

The ventral cord (Pl. VI., Fig. 5, & Pl. VII., Figs. 6 & 7) generally presents two elongate ganglionic swellings to each somite, corresponding to the two sets of lateral nerves arising.

Ganglion cells are but few on the upper half of the cord, but are almost continuously distributed on the under surface except at the dissepiments, where the cord is rapidly reduced in size and contains no ganglion cells. There is nothing in the nerve cord or its delicate sheath to represent the giant fibers of the earthworm.

The ventral cord is supported beneath, at the center of each somite, between the ganglionic swellings, by the "ventral organs" of Timm (Pl. VI., Fig. 5, & Pl. VII., Figs. 6 & 7),*—pyramidal pads or cushions of cells, the outer ones large, distinct, nucleated, the inner resembling the ganglion cells of the nerve cord itself. The apex of the pyramid extends between the longitudinal muscle bands, and the base of it commonly supports the cord, the lateral angles frequently extending upwards, beside the cord, and sometimes, especially in the anterior somites, half surrounding it (Pl. VII., Fig. 6). In the posterior part of the body, however, the cord and the ventral organs are much less closely connected, and often lie side by side quite free from one another. These cellular masses are longest from before backwards, and are connected with each other by a single nerve fiber running from one to the other, this having occasionally a nucleated cell in its course.

The lateral nerves (Pl. VI., Fig. 5) all pass from their origin outwards and downwards through the longitudinal muscular layer of the body wall to the circular muscle, beneath which they are distributed. They are swollen and slightly ganglionated just beyond their origin. Three pairs of these lateral nerves rise in each somite (excepting a few of the most anterior), two from the posterior swelling of the ganglion and one from the anterior. The posterior pair arise immediately in front of the dissepiment, the second pair a short distance further forward,—commonly immediately behind the ventral organ,—and the first pair (which pass directly downward) at about the anterior fourth of the somite. These nerves are given off on the same horizontal plane, and the pairs are opposite.

* The structure of these bodies, as well as their greater size in the anterior segments, seems to me to bear out the suggestion of Timm that they are sensory organs.

The nephridia open into the cœlom by a conspicuous broad, shallow, bi-lobed, ciliated funnel (Pl. VII., Figs. 8 & 9) nearly sessile on the anterior face of the dissepiment at about the level of the nerve cord. The larger lobe of the funnel is composed of a single layer of cylindrical cells arranged fan-like, and each covered at its outer end by a dense brush of long and very fine cilia. From this funnel a short tube narrows rapidly backward to the dissepiment, through which it is continued into a narrow lobe of the so-called fatty body of the somite behind (Pl. VII., Fig. 10). These bodies, composed of irregular masses of large cells, contain, according to Leydig,* delicate contorted tubes representing the glandular portion of the nephridia,—a fact difficult to demonstrate positively in prepared slides. They extend upwards beside the alimentary canal, in immediate proximity to the chlorogon layer, their upper end sometimes reaching the dorsal vessel. Below, a slender lobe extending downwards and inwards is supported by one of the setal muscles, which is inserted on the middle line of the ventral body wall. Another lobe extending downwards and outwards, contains the large excretory duct, which passes from the dorsal surface of the intestine with an S-like curve to the body wall (Pl. VI., Fig. 2), where it is rapidly narrowed to a minute tube, which, passing through the body wall, opens, with a slightly expanded orifice, upon the surface about a tenth of a millimeter in front of the seta and quite outside the setal sheath. This orifice, in the living worm, is frequently marked by little accumulations of excrete matter, and the tube can be traced a short distance inward by the thick cuticular lining of its terminal part. The first nephridium appears in the ninth segment, and the first ciliated funnel in the eighth. These structures are, however, rudimentary in the first six segments in which they occur, the fatty bodies being reduced to narrow masses of connective-tissue nuclei which extend up in a single band beside the alimentary canal, immediately behind the dissepiment, and the funnel not being bi-lobed and not always ciliated. No duct or external opening is distinguishable in these anterior nephridia.†

* Archiv f. Mikrosk. Anat. I., p. 283.

† The segments in which these incomplete nephridia occur, are, according to Beddard, those in which the sexual organs are situated in the sexually mature worm.

The change to the distinctive cell of the fatty body and the fully developed bi-lobed, ciliated funnel is gradual, becoming complete in the fifteenth segment, where, however, the fatty bodies are still very small, occupying only the anterior part of the cœlom. In the posterior somites, on the other hand, the nephridia and the fatty bodies are very large, occupying the greater part of the cœlomic space. There was no trace of sexual organs in any of the specimens studied.

Just behind the tip of each seta is a small oval mass of cells resembling a gland (Pl. VI., Fig. 2) and opening to the surface at the very margin of the setal sheath. The first dissepiment occurs between the fourth and fifth segments. The cœlomic fluid is remarkably destitute of leucocytes.

The pharynx is short, thick-walled, with heavy roughened cuticle, thick, circular and rather few and stout radiating muscles. A broad, low median ridge projects fromthe dorsal wall of this cavity. The œsophagus extends through segments one to three. It is thin-walled in the first two somites, with a thin cuticular lining and scarcely any circular muscular fibers, but very numerous slender radiating muscles extending to the body wall. In the third somite its structure is similar, except that it is provided with a very thick circular muscle and that the radiating muscles are first reduced in number and then disappear. The cuticle is also thicker than that of the preceding part. With the fifth somite the intestine suddenly begins, the muscular wall becoming very thin and the epithelial cells very long and highly and irregularly villose in arrangement (Pl. VII., Fig. 11). Here also begin the chlorogon cells in a thin imperfect layer. The villosities become at first more prominent and irregular backwards, but at about the fifteenth to the twentieth segment are gradually reduced in length, the epithelial lining becoming more uniform in thickness. The intestine is slightly constricted at the dissepiments, and there also the epithelial cells are considerably shortened (Pl. VIII., Fig. 12). The exposed ends of the cells are densely ciliated. The intestinal wall contains capacious blood sinuses which connect at intervals with the dorsal vessel (Pl. VIII., Fig. 12). In the posterior part of the alimentary canal the epithelial cells are very much elongated, and the lumen of the canal small.

The chlorogon layer becomes finally thick and extensive, deeply imbedding the alimentary canal and the dorsal vessel, and extending out upon the branches of the latter as far as the body wall.

In the alimentary canal of the specimens examined were numerous slender, fusiform, monocystid Gregarinidæ (Pl. VIII., Fig. 14), average examples being about .34 mm. long by .02 mm. wide, tapering towards both ends, the anterior extremity with an apparent open pore or sucker by means of which it was commonly adherent to an epithelial cell. In one such case the protoplasmic contents of such a cell were drawn out, by the slight withdrawal of the gregarinid, into a short, thick, striated thread. Each has a large, circular, highly granular nucleus, commonly near the center. In some cases these Gregarinidæ were in masses of half a dozen.

In the cœlom are numerous encysted parasites (Pl. VIII., Fig. 15), usually thick-walled, with a central protoplasmic mass (varying from spherical to crescentic), within which is a spherical, conspicuous, highly granular nucleus, often containing a nucleolus also. These bodies are commonly attached to the inner surface of the longitudinal muscle layer, but are occasionally imbedded in the fatty bodies or lie free in the cœlom.

BIBLIOGRAPHY.

HOFFMEISTER, W. Beiträge zur Kenntniss deutcher Landanneliden. — Wiegmann's Archiv für Naturgeschichte, 1843, Bd. I., pp. 183–198.

———Die bis jetz bekannten Arten aus der Familie der Regenwürmer. Braunschweig, 1845.

SCHLOTTHAUBER, DR. Beiträge zur Helminthologie. ("Amtl. Ber. über 31 Versammlung deutscher Naturforscher und Ärtze zu Göttingen, Sept. 1854. Göttingen, 1866, pp. 122–124.") [Vejdovský.]

CLAPARÈDE, E. R. Recherches sur l'Anatomie d'Oligochètes. Mèm. Soc. Phys. et hist. nat. Genéve, Tom. XVI. 2-de part. 1862, Pl. 1–4, pp. 217–291.

LEYDIG, Fr. Ueber Phreoryctes Menkeanus Hoffm. nebst Bemerkungen über den Bau anderer Anneliden. Archiv für Mikroskopische Anatomie, Bd. I. 1865, pp. 249–294, Taf. 16–18.

NOLL, F. C. Ueber einen neuen Ringelwurm des Rheins. Wiegmann's Archiv für Naturgeschichte, Jahrg. 40, 1874, pp. 266–270, Taf. VII.

VEJDOVSKÝ, F. Beiträge zur Oligochaetenfauna Böhmens. Sitzungsber. d. kön. böhm. Gesellschaft der Wissensch. Prag. 1875, pp. 191–201.

CLAUS, CARL. Grundzüge der Zoologie, Vierte Ausgabe. Marburg, 1880.

MICHAELSEN, W. Die Oligochaeten von Süd-Georgien nach der Ausbeute der Deutschen Station von 1882–83. Jahrb. Wiss. Anst. Hamburg, 5 Jahrg, pp. 55–73, Taf. 1, 2. Abstract: Zoologischer Jahresbericht, 1888, p. 51, Verm.

TIMM, RUD. Beobachtungen an Phreoryctes Menkeanus Hoffm. und Nais. Ein Beitrag zur Kenntnis der Fauna Unterfrankens. Arbeiten des zoolog.-zootom. Inst. in Wurzburg, Bd. VI. (1883), Taf. I., II. Review: Zoologischer Jahresbericht, 1883, I Abth., p. 203.

VEJDOVSKÝ, F. System und Morphologie der Oligochaeten. Bearbeitet im Auftrage des Comité's für Naturhistorische Landesdurchforschung Böhmens. Prag. 1884, pp. 48–50. Abstract: Zoologischer Jahresbericht, 1885, I Abth. Nachtr., pp. 47–57.

MINOT, C. S. Vermes. Order I. Oligochæta. Standard Natural History, Vol. I. [1885], p. 223.

GIARD, ALFR. Sur une nouvelle station de Phreoryctes Menkeanus Hoffmeister. Bull. Scientif. France et Belg. (3) 1. Ann. No. 4 [1888], p. 298.

BEDDARD, F. E. On the Reproductive Organs of Phreoryctes. Ann. Mag. Nat. Hist., Ser. 6, Vol. I., No. 6 [June, 1888], pp. 389–395, 1 Pl. Abstracts: Jour. Roy. Micr. Soc. 1888, p. 579; Zoologischer Jahresbericht, 1888, p. 54, Verm.

———Anatomy and Histology of Phreoryctes. Abstract: Jour. Roy. Micr. Soc. 1889, Part 6, p. 755. (Proc. Roy. Soc. Edinburgh, Vol. XVI., 1888–89, pp. 117–119).

FORBES, S. A. Note on an American Species of Phreoryctes. American Naturalist, May, 1890 [Vol. XXIV.], p. 477.

EXPLANATION OF PLATES.

PLATE VI.

FIG. 1.—Ventral seta detached. × 120.

FIG. 2.—Ventral seta in its sac, with problematical gland (?) just behind its tip, and terminal portion of duct of nephridium in front. × 192.

FIG. 3.—Valves of dorsal vessel. × 328.

FIG. 4.—Diagram showing course of lateral vascular arches, and position of valves. × 36.

FIG. 5.—Ventral nerve cord in one somite, with ventral organ and lateral nerves. The figure shows also the thick longitudinal ventral muscle, the thin circular muscle layer, the hypodermis, and the cuticle. × 200.

PLATE VII.

FIG. 6.—Transverse section of nerve cord and ventral organ from anterior part of body, showing also portion of ventral longitudinal muscle, circular muscle layer, hypodermis, and cuticle. × 192.

FIG. 7.—Same as FIG. 6, but from central part of body. × 192.

FIG. 8.—Ciliated funnel of nephridium, and portion of anterior lobe of fatty body, with septum intervening. × 328.

FIG. 9.—Front view of ciliated funnel of nephridium. × 328.

FIG. 10.—Diagram showing form and position of fatty bodies. × 43.

FIG. 11.—Transverse section of alimentary canal and dorsal and ventral vessels, a short distance behind œsophagus. The outer cells form the chlorogon layer. × 192.

PLATE VIII.

FIG. 12.—Same as FIG. 11, but from central part of body. × 192.

FIG. 13.—Portion of wall of alimentary canal. × 328.

FIG. 14.—Gregarinæ,—one attached to wall of intestine. × 192.

FIG. 15.—Single-celled parasites from cœlom. × 328.

PLATE VI.

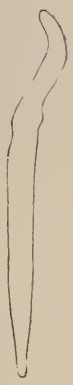

FIG. 1.

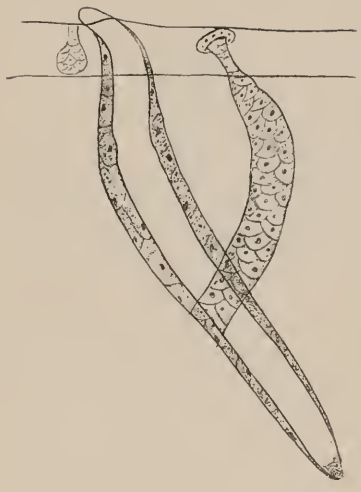

FIG. 2.

FIG. 3.

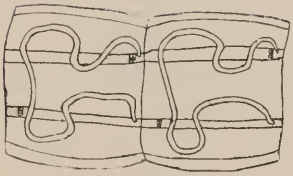

FIG. 4.

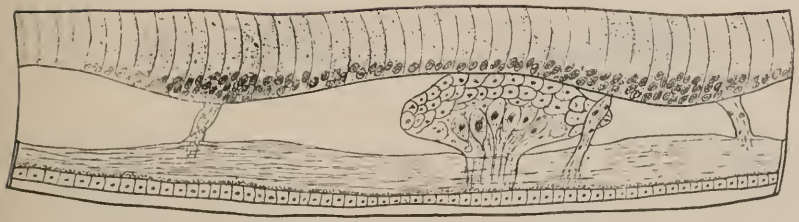

FIG. 5.

PLATE VII.

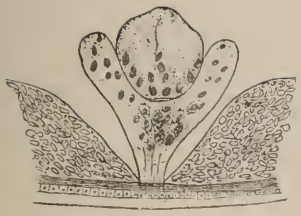

FIG. 6.

FIG. 7.

FIG. 8.

FIG. 9.

FIG. 10.

FIG. 11.

PLATE VIII.

FIG. 12.

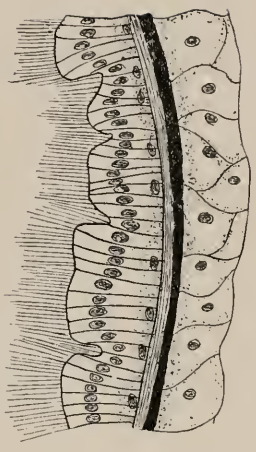

FIG. 13.

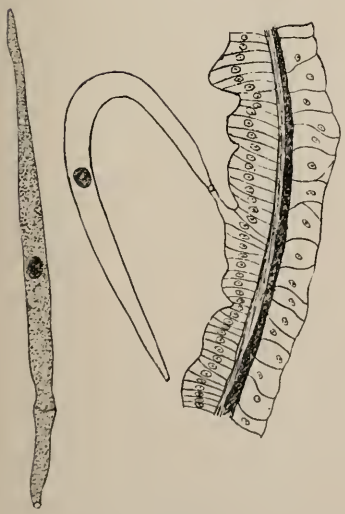

FIG. 14.

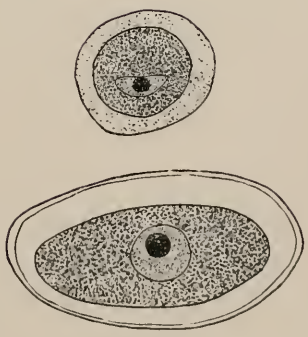

FIG. 15.