2. *Arthrochordeumium appendiculosum* n. g. n. sp.

A new endoparasitic Copepod in the Ophiurid Astrocharis gracilis Mrtsn.

By

K. Stephensen.

Till now we know only two endoparasitic Copepoda from Ophiurids, *viz.*:

Philichthys amphiuræ Hérouard, Sur un nouveau copépode parasite d'Amphiura squammata; Comptes Rendus Acad. Sci. Paris, tome 142, 1906, 3 pp., 3 textfigs., and

Chordeumium[1]) obesum Jungersen.

Chordeuma obesum, a New Parasitic Copepod endoparasitic in Asteronyx Loveni; Jungersen, in Report Brit. Assoc. 82.d Meeting 1912. — Chordeuma obesum, a New Parasitic Copepod endoparasitic in Asteronyx Loveni M. Tr.; Jungersen, in Mindeskrift for Japetus Steenstrup, No. 16, 1914.

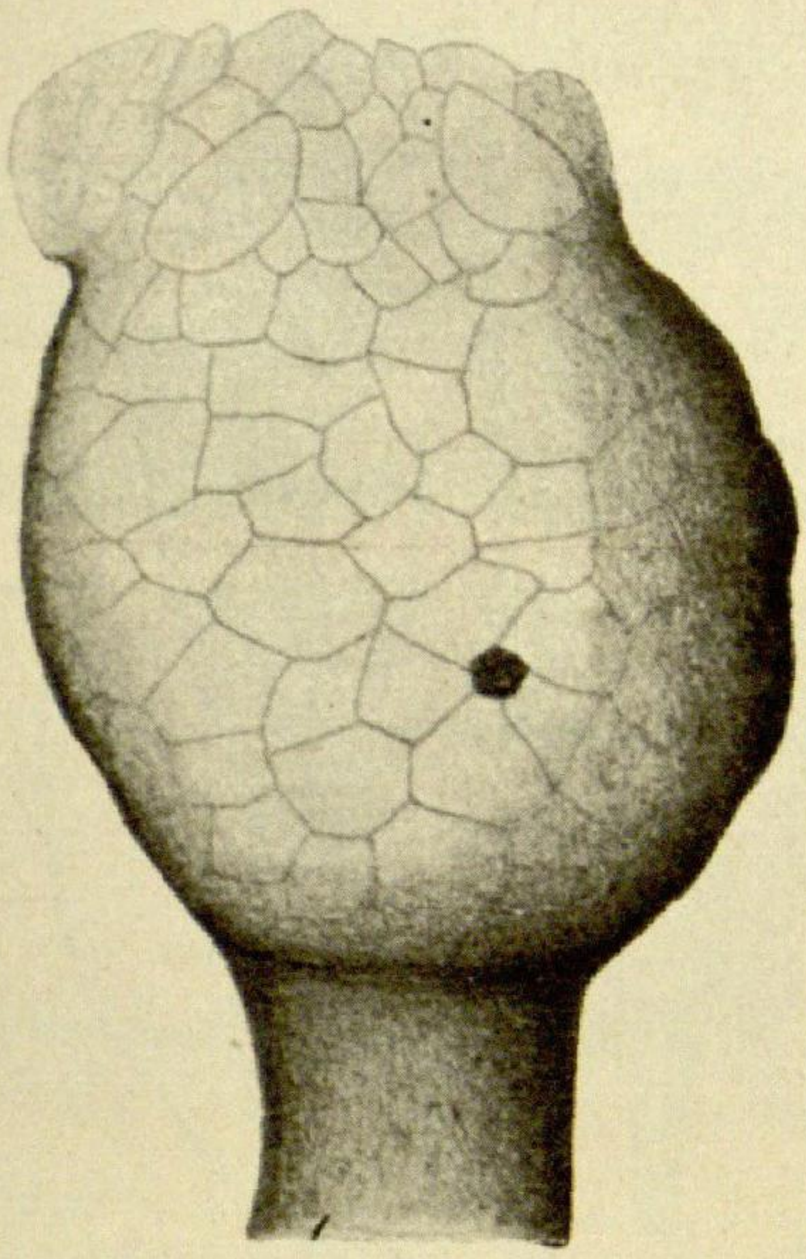
The first species was found at Roscoff, the other is very common in the Skagerrak, and no species was known outside the northern seas.

The parasite in question is situated in the coelome of the proximal part of one of the arms of the host, and the arm is dorsally swelled into a gall with a little pore about in the centre

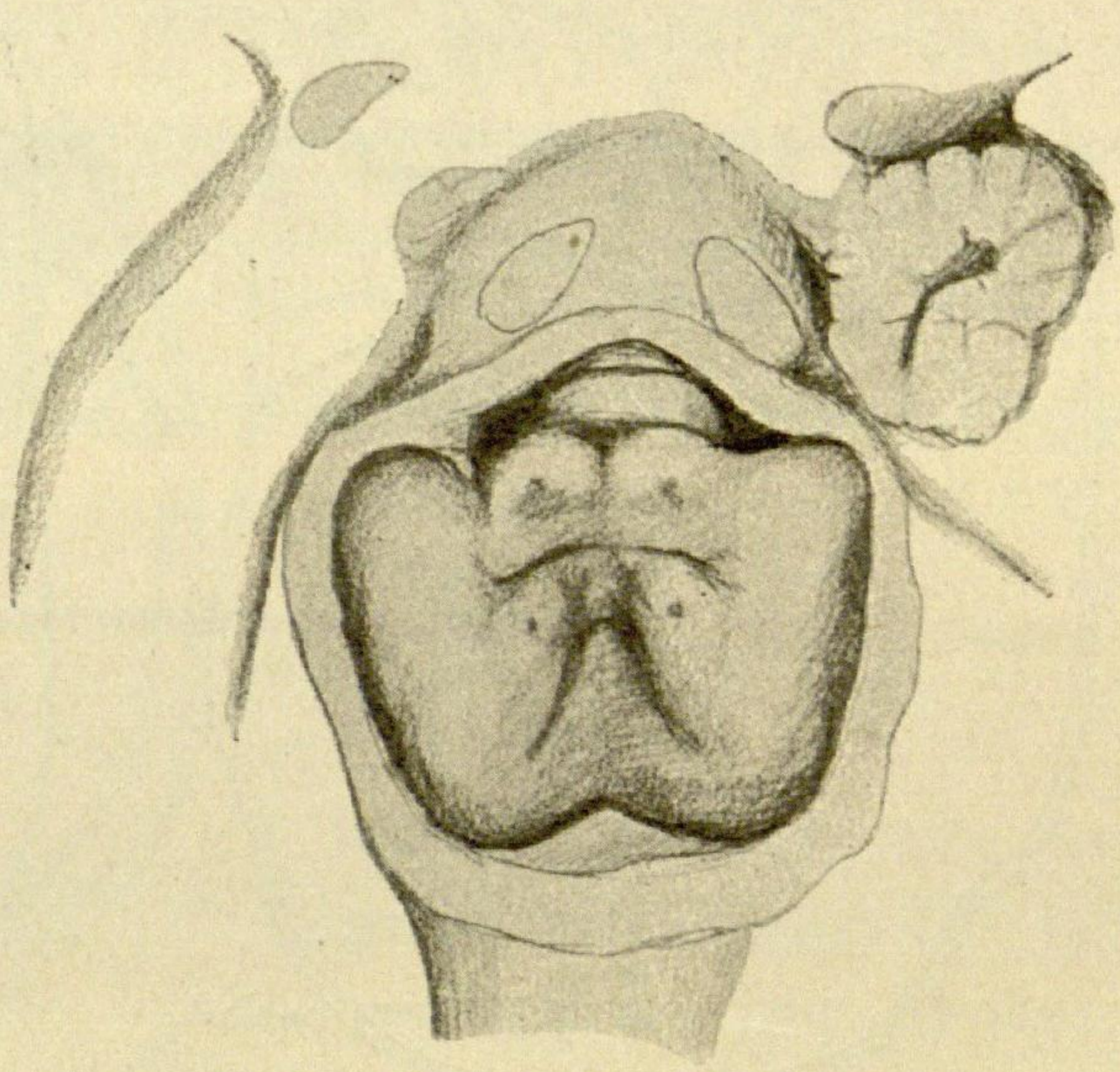
---

[1]) The name *Chordeuma* is preoccupied for Myriapoda (*Chordeuma* C. L. Kock, System d. Myriapoden, Regensburg 1847, p. 51, 124—125, Pl. I, fig. 9—10; *Chordeumiden* C. L. Kock ibid. p. 49, 119) and is in combination with affixa (e. g. *Microchord.*, *Orthocord.*: C. Verhoeff in Wiegmann, Archiv f. Naturgesch., 63. Jahrg., 1. Bd., 1897, p. 131) used for other Myriapoda. Thus the name *Chordeuma* for a Copepod must be dropped, and I propose to change it into *Chordeumium*.

(fig. 7). The diameter of the gall is about twice that of the arm, and the parasite lies with the head turned towards the disk of the host (fig. 8). At the basis of the arm alongside the gall another gall, but smaller and totally collapsed, may be seen (fig. 8).



7.



8.

Fig. 7. The gall of Astrocharis gracilis, including Arthrochordeumium appendiculosum (drawn by Dr. Th. Mortensen).

Fig. 8. The gall opened, showing the natural position of Arthrochordeumium appendiculosum. Above to the right a collapsed gall may be seen at the basis of another arm.

Arthrochordeumium appendiculosum n. gen., n. sp.

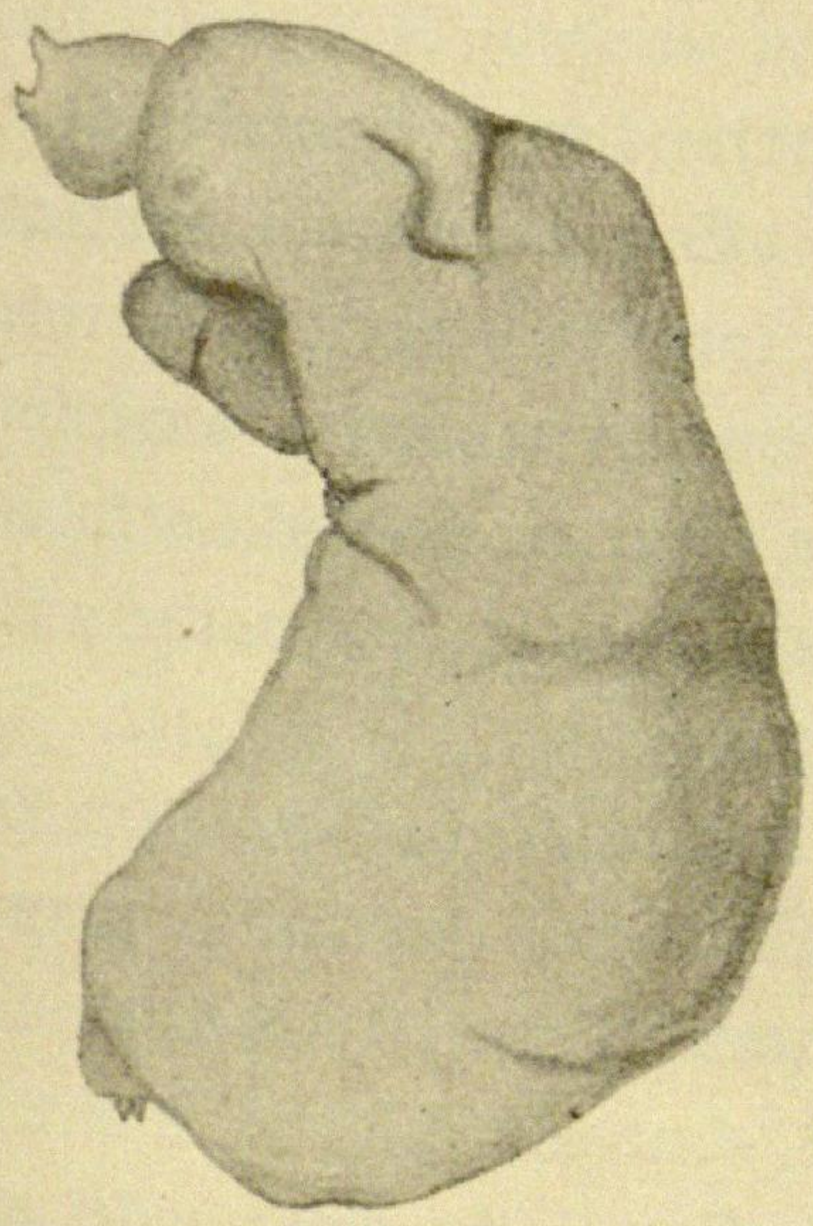


Fig. 9. The male from the left side.

On account of the great similarity of the male to that of *Chordeumium obesum*, and of the distinct articulation in the thorax of the female, I propose the generic name *Arthrochordeumium*; the specific name *appendiculosum* refers to the appendices on the left side of the 2. and 3. thoracic segment in the female.

Male. (Figs. 9—12). Length 1,7 mm, breadth 1 mm.

Exterior. The body is sausage-shaped or saccate, curved, somewhat broader than thick and without true segmentation. No eyes. A little unpaired wart is placed

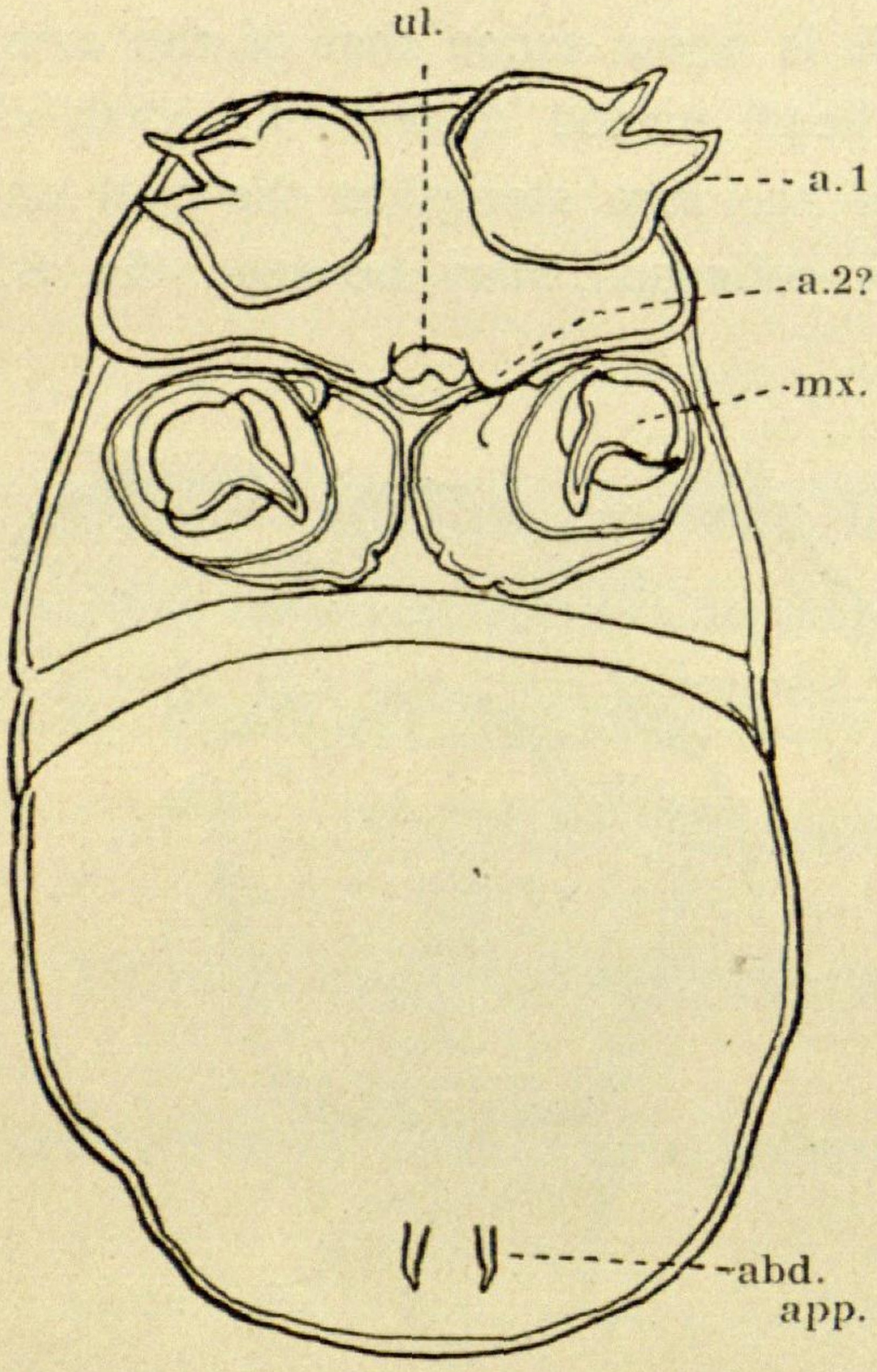


Fig. 10. The male, ventral view.

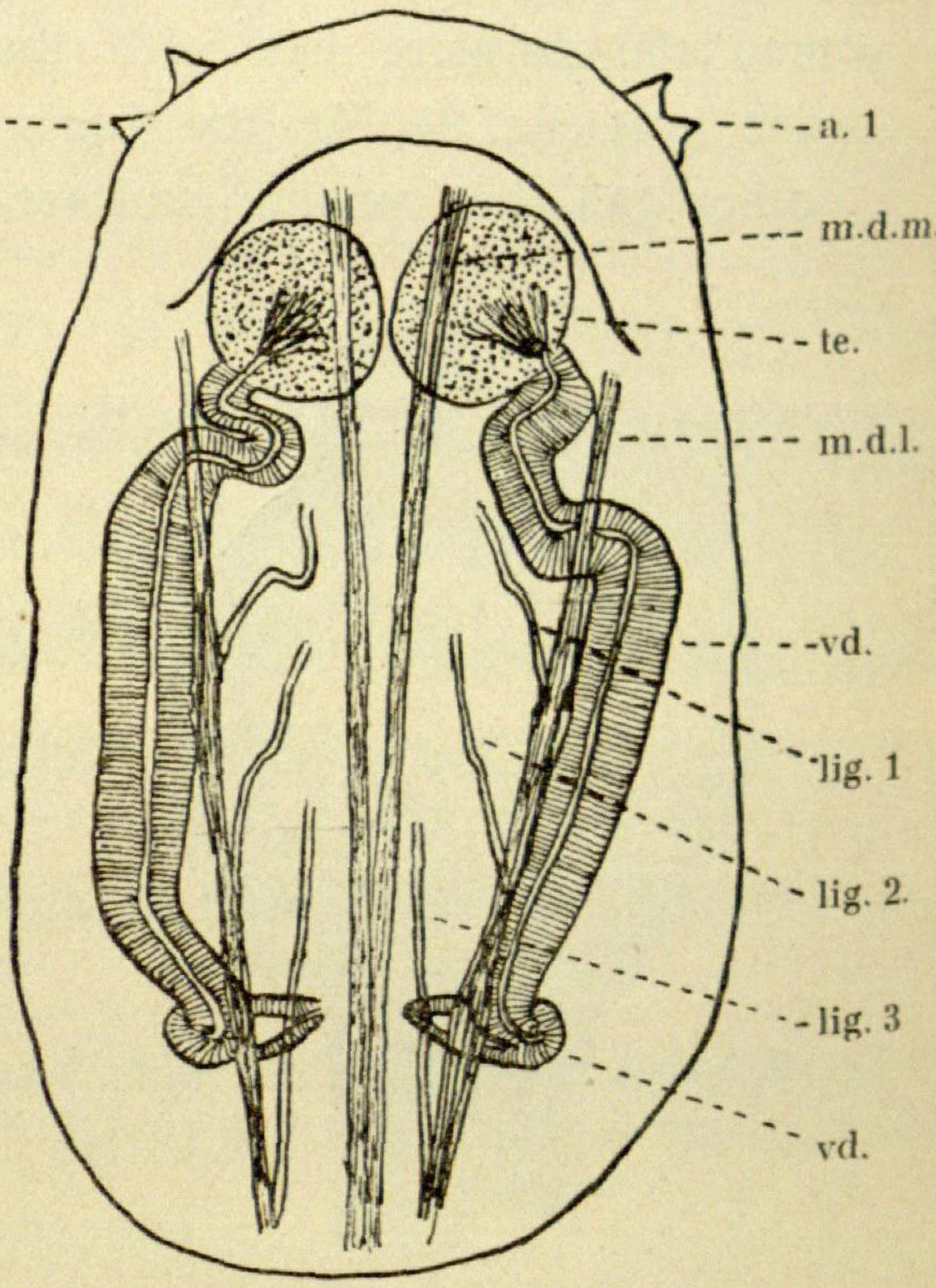


Fig. 11. The male, dorsal view.

Reference letters to figs. 10—13 and 16—18.

a. 1 = 1. antenna. a. 2 = 2. antenna. abd. app. = abdominal appendages. ap. = postabdomen. ce. = cephalon, head. in. = intestine. lig. 1—lig. 3 = the dorso-ventral ligaments. m.d. = dorsal muscle. m.d.l. = dorsal lateral muscle. m.d.m. = dorsal median muscle. m.v. = ventral muscle. mx. = maxilla. te. = testes. th. 1—th. 4 = 1.—4. thoracic segments. vd. = vas deferens (spermoduct).

in the middle line of the dorsum close behind the frontal edge, another dorsally about between the testes. On the dorsal surface there is a flat prominence dorsally to the intestine and a couple of feeble longitudinal folds at the thorax. Ventrally there is a rather deep transversal fold behind the antennæ and two smaller folds behind the maxillæ. Postabdomen is a little curved ventrally and has a pair of small unsegmented appendages.

As the likeness between this ♂ and that of *Chordeumium* is very striking, the appendages may be signified in the same manner as does JUNGERSEN. 1. pair of antennæ (figs. 10—12, a. 1) are almost totally as in the named species, but are placed a little closer to each other at the ventral middle-line. At each side of the cleft upper lip (fig. 10, ul.) a little triangular flap is placed (fig.

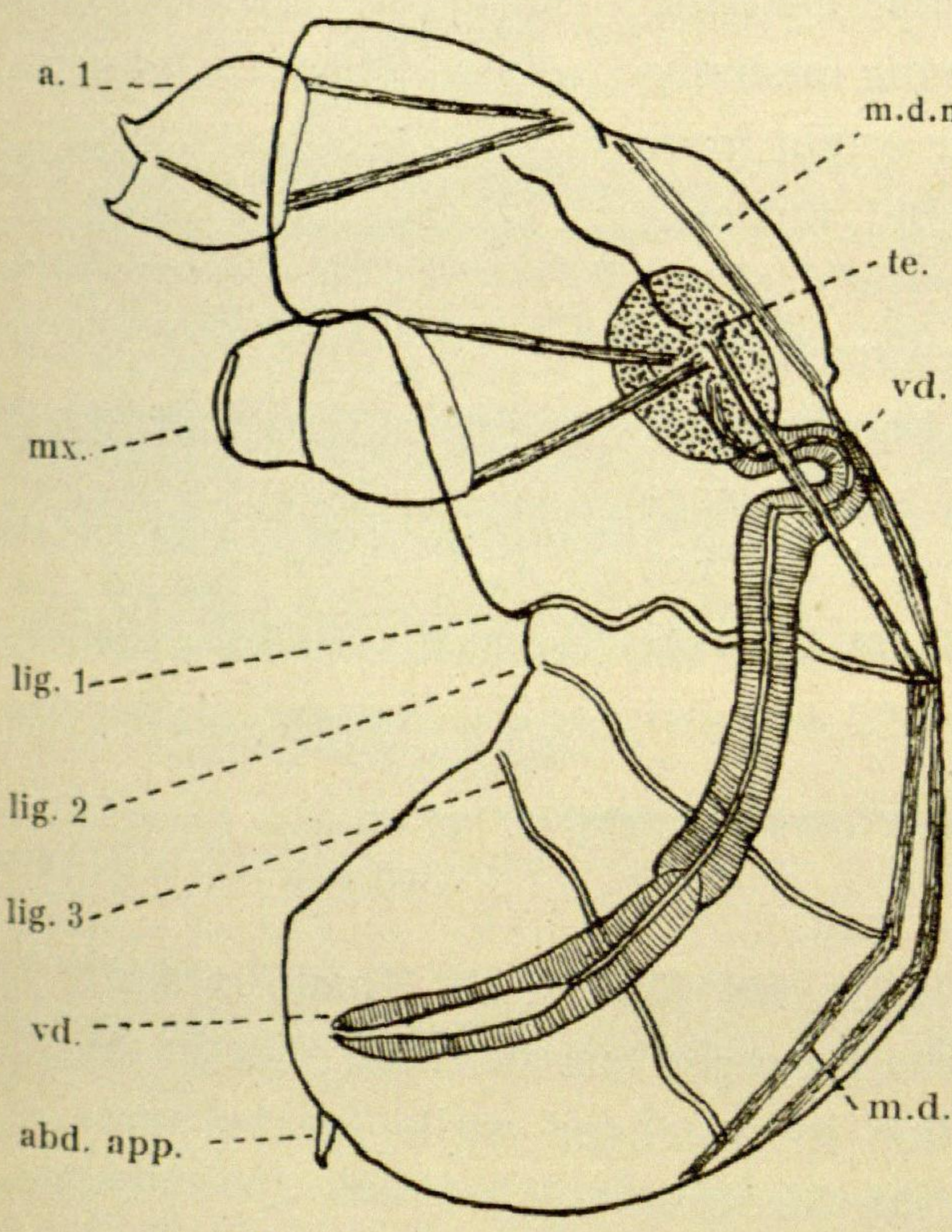


Fig. 12. The male, from the left side.

10, a. 2?), perhaps being ant. 2; if this interpretation be wrong, the adult ♂ totally wants ant. 2. Also the maxillæ (figs. 10 and 12, mx.) are about as in *Chordeumium* and consist of three joints; small protuberances as those drawn by JUNGERSEN at the two ends of 1. joint are also to be found in the present species, but the finer sculpture (hairs etc.) I have not been able to find. Thoracic felt absent.

Inner organisation. Also the inner organisation (figs. 11—12) is, as far as it may be seen, essentially as in *Chordeumium*.

The genital organs consist of two ovoid testes (te.) in the head, not connected — as far as it may be seen — by a transverse bridge. The spermoduct (vd.) has a curvature close behind the testes and another curvature close before the hind end; it seems to have equal width over the whole except in the hind end, where it widens into a „receiver“ for a spermatophore; the „receiver“ is much wider in the left than in the right spermoduct; thus there seems to be only one spermatophore at a time. I have not been able to find the genital openings.

The alimentary canal seems to be as in *Chordeumium*.

The nervous system I have not been able to find.

The muscular system (figs. 11—12) I cannot interpret in all details and have only been able to draw the main features. Ant. 1 and maxillæ have two (or three?) muscles. There are two pairs of dorsal longitudinal muscles, the one close to the middle line (m.d.m.), the other more laterally (m.d.l.), exactly as in *Chordeumium* ♀. There are a pair of ventral muscles lying as in ♀ (p. 274); but on account of the curved form of the body they can not be seen so distinctly that they can be drawn.

Besides the muscles the thorax contains three pairs of ligamenta (lig.), lying medially to the spermoducts, taking their origin from the points where the latero-dorsal muscles are attached, and stopping at the middle of the ventral surface. They seem to be attached off the places where the intervals between the thoracic segments should be, if such a segmental division were found; but I am not able to interpret them. They seem to consist of chitine; at all events they are not muscles.

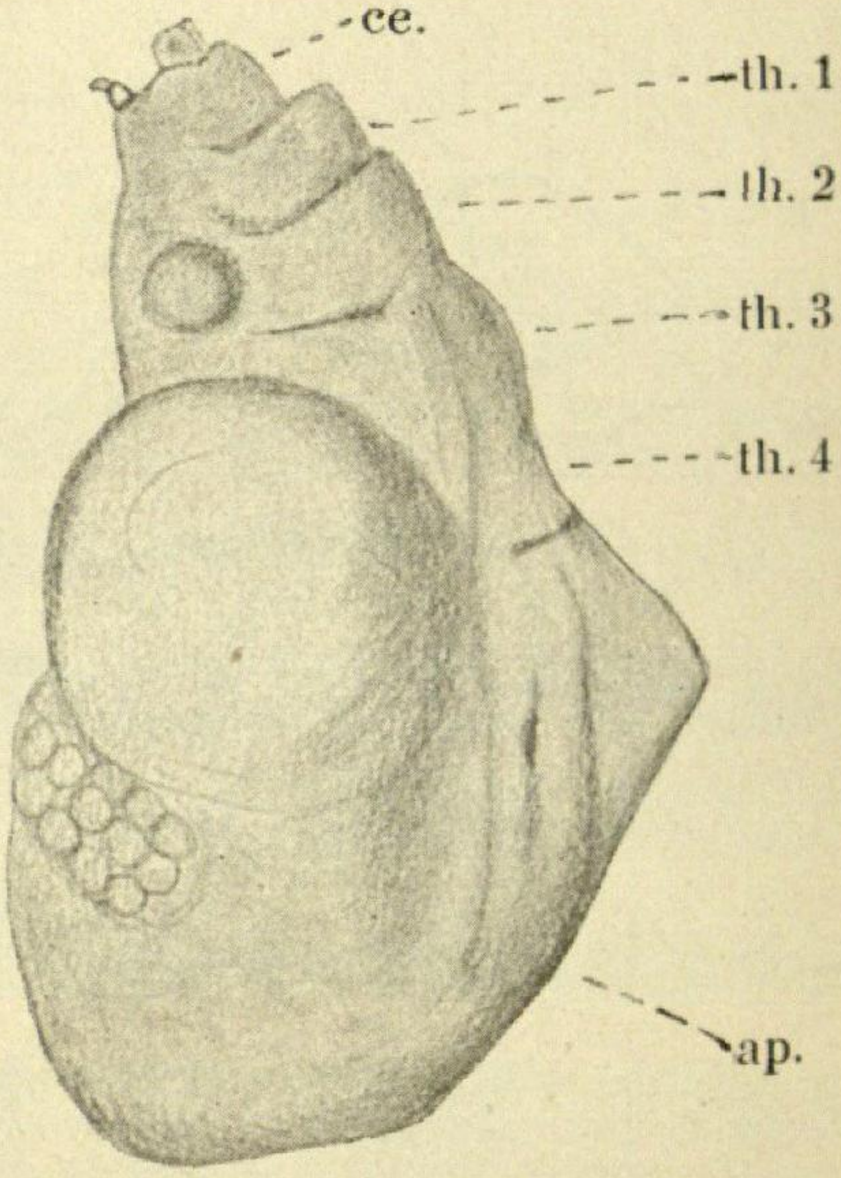


Fig. 13. The female, from the left side.

Female. (Figs. 8, 13—18).

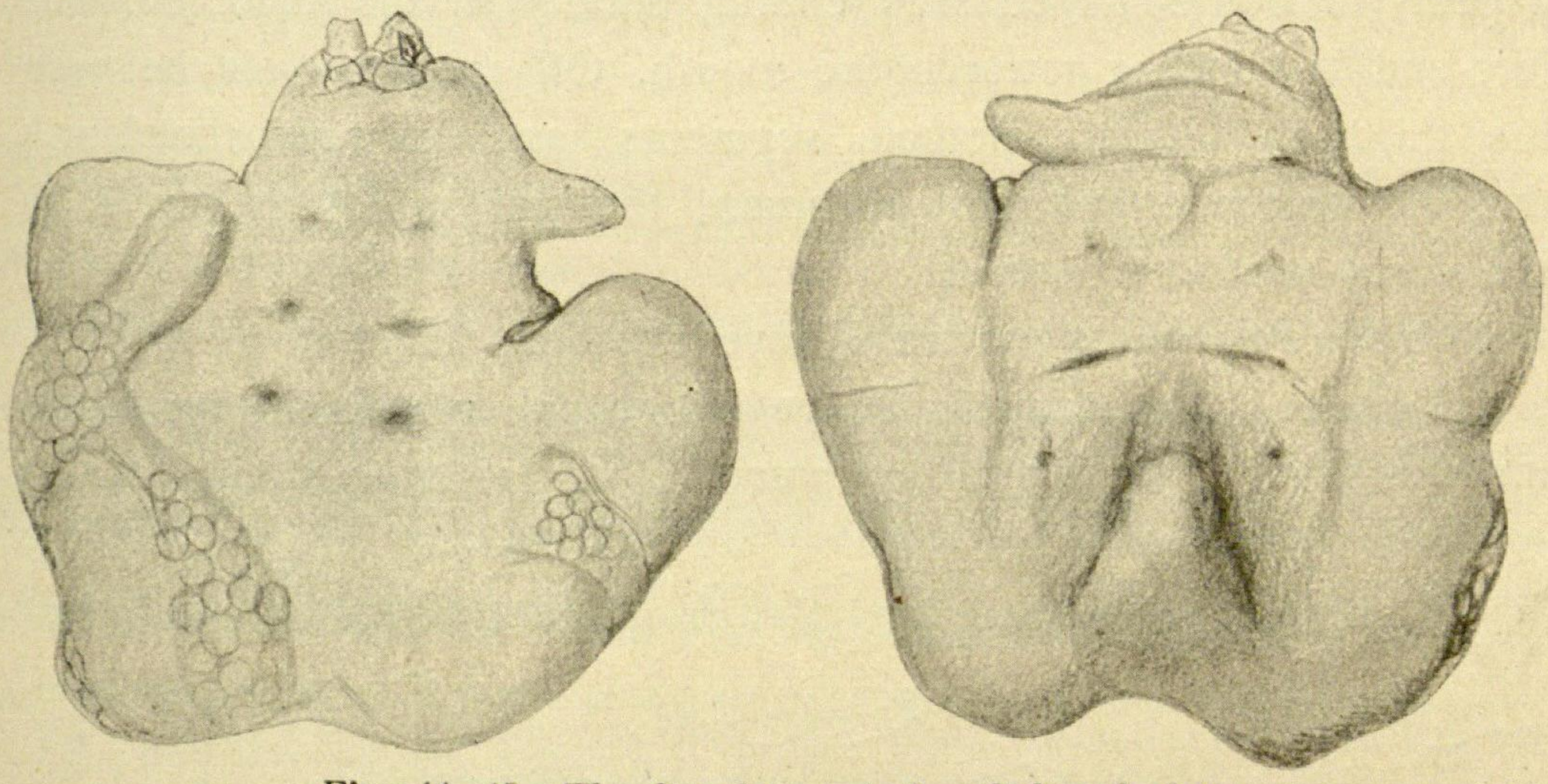
Length 2.5 mm, breadth 2.6 mm.

Exterior. As may be seen from my fig. 8 (the female in situ), the fam. *Dajidæ* (*Isopoda*) immediatly gets us in mind; but in the *Dajidæ* it is the hind end which is prolonged while in the species in question this applies to the fore-end.

The body is somewhat symmetrical; the fore-end is bent a little to the right. Concerning the processes on the left side of the 2. and 3. thoracic segment see below.

The body is composed of a head (ce.), four thoracic segments (th. 1—th. 4), and an unsegmented postabdomen (ap.). The ventral side is concave, the dorsal side vaulted with a projecting three-angular carina or process on the fore-part of the postabdomen. The head and the two first thoracic segments are much narrower than the hindpart of the body, which is trapezoid with the shorter side posteriorly and with a little concavity on each side and on the middle of the hind edge.

At the dorsal side there is a distinct segmentation between the head and first thoracic segment, and on the left side between the segments 1—2 and 2—3. Also the limit between 4th thoracic segment and first abdominal segment is rather sharp at the middle of the back, and may be seen as a fine line at the two side-edges of the body. The limit between 3. and 4. segment is marked by a pair of small impressions due to the fixation of the second pair of the dorso-ventral ligaments; similar impressions are found where the exterior ramus of the hind part of the dorsal



Figs. 14—15. The female, ventral and dorsal view.

muscle has its acute curvature off the apex of the dorsal abdominal process between the two first abdominal segments.

The process on the left side of the second thoracic segment is cylindrical, somewhat pointed towards the apex. On the third segment there is a similar but much smaller process. On the right side there are no similar processes.

At the concave ventral side there is no real segmentation, but three pairs of impressions may be seen *viz.*, the ventral ends of the three pairs of the dorso-ventral ligaments, corresponding to the limits between 2.—3. and 3.—4. thoracic segments, and between 4. thoracic segment and the first abdominal segment.

On the right side of the body there lies a rather large, bifurcate jelly-like mass containing the eggs, and on the left side a rather little egg-mass; the genital openings are not to be seen.

Limbs. The head has only two pairs of limbs (fig. 17), the antennules (a. 1) and the maxillæ (mx.). The form of these appendages is about as in the male. Other limbs are not found.

Inner organisation. The specimen was cleared in oil of cloves in order to show the inner organisation.

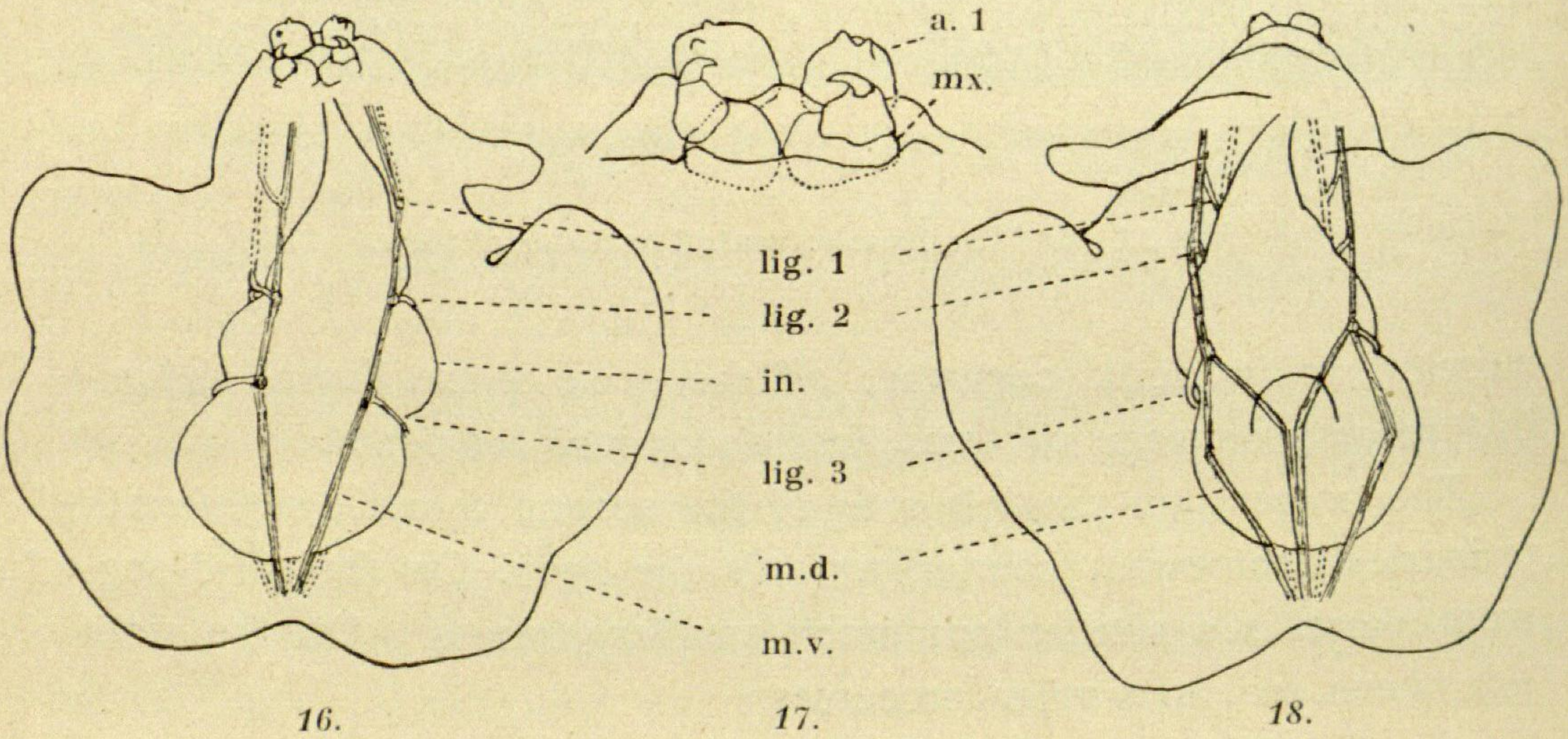
The ovaries can not be seen so distinctly that they can be drawn, and I have not at all been able to see the oviducts and genital openings.

The alimentary canal (figs. 16 and 18, in.). The mouth can not be seen distinctly enough to be drawn. The stomach is

a pear- or bottle-shaped sack ending blindly in the abdomen. The fore-end is tapering towards the mouth. Off the intervals between the third and fourth thoracic segments, and between the fourth thoracic segment and the abdomen, the stomach is narrowed by the dorso-ventral ligaments.

The nervous system I have not been able to see.

Muscles (figs. 16, 18). There is one pair of dorsal longitudinal muscles (m.d.), lying with an interval about as large as the breadth



16. *17.* *18.*

Figs. 16 and 18. The female, ventral and dorsal view.
Fig. 17. The head of the female, from below.
(For explication of the letters see p. 269).

of the intestine. The fore-end cannot be seen. At the interstice between the fourth thoracic segment and the abdomen each muscle is cleft into two branches; the inner branch meets with that from the other side just at the innerside of the three-angular dorsal process, and goes then along with each other to the hind end of the body; the outer branch has a curvature inside the hindmost pair of dorsal impressions and goes from there to the hind edge of the body where it meets with the medio-dorsal branch(es) and the two longitudinal ventral muscles (m.v.). — Also other muscles are found, but I cannot render an account of them.

Dorso-ventral ligaments (figs. 16, 18, lig. 1—3). At the same places where the dorsal and ventral muscles are attached off the intervals between the following segments: 2.—3. and 3.—4. thoracic segments, and 4. thoracic segment and the abdomen, three

pairs of ligaments are fixed inside the impressions mentioned above. Each ligament goes from a dorsal impression with its corresponding muscular insertion to a similar impression at the ventral side. The two hind-most pairs of ligaments narrow the stomach, especially the hind-most pair. —

The systematic position of this interesting species can not be ascertained. The male resembles very much that of *Chordeumium*, the position of which is also doubtfull (Jungersen, l. c. 1914, p. 18), but the females are quite different. The species does not seem to be closely related to any of the existing families. Unfortunately there are only two specimens (♂, ♀), both full-grown; if we had had earlier stages, it might have been possible to find out the relation to other families; but this is not the case.

23—2—18.