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TRANSACTIONS
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ART. XVIII.—*Some Earthworms from the North Island of New Zealand.*

By W. B. BENHAM, D.Sc., M.A., F.Z.S., Professor of Biology
in the University of Otago.

[*Read before the Otago Institute, 13th September, 1904.*]

Plate XI.

ALL the earthworms, with two exceptions,* that have hitherto been ascribed with certainty to New Zealand have, as a matter of fact, been collected in the South Island, and chiefly from Canterbury and Otago; but during the last year or two I have received numerous specimens from various localities in the North Island, and in the early months of the present year I received from Mr. Elsdon Best a collection of worms made at Ruatahuna, the interest in which is enhanced by the fact that several of the species were in former times used as an article of diet by the Maoris, and are referred to under their Maori names in his article "The Food-products of Tuhoeland" in these Transactions.† I gladly take this opportunity of thanking Mr. Best for his kindness in taking the trouble, at my request, to collect, preserve, and forward to me these extremely interesting species; for not only is this the first occasion in which earthworms have been recorded as being eaten by man of any race, but, from a zoological point of view, they introduce us to a family of earthworms hitherto scarcely represented in New Zealand. To Mr. Charles Cooper, of Auckland, my thanks are also due, for it was at his suggestion that I put myself into communication with Mr. Best, whose article I had not at that time read, and was therefore ignorant of the fact that the Maori esteemed the earthworm as an article of diet. To several other correspondents I herewith offer thanks for forwarding to me specimens, including Captain Hutton, Professor H. B. Kirk, and Mr. H. Suter.

I have already written a detailed account of these new species, and have sent it to the Zoological Society for publication‡; nevertheless it seems desirable to place on record in these Transactions all new species of animals described from New Zealand, even if a certain amount of duplication of articles

* These two exceptions are *Maoridrilus plumbeus* and *Microscolex monticola*, both described by Beddard, from Mount Pirongea, near Auckland.

† Trans. N.Z. Inst., xxxv., p. 45.

‡ Proc. Zool. Soc., 1904.

results. Here and now it is only necessary to present a list of the new species, but I cannot let the opportunity pass by without emphasizing the fact that the predominant earthworms in the North Island belong to a subfamily quite different from that to which the predominant earthworms of the South Island belong, and heretofore believed to be characteristic of New Zealand as a whole.

The South Island earthworms (extending up to and including Stephen Island in Cook Strait) belong to the subfamily *Acanthodrilinæ*; on the other hand, the commonest earthworms in the North Island belong to the subfamily *Megascolecinae*, which is characteristic of Tasmania and Australia.

The problem of distribution presented to us renders our former ideas on the subject as to the relation of our fauna to that of Australia somewhat confusing: and I do not at present propose to discuss it till I have worked out the line along which the two subfamilies came into contact in New Zealand. I shall be extremely grateful for any earthworms from Nelson and Marlborough, as well as from the southern parts of the North Island, for we are very deficient in knowledge as to the fauna in these parts of the country.

LIST OF NEW SPECIES.

Fam. MEGASCOLECIDÆ.

Subfam. ACANTHODRILINÆ.

1. *Maoridrilus mauianus*, Benham.
Loc. Auckland.
A single individual. Collected by Mr. Suter.
2. *Octochætus michaelsoni*, Benham.
Loc. Wellington.
A single specimen. Collected by Captain Hutton.

DINODRILOIDES, Benham (1904).

3. *Dinodriloides beddardi*, Benham.
Loc. Auckland.
A single individual. Collected by Mr. Suter.
4. *Rhododrilus edulis*, Benham.
Loc. Ruatahuna.
Two individuals. Collected by Mr. Elsdon Best. This worm is known to the natives of Tuhoeland as *tarao* (= *wharu*, and perhaps *huharu*); it appears to be common, and was used as food.*

* I have added diagrams to illustrate the specific characters of this and the following species, for comparison with other species of *Rhododrilus* described in the present volume.

5. *Rhododrilus besti*, Benham.

Loc. Ruatahuna.

A single individual. Collected by Mr. Elsdon Best.

This is the *tokerangi* of the natives, and is not included in Mr. Best's list of edible species. He writes me that it is "found on tracks, &c., in the morning, generally after a wet night."

Subfam. MEGASCOLECINÆ.

TOKEA, Benham (1904).

6. *Tokea esculenta*, Benham.

Loc. Ruatahuna.

Collected by Mr. Elsdon Best, in stony places: it is termed *kurekure* by the natives, who eat it.

7. *Tokea sapida*, Benham.

Loc. Ruatahuna.

Collected by Mr. Best. This is also an edible species, and is not distinguished by the Maori from the preceding species, the same name, *kurekure*, being used for both. It was one of the most prized kinds, and was reserved as food for the chiefs.

8. *Tokea ureweræ*, Benham.

Loc. Ruatahuna.

Collected by Mr. Best. It is the *pokotea* of the Maoris, who included it in their bill-of-fare.

9. *Tokea huttoni*, Benham.

Loc. Whangarei.

One individual. Collected by Captain Hutton.

10. *Tokea suteri*, Benham.

Loc. Auckland.

One individual. Collected by Mr. Suter.

11. *Tokea kirki*, Benham.

Loc. Ohaeawai.

Five specimens. Collected by Professor H. B. Kirk.

12. *Tokea maorica*, Benham.

Loc. Auckland: Waitakerei Bush and Nikau-palm Bush, near Auckland.

Eight individuals. Collected by Mr. Suter.

It will be seen that out of a collection containing twelve new species, only two belong to the predominant genera of the South Island—viz., *Maoridrilus* and *Octochætus*. The genus *Rhododrilus* is represented by one species in the South Island, one species in the Chatham, and two species (described in the present volume) in the southern islands.

The new genus *Dinodriloidea* is allied to *Dinodrillus* of the South Island, of which only one species is at present known. There are five species belonging to the subfamily *Acanthodrilinae*: the remaining seven belong to a new genus, allied to the Cryptodrilina series of Australia.

The genus *Tokea* (from the Maori *toke*, an earthworm) is very widely distributed over the North Island, as will be seen from the varied localities at which it has been collected—from Ohaeawai at the north to Ruatahuna in the south-east portion of the island.* It is probably the commonest earthworm in these parts, as two species occur in and around Auckland, three species at Ruatahuna, and from the majority of the other localities no other genus has been received. It is, so far, unknown in the South Island.

To this list of new species from the North Island we must add Beddard's species, *Maoridrillus plumbeus* and *Microscolex monticola*, from Mount Pirongea, described in 1895. But before that date Schmarda described "*Hypogæon orthostichon*," from "Mount Wellington, New Zealand." This worm is now placed, by those who have re-examined the specimen, in the genus *Notoscolex*, a thoroughly characteristic Australian genus; and doubt has been thrown on the accuracy of Schmarda's statement that it was collected in New Zealand—firstly, because no representative of that genus had hitherto been found here, and secondly, because there is no "Mount Wellington" of conspicuous size in New Zealand. It has been suggested that the well-known mountain of that name near Hobart was the real source whence Schmarda obtained the worm, and that the words "New Zealand" were due to a *lapsus calami*†; and I went so far as to refer to it, in a note read before the Australasian Association for the Advancement of Science at Hobart in 1902, as a "neglected Tasmanian earthworm." But these two reasons for doubt may now be laid aside—for, firstly, the genus *Tokea* is closely allied to *Notoscolex*, and the differences are such that unless particular attention were paid to the points of difference they might readily be overlooked, and the description is insufficient to decide the question: it is possible, then, that Schmarda's worm may indeed belong to this new genus *Tokea*. Then, secondly, in reply to a query from me, Professor Kirk informs me that "Mount Wellington is the name of a small volcanic cone just outside Auckland, now under cultivation"; so that the suggestion of a geographical error seems to have

* I have recently received species of this genus from Little Barrier Island.

† Hutton, "Catalogue of the Worms of New Zealand," Trans. N.Z. Inst., xi., footnote, p. 317.

been unnecessary. It is probable that the point will never be decided, and, as Schmarda's worm no longer forms an exception to the zoo-geographical problem, its decision is now of little importance.

EXPLANATION OF PLATE XI.

The illustrations of the anatomy of the earthworms described in this article are purely diagrammatic, indicating only the segmental position of the various organs, the worm being supposed to be slit up along the dorsal line and the body-wall pinned aside.

A group of three diagrams refers to each worm herein described. The left-hand diagram in each of the groups referring to a species represents the external features. The location of the various genital pores is represented as round black dots (if on a papilla this is left white), the clitellum is obliquely shaded, the tubercula pubertatis are vertically shaded.

In addition, the arrangement of the chætæ—labelled *a*, *b*, *c*, *d*—is indicated in segments 5 to 23 on one side; they are omitted on the other side for clearness' sake. The true relative spacing of the chætæ is shown.

The position of the nephridiopores is indicated by the small circles on one side of the figure.

The middle figure represents the alimentary canal and so much of the vascular system as is diagnostic. The latter is black. The gizzard is indicated by vertical shading, the œsophageal glands by more or less horizontal lines. The intestine is not represented as being constricted, which is, however, the case in most worms.

The right-hand figure shows the reproductive system. The gonads are in black. The sperm-sacs are dotted. The sac with penial chætæ when present is indicated, and the muscular duct of the spermiducal gland is transversely striped. The transverse muscles in the 18th segment are shown.

No attempt is made to give the relative sizes of the worms or of the various organs.

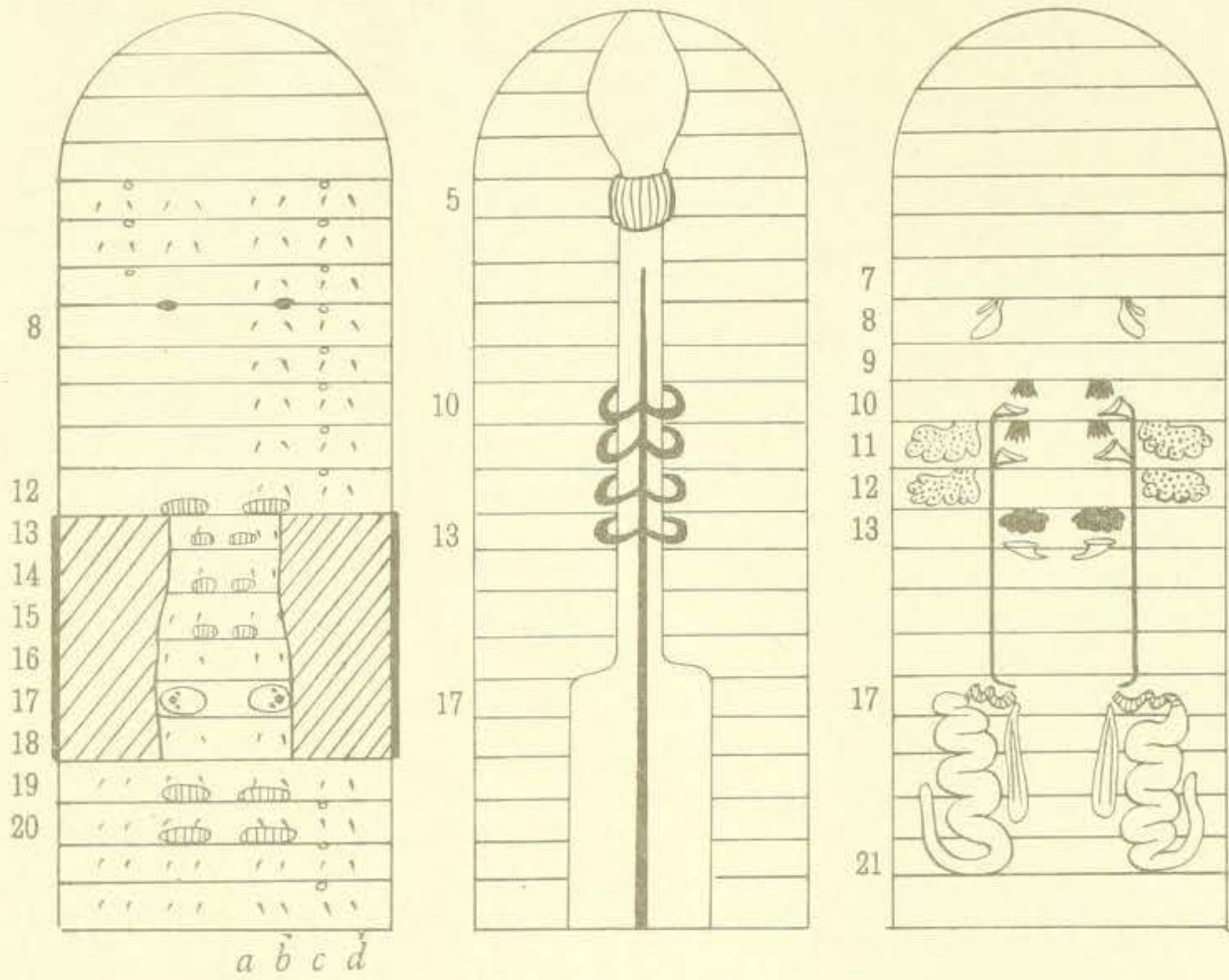
ART. XIX. — *On the Oligochæta from the Southern Islands of the New Zealand Region.*

By W. B. BENHAM, D.Sc., M.A. F.Z.S., Corr. M. R. Soc. Tasm.,
Professor of Biology, University of Otago.

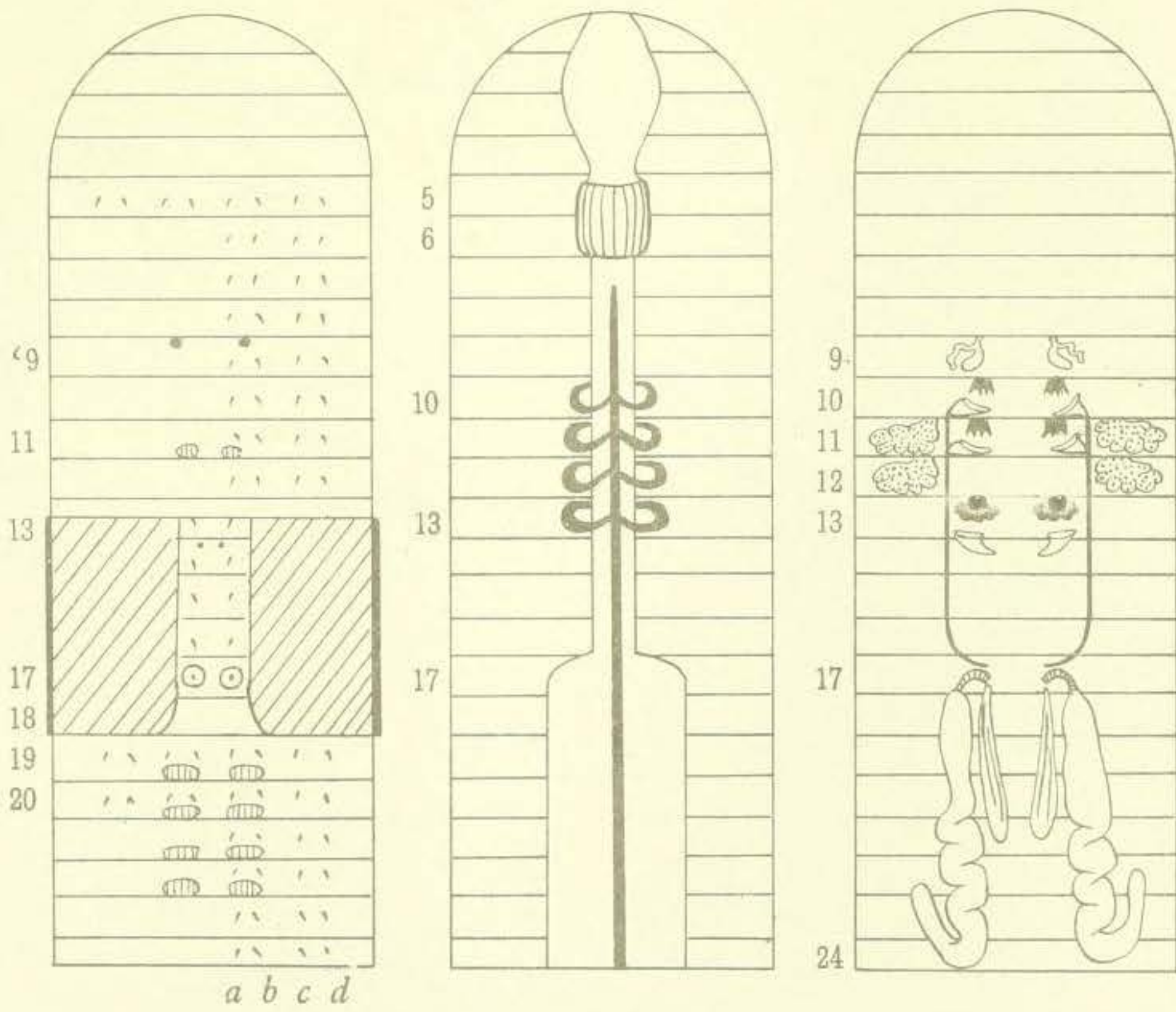
[*Read before the Otago Institute, 13th September, 1904.*]

Plates XII. and XIII.

IN the winter of last year (July, 1903) Dr. L. Cockayne paid a visit to the southern islands on the Government steamer "Hine-moa," and while collecting plants was good enough to collect earthworms, which he kindly handed over to me. The following is the list of worms described in the present paper, all but the last being collected during this expedition:—



Rhododrilus edulis.



Rhododrilus besti.