

On *Cryptochaeta*, a New Genus of Earthworms; and a Nomenclatural Muddle Solved

W. B. BENHAM, K.B.E., F.R.S.

[Read before Otago Branch, October 12, 1948; received by the Editor,
April 4, 1949]

THE first zoologist to describe, however superficially, earthworms living in New Zealand was F. W. Hutton, Captain in the Royal Fusiliers, who published in 1876 a list of eight species.

It is true that the names conferred by him were wrong both generically and specifically, but at that time very little was known of extra-European earthworms, and it is evident from this and his other papers on the group that he had not access to the few articles that had been published in foreign journals.

It is, indeed, very surprising that Hutton, having no zoological training, being indeed primarily at that time a geologist, should have tackled this group of animals, for, unlike certain other groups of non-vertebrates such as insects and spiders, these worms cannot be recognised specifically by ordinary external features. In such a group as the Lepidoptera, the species are easily distinguishable by the colour pattern of the wings. In beetles and spiders and so on the external structure or colouration are ready guides, but this is not the case for earthworms. External differences are very slight, and require at least a magnifying glass, and then will only indicate, perhaps, the genus and, in most cases, only the family to which the animal belongs. Dissection is necessary in order to examine the internal structure and even perhaps the study of microscopic sections of the various organs thus exposed. In other words, some training in zoological methods is needed in order to make out the systematic position of the animal being examined.

In spite of these difficulties, of which he was probably not aware, Hutton was the pioneer in this particular field of Zoology in New Zealand.

It was not until 1887, nine years later, that F. E. Beddard, Prosector at the Zoological Gardens in London, published a series of articles on the earthworms sent to him by my predecessor, Professor Jeffrey Parker, in which he described the anatomical features of several earthworms from New Zealand. Material was also sent him by W. W. Smith, who had made a study of the habits of earthworms in Canterbury.

To Beddard we owe a sound knowledge of some of these animals, and several of the generic names still used date from his work.

Referring now to Hutton's contribution, I have already published (1899) comments and corrections of the "types" of Hutton's "species," which fortunately had been preserved in the Otago University Museum. But one of the specific names conferred by him

included at least two, if not three, distinct species. I refer to his "*Lumbricus levis*." Of this "species" I found that one is the widely distributed *Allolobophra caliginosa* (closely allied to the genus *Lumbricus* and at that time not separated). The other, as I indicated, is a member of a very different family and belongs to Beddard's genus *Octochaetus*, its true name being *Octochaetus levis* Hutton.

But, in addition to those in the store-room, of which my article dealt, I later came across a worm in a Museum jar which had, for many years, been in the Exhibition Gallery. This was labelled in Parker's script "*Eudrilus levis* Hutton"; its locality "Hampden," from which one of the specimens in the store-room came.

Now I naturally hailed this additional specimen of "*levis*" with some joy, as I wished to add to my knowledge of the species by confirming what I had found in the previous specimen. But at once, on studying the external features, I found that it differed from the other one in the condition and arrangement of the chaetae. For, until a portion of the skin was cut out and examined under the microscope,

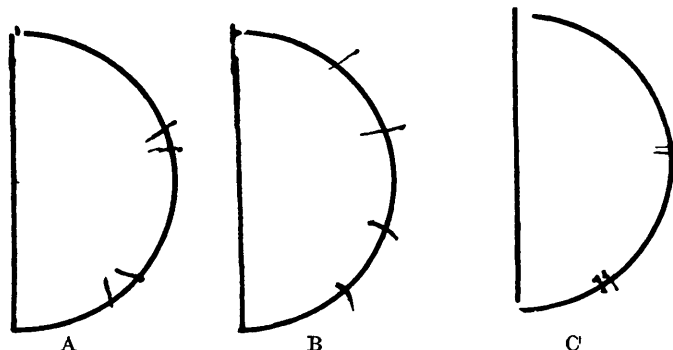


FIG. 1.—Half sections of body of (A) *Lumbricus*, (B) *Octochaetus*, (C) *Cryptochaeta* to indicate the spacing of the eight chaetae.

I was unable to detect any chaetae, and apparently that is why Hutton named it "*levis*"—smooth—not roughened by any chaetae. This at once showed that it did not belong to the genus *Octochaetus*, in which the eight chaetae in a segment are widely spaced, whereas, in most genera such as *Lumbricus* they are in four couples. (Fig. 1.) On examination of a portion of the body wall, including several segments treated with KOH cleared in zylol and mounted in Canada balsam, these chaetae were scarcely recognisable under a low magnification, and it required the use of objective 7 to see them satisfactorily.

The chaetae are in couples, but the two are close together, almost in contact, so that at first it seemed that one of them might be a replacing bristle such as occurs regularly in such a form as *Lumbricus*. But no! They are of equal size and in each segment only the four couples. The dorsal pores are evident, but I could see no nephridial pores, and presume it is micronephric.

Here, therefore, we have a new genus, for so far as I can ascertain from literature, no such condition has been recorded. I propose to name the genus *Cryptochaeta*, since the bristles are concealed.

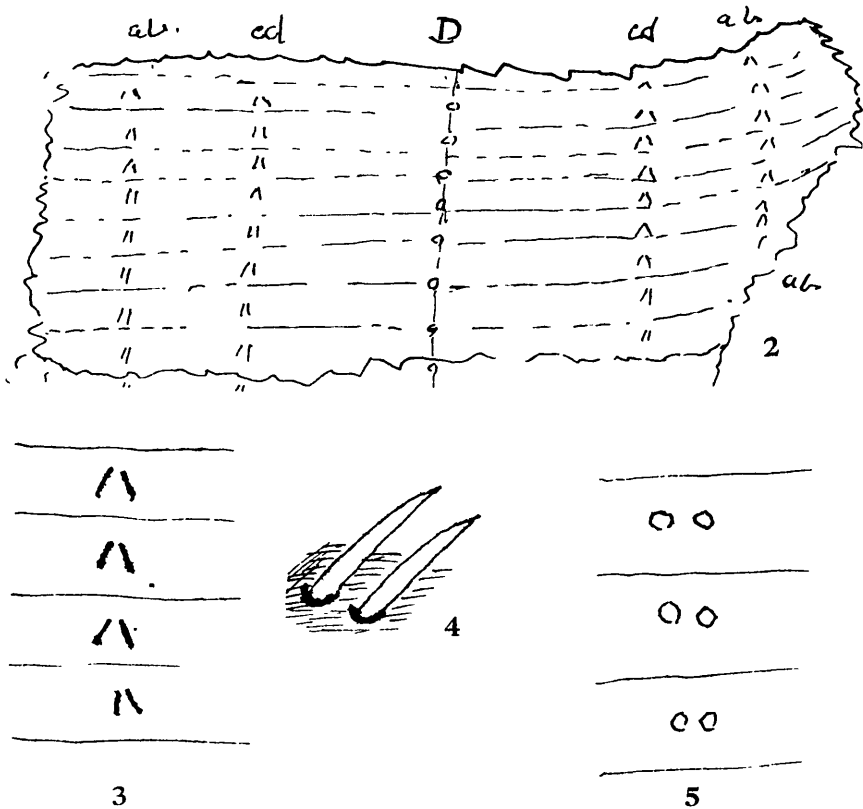


FIG. 2—Portion of body wall, outline under camera lucida under low magnification, showing the spacings of the chaetal couples and the dorsal pores, D; ab, ventral couples; cd, dorsal couples.

FIG. 3—Camera lucida drawing under higher magnification of a chaetal row.

FIG. 4—Chaetal couple in profile, under high power, but not a camera sketch.

FIG. 5—The same of the chaetae in section.

Family ACANTHODRILIDAE

CRYPTOCHAETA gen. nov.

Cryptochaeta microchaeta sp. nov.

Length 150 mm. Breadth 5 mm. Prostomium epilobic. Clitellum on segments 12 to 20. Prostate papillae on 17 and 19 not prominent. Chaetae are minute, eight in number, in very close couples, the pair almost touching one another. No penial chaetae detected in the skin of this area mounted and cleared.

Gizzard large, occupying segment 7. Oesophageal swellings (? glands) in segments 13', 14' and 15'. Spermatheca globular with mulberry-like diverticulum. (Fig. 6.) Prostate acanthodrilid.

Micronephric—was unable to detect nephridiopores on mounted skin; and owing to the small size and the soft condition of the worm I was unable to explore fully its internal structure.

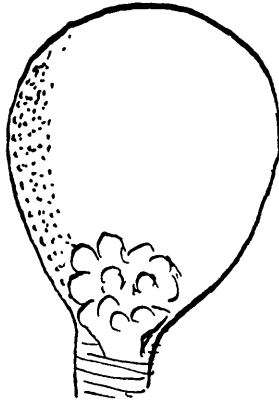


FIG 6—A spermatheca.

THE HISTORY OF A FALSE NAME

A Nomenclatural Mixture and a Puzzle Solved

Hutton called this worm "*Lumbricus levis*," but as I explained in 1899 (*Trans. N.Z. Inst.*, 31) he had included under this title at least two entirely remote genera; one is the introduced European *Alloobophora caliginosa*: another belongs to the genus *Octochaetus*, a truly New Zealand genus. But between the time of Hutton's article (1876) and my paper, W. W. Smith had, in 1886, removed it from the genus *Lumbricus* and speaks of it as "*ENdrilus levis*." Presumably he intended to write "*EUdrilus*," and further refers to two other forms under this generic title, to wit, "*Endrilus annectens*" and "*E. campestris*." Neither of these three species belongs to the genus *Endrilus*. There is not the slightest resemblance to this genus. It must be borne in mind that at that time Smith, like Hutton, had evidently no direct knowledge of the work of Edmund Perrier on non-European earthworms (1872). But this erroneous use of the generic title "*Endrilus*" has introduced an error in regard to geographical distribution of the genus, for the systematists, Beddard and Michaelsen, relying on Smith's statement, were led, each of them, to include the genus *Endrilus* as occurring in New Zealand. I have failed to find, in any of the numerous monographs by these two authorities, any reference to which species of this genus occurs here, and in the fifty years that I have been examining earthworms gathered in all parts of the Dominion, I have not seen a representative of this genus.

Eudrilus is characteristically found in West Africa and in the East Indies, and though one species has been introduced into various other places, there is, it seems to me, little likelihood of it being introduced by direct trading as has happened in other instances. For New Zealand has little, if any, direct communication with the "home" of *Eudrilus*. It may be mentioned that the geographical distribution of earthworms is quite a definite matter.

We must, therefore, exclude *Eudrilus* as the generic title of this "*levis*."

But this is not the end of the series of errors, for Hutton, in a footnote to an extract from Perrier's article (*Journal N.Z. Science*, vol. 1) shifts this "*Eudrilus*" to the genus "*Digaster*." He gives no reason for this astounding novelty. Thus "*levis*," by whatever name you call it, has no resemblance anatomically and even externally to either of these two genera. But I found in the Museum collection a jar labelled by Professor Parker "*Eudrilus levis*"; however, as I have mentioned in the present article, it is quite different from the earthworm I studied in 1898.

And so we have this astonishing and annoying synonym: *Lumbricus levis* Hutton, 1876; *Digaster levis* Hutton, 1883; *Eudrilus levis* Smith, 1886; includes the two species (A) *Octochaetus levis* Benham, 1899,

(B) *Cryptochaeta microchaeta* Benham, n. gen., 1949.

This series of names is bad enough, but Hutton included under his "*levis*" the totally different worm *Allolobophora caliginosa*.

These early students did their best in their endeavours to add to our zoological knowledge, but without literature, without any acquaintance with anatomy, unfortunately fell into errors. But we owe to W. W. Smith indirectly our first knowledge of the earthworm fauna, for he, being intensely interested in the habits of these creatures, sent earthworms to F. E. Beddard, who was the first zoologist to put the general character of our Oligochaete fauna on a secure basis.

Anyone interested in the activities and general habits of earthworms will find a fund of information about them in articles by W. W. Smith in the *Transactions of the New Zealand Institute*, vols. 19, 25 and 26. (At that time he was in charge of the Ashburton Domain.) In the latter volume he transcribes Beddard's published accounts of some of the genera such as *Acanthodrilus*, *Octochaetus*.

BIBLIOGRAPHY

- BENHAM, W. B., 1899. *Trans. N.Z. Inst.*, 31.
 HUTTON, F. W., 1876. *Trans. N.Z. Inst.*, vol. 9.
 ——— 1883. *Journal N.Z. Science*, vol. 1, p. 586.
 PERRIER, E., 1872. Recherches pour servir à l'histoire des Lombriciens terrestres. *Nouv. Arch. Museum*, 8.
 SMITH, W. W., 1886. *Trans. N.Z. Inst.*, 19. Also vols. 25 and 26.