ARTICLE VIII.—*An American Terrestrial Leech.* By S. A. Forbes.

Our common land leech was first obtained by me in April, 1876, at Normal, McLean County, Illinois, where it was dug up in a house garden, about a dozen rods from the nearest rivulet. An example sent the following year to Prof. A. E. Verrill, with some remarks on its superficial characters, was by him identified provisionally and with some hesitation as his *Semiscolex grandis*, originally described* from three aquatic individuals obtained from Lake Huron, Lake Superior, and West River, Connecticut. I have now, however, fifty-six specimens of this leech, all from the earth in Central Illinois, some of them half a mile or more from water, and representing collections made at different times from April, 1876, to June, 1890; while, on the other hand, it has not once occurred in the course of a large amount of aquatic work done in the same regions during these fifteen years. It has, moreover, constant characters which clearly distinguish it from *Semiscolex grandis*, as far as one may judge by a comparison with Verrill's description, and I do not doubt that it is distinct.

Its only known food is earthworms of various genera, and these it swallows entire, as I have repeatedly found by dissection, and demonstrated likewise by feeding experiments on leeches in captivity.

From the fact that all my specimens were obtained during the early months of the year,—from March to June,—it is probable that this leech, like the earthworm, penetrates to considerable depths during the midsummer drouths.

DIAGNOSIS.

Semiscolex terrestris, Forbes.† This is one of the largest of our leeches, my contracted alcoholic specimens reaching a

* Synopsis of the North American Fresh-Water Leeches. By A. E. Verrill. U. S. Commission of Fish and Fisheries. Part II. Report of the Commissioner for 1872 and 1873, p. 672.

† American Naturalist, vol. xxiv., 1890.

length of seven inches, a width of three fourths and a depth of three eighths of an inch. In form, it is heaviest posteriorly, being widest at about the eighth annulus in front of the acetabulum, but tapering very gradually or scarcely at all thence forward to the anterior fourth, and thence more rapidly to the mouth. Its transverse section is depressed oval, flattened beneath, the margins of the body obtuse.

The color is sooty drab, varying to plumbeous black, somewhat lighter beneath, uniform in tint, and quite without spots or mottlings of any sort. A darker median longitudinal stripe, very conspicuous and well defined, is almost invariably present; a paler marginal stripe often approaching buff, little less constantly so; and a ventral submarginal stripe of the same color as the median dorsal one likewise quite frequent. The surface is everywhere smooth, and I find no external trace of segmental papillæ.

There are ninety-nine complete annuli from the mouth to the posterior sucker, four imperfect annuli in the cephalic lobe (counting the one bearing the first pair of eyes as the first), and one such just before the vent — one hundred and four in all. All the perfect annuli are very distinct except the first two, which, while well distinguished dorsally, are almost, but not quite, fused beneath to form the posterior border of the mouth. In front of the first annulus is the upper lip, divided by a delicate median groove. There are, consequently, eleven such grooves meeting the margin of the mouth, its posterior boundary being formed by the undivided ventral portion of the fifth annulus. The eyes are ten in number, placed upon the first, second, third, fifth, and eighth annuli, representing somites one to five. The acetabulum is broad oval, wider than long, and measures about 10 mm. in its greatest diameter. The vent is large and surrounded by irregular radiating grooves.

The first nephridial pore is at the anterior margin of the tenth complete annulus,— the fourteenth in all,— and the last or seventeenth pore at the anterior margin of the ninetieth ventral annulus,— the ninety-fourth of the full series. These pores open on the ventral surface just within the dark ventral line, and consequently at some little distance from the margin of the body. The male sexual opening is on the posterior part of the

twenty-eighth entire annulus and the female opening on the thirty-third.

Within the buccal cavity is a prominent circular fold. Maxillæ three, minute, .5 mm. to .66 mm. in length, each with an armature of twelve to fifteen bicuspid teeth. The pharynx presents ten to fifteen longitudinal folds, the number varying in different parts, with an average of twelve or thirteen.

I have seen no specimens of *Semiscolex grandis*, Verrill, but draw from the author's description distinctions in the number of the annulations ("about ninety" in *grandis*), the presence of maxillæ, the positions of the sexual orifices (in *grandis* in the twenty-fifth and thirtieth annuli respectively), and in the color markings,—*grandis* being, in Verrill's specimens, without stripes, but spotted or blotched with dark.

ANATOMICAL NOTES.

The genus Semiscolex, to which this species unquestionably belongs, was described by Kinberg* in 1867, but has been since very little discussed. It is not, in fact, again referred to in any literature within my reach, except by Verrill, in the third volume of the American Journal of Science (1872) p. 136, and in the Report of the U. S. Fish Commissioner for 1872 and 1873, p. 671. It is clearly closely allied to Aulastoma, Moqu., and seems to me but doubtfully distinct. The following anatomical details will help to an understanding of the relations of our species :

The alimentary canal is clearly distinguishable into five regions. The first is the pharynx (closely invested by muscles), which extends to about the twenty-second annulus from the mouth. The second is the so-called œsophagus and proventriculus, a simple cylindrical tube without lateral sacculi, terminating opposite the fourteenth ventral ganglion (counting the subœsophageal as the first), where it gives off two long, slender sacculi which extend backward beside the alimentary canal to the last testis. At the point of origin of these sacculi, the canal becomes very much enlarged, the three remaining

* Ofversigt af Kongl. Vet. Akad. Forhandlingar, xxiii, p. 357.

divisions being of nearly equal length. The third region, the digestive stomach of Bourne, is large and thin-walled, its cavity presenting about four regular constrictions, and its mucous membrane being conspicuously and finely rugose. The next section, the intestine proper, is smaller, with minute, irregular, and much less conspicuous rugosities; while the last section, the rectum, is about the diameter of the stomach, with a smooth mucous membrane. It passes backward without narrowing, rapidly rounding directly into the large anus.

The testes are ten in number in the specimens examined. The penial sheath is very long, extending from opposite the seventh ventral ganglion (where it is surrounded by the *glandula prostatica*) backward to a point opposite the ninth ganglion. Here it bends abruptly forward upon itself and passes to its external opening beneath the sixth ganglion. Immediately in front of the *glandula prostatica* lies the glandular part of the seminal vesicle of the left side, that of the other side being just opposite. Forward from this runs the thick-walled, shining *ductus ejaculatorius*, continued posteriorly as a slender, somewhat contorted tube which meets its fellow of the right side as this comes under the nerve cord just behind the sixth ganglion, the two then running in company to the base of the penial sheath.

The ovaries are small, nearly spherical, and lie closely approximated on each side of the nerve cord, immediately behind the seventh ganglion. The common oviduct passes first through a pyriform *glandula albuginea*, the apex of which reaches backward to the eighth ganglion, and then, at first small but presently much enlarged, runs backward somewhat deviously to the ninth ganglion, where it turns directly forward and continues unchanged to its orifice.

The suboesophageal ganglion is closely approximated to the next behind, the second and third ganglia are about half as far apart as the third and fourth, and these about two thirds the distance of the fourth and fifth. The last four ganglia are likewise much approximated, the posterior one being very large, and sending off several pairs of branches.

ERRATA.*

Page 47, line 6, page 48, line 8, and page 49, lines 5, 9, and 10 from bottom, for *clitellus* read *clitellum*.

Page 79, line 9, for *Opilonca* read *Opilionca*.

Page 108, line 11, for *longitudinal* read *circular*.

Page 109, line 8, for *worms* read *body*.

Page 115, line 1, dele initial *R*.

Page 122, line 10, for *ten* read *twenty*.

Page 138, line 16, for *Blackisded* read *Black-sided*.

Page 185, line 13 from bottom, page 228, line 17, and page 229, line 7 from bottom, for *troosti* read *troostii*.

Page 187, line 12 from bottom, page 272, line 6 from bottom, and page 275, line 1, for *kirtlandi* read *kirtlandii*.

Page 187, line 15 from bottom, for *lineata* read *lineatum*.

Page 213, line 17 from bottom, for 7 read .7.

Page 214, line 7, for 7 and 3 read .7 and .3.

Page 224, line 13 from bottom, for *Tortoise* read *Tortoises*.

Page 225, line 3, for *picta* read *marginata*.

Page 240, line 6 from bottom, for *1824* read *1825*, and before pp. insert IV.

Page 242, line 8 and 12 from bottom, and page 243, line 1, for *Macroclemys* read *Macroclemmys*.

Page 252, line 11, for *Crematogaster* read *Cremastogaster*.

Page 269, line 22 from bottom, and page 271, line 1, for *fasciatus* read *fasciata*.

Page 272, line 9 from bottom, and page 273, lines 7 and 14 from bottom, for *grahami* read *grahamii*.

Page 293, line 13 from bottom, for *elapsoidea* read *elapsoideus*.

Page 295, line 6, for *triangulum* read *triangulus*.

Page 309, lines 5 and 6 and line 3 from bottom, for *amœnus* read *amœna*.

Page 349, line 3 from bottom, for *A* read *W*.

Page 352, line 16, for *Ichyomorpha* read *Ichthyomorpha*.

Page 353, line 4 from bottom, for *Menopomidæ* read *Cryptobranchidæ*.

Page 366, line 16, and page 367, line 14 from bottom, for *erythronota* read *erythronotus*.

Page 367, line 8 from bottom, for *relations* read *relation*.

Page 371, line 11 from bottom, for *cingulata* read *cingulatum*.

Page 378, line 7, dele period after prehension. S. Garman is authority for last sentence of paragraph only.

Page 385, line 4 from bottom, dele comma after its.

Page 410, line 18 from bottom, for *sublata* read *subulata*.

Page 411, line 11, for *bimabulata* read *bimaculata*.

Page 431, line 16 from bottom, for *mutica* read *muticus*.

Page 435, line 12 from bottom, for *querci* read *quercus*

Page 441, line 19, for *Salamandra* read *salamandra*.

Page 451, line 14 from bottom, for *Anonophora* read *Aconophora*.

Page 486, line 4, for *limabta* read *limbata*.

Page 494, line 2 from bottom, and page 495, lines 13 and 16, for *lineatus* read *lineata*.

*See also pp. 178–181 of Article XIV.

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*).

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*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*.

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* *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).

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

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