

**Article XIV.—OLIGOCHÆTA COLLECTED IN GREENLAND
BY THE CROCKER LAND EXPEDITION¹**

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The oligochæte collections of the Crocker Land Expedition, made by Dr. M. C. Tanquary, were sent to the writer for study and identification. In spite of the meagerness of the collections and the fact that they were all taken in one locality (Umanak, Greenland), the specimens are of considerable interest. Until recently (Smith and Welch, 1919) the whole arctic portion of North America was practically unknown territory so far as these animals were concerned. As pointed out in the above-mentioned publication, *Lumbriculus variegatus* (O. F. Müller), *Lumbricillus profugus* (Eisen), *Lumbricillus minutus* (O. F. Müller), and *Enchytræus albidus* Henle were reported from Greenland many years ago and constituted the only records for the great expanse of territory between that country and Bering Strait until the recent publication of the results of the Canadian Arctic Expedition, which gives some indication of the oligochæte fauna in arctic America. The Crocker Land Expedition material, in a general way, completes the survey of this group across the continent.

Two recognizable species, *Lumbriculus variegatus* (Müller) and *Mesenchytræus falciformis* Eisen, and another unidentified form, *Mesenchytræus* species, comprise the collections. *Lumbriculus variegatus* was common in the Canadian Arctic Expedition collections and now the old record of this form in Greenland, made by Eisen in 1872, has been definitely confirmed. Representatives of *Mesenchytræus* are reported in Greenland for the first time, although they were to be expected since the genus is known to have a wide distribution in the arctic portions of the whole northern hemisphere. Both of the recognizable species of these collections occur in arctic Eurasia. A list of the literature dealing with the North American species of *Mesenchytræus* will be found in a previous publication (1919) by the writer.

ENCHYTRÆIDÆ

***Mesenchytræus falciformis* Eisen**

One of the collections, made at Umanak, Greenland, June 22, 1914, contained twenty-three specimens, eleven of which are sexually mature. The remaining twelve specimens exhibit varying degrees of immaturity

¹Contribution from the Zoological Laboratory of the University of Michigan.

and were of little assistance in the determination of the species. The only other information accompanying the collection is that they were found "in fresh water stream."

A study of these enchytræids based upon serial sections and cleared whole mounts showed a very close agreement with the descriptions of *Mesenchytræus falciformis* Eisen. While the latter has not been as completely described as is desirable, yet enough is known about Eisen's original material to make it safe in identifying this Greenland form as *falciformis*.

EXTERNAL MORPHOLOGY.—Body cylindrical, elongate, slender, smooth; of about same diameter throughout, except in region of clitellum and extremities. Length of mature specimens (alcoholic), 6–9 mm.; maximum diameter (clitellar region), approximately 0.5 mm. Segmentation feebly marked externally, except in region of extremities. Surface between intersegmental grooves smooth; no secondary annulations. Somites, 32–48; average of eleven mature specimens, 42. Clitellum on 11–13; margins poorly defined; relatively thin; continuous about body. Setæ typically mesenchytræid; sigmoid; in four fan-shaped bundles per somite; 2–4 in lateral rows, 2–6 in ventral rows. Prostomium blunt, smooth, rounded. Head-pore on tip of prostomium. Color (alcoholic specimens), very light yellow. No evidence of pigmentation in body-wall.

INTERNAL MORPHOLOGY.—Lymphocytes sparse, small, scattered throughout cœlom; loaded with granules, apparently pigmental. Brain about as long as wide; posterior margin very slightly concave; anterior margin distinctly emarginate, lateral margins straight and converging cephalad; close agreement with original figure by Eisen (1879, Pl. I, fig. 2*d*). Nephridia of typical mesenchytræid structure; anteseptal part composed only of nephrostome borne on short, slender pedicel; post-septal part enlarged, irregular, compressed; efferent duct arising from ventral surface near septum. Spermiducal funnel very small; length about twice diameter; collar small, flaring; sperm-duct short, thick, irregular, about 5–6 times longer than funnel; diameter of duct greater than that of funnel. Dorsal blood-vessel arising in 16; cardiac body apparently absent. Sperm-sacs two in number; short, extending only into 13; containing masses of sperm in mature specimens. Ovisac single; extending into 16. Penial bulb very small; simple, but one set of glands within bulb proper; apparently no muscle strands within bulb except at base; periphery of bulb covered with envelope of loosely associated gland-cells, exact relation of latter to bulb uncertain; atrium and atrial

glands absent. Spermathecæ small; short, confined to 5; simple; no diverticula; about same diameter throughout length; end blindly; no evidence of connection with digestive tract; no glands at ectal opening.

Discussion

CARDIAC BODY.—The apparent absence of the cardiac body in these specimens deserves comment. In spite of the good state of preservation of the material the writer has been unable to discover any structure in the dorsal blood-vessel which could be positively identified as the cardiac body. Its presence is usually regarded as one of the constant features of members of the genus *Mesenchytræus*. In the material studied by Michaelsen (1887, p. 370) this body was found to be thin, very slightly swollen, and composed of few cells. In the Greenland material the writer found a few hints of what may possibly be a very much reduced cardiac body but a definite conclusion was not possible.

PIGMENT.—Evidence of the presence of pigment in this species was found in the lymphocytes, which are heavily loaded with a dark granular non-staining material resembling that in the lymphocytes and certain other internal organs of some of the glacier enchytræids (Welch, 1916). One of the specimens shows a considerable amount of granular, non-staining material in the chloragog cells throughout the body. This material is in the form of minute particles, scattered more or less uniformly throughout the cytoplasm.

OVISAC.—In the original description, Eisen (1879, Pl. xv, fig. 46) appears to indicate the presence of two ovisacs which extend caudad into 16. Michaelsen (1887, p. 371) reported the ovisac as single, median, and extending into 19. In the Greenland material the ovisac agrees with Michaelsen's description, except that it extends only into 16. However, the distribution of the developing egg-masses is such that perhaps the apparent discrepancy between the accounts of Eisen and Michaelsen can be accounted for. In cleared, whole specimens the ovisac does appear as a double structure, one part on each side of the digestive tract, but a close scrutiny of serial sections reveals that while the ovisac is median in position the egg-masses lie in two more or less parallel, longitudinal rows to the right and left of the median line and at the medial line the dorsal and ventral walls of the ovisac are in very close proximity, often in actual contact. Thus a distinct double appearance is given in gross preparations and possibly Eisen's figure might have been based upon such a condition.

PENIAL BULB.—The penial bulb in this species seems to depart somewhat from the mesenchytræid type of structure which prevails throughout the genus *Mesenchytræus*. From the material at hand it has been very difficult to determine the finer details of structure and it may be that it represents a very simplified form of mesenchytræid bulb. The atrium, atrial glands, and accessory glands appear to be lacking. In serial sections the bulb consists of a distinct invagination of the body-wall surrounded by cells, apparently of one kind, which form the main body of the organ. The peripheral part of the bulb is composed of a loosely constructed layer of cells, seemingly glandular in nature, which merges into the wall of the sperm-duct. The writer has been unable to determine from these Greenland specimens the exact nature of this peripheral mass of tissue. It seems unlikely that it is some modified form of the atrial glands. Possibly it represents the peripheral gland-cells which appear in the bulb of certain species having the lumbricillid type of structure, but the line of separation between the two kinds of cells is very prominent—much more so than in lumbricillid bulbs. In some of the preparations there is distinct evidence that the muscles of the body-wall extend up along the line of division for a short distance. If this mass of loosely constructed tissue is really a part of the body of the bulb, then there is a small amount of muscle-tissue within the bulb at its base, thus resembling to some extent, the distribution of muscle-tissue in the penial bulb of *Mesenchytræus unalaskæ* (Eisen, 1905, p. 21, fig. 1*e*). The sperm-duct appears to empty directly into the penial invagination.

The structure of the penial bulb in this species seems to exhibit a departure from the definition of the genus (Welch, 1920), although the other characters are clearly mesenchytræid and there is no doubt as to the generic determination of the specimens. However, the condition of the material is such that the presence of much-reduced structures characteristic of the mesenchytræid type might not be recognizable. If such structures be present, they are exceedingly small.

Mesenchytræus species

One collection made at Umanak, Greenland, June 1, 1914, contained nine specimens, all of which are badly contorted and represent various degrees of immaturity. Only three worms were sufficiently straight to permit sectioning or mounting and these constitute the only individuals which received detailed, internal examination. None of the three are completely mature and positive specific identification is, therefore, impossible. However, sufficient data were secured from both internal

and external characters to show definitely that the material belongs to the genus *Mesenchytræus*. In a number of respects resemblance to *Mesenchytræus falciformis* is evident, and it is possible that these worms may be immature stages of this species, since the collection was made at an earlier date than the foregoing one. However, there is nothing to indicate that the two collections were made in the same habitat since the only other information accompanying the material is that the specimens were found "in damp moss."

LUMBRICULIDÆ

The collections contained one specimen taken at Umanak, Greenland, July 2, 1914, from the bottom of a fresh-water lake. This specimen was submitted to Professor Frank Smith, of the University of Illinois, who kindly made the necessary identification and who furnished the following description.

Lumbriculus variegatus (O. F. Müller)

"The single specimen of this species in the collection is obviously incomplete posteriorly, and has 69 somites, with evidence of others in an early stage of development at the posterior end. The maximum diameter of the body is 1.06 mm.

"The specimen was not in a state of sexual activity, and the reproductive organs are only partially developed. Since the positions of these organs in this particular species are subject to wide variation, it is desirable to have records preserved of all accurately determined data concerning such positions. Spermaries and vestigial spermiducal funnels are present in somite 8, and what appear to be ovaries and vestigial oviducal funnels are present in somite 9. In the right side of somites 10 and 11, and the left side of somite 10 are very small structures resembling gonads, though probably at no time having such function. There are no recognizable atria nor spermathecæ, and their location cannot be determined with certainty.

"Eisen (1872, p. 122) has reported *L. variegatus* from Greenland, but the basis for the identification of the Greenland specimens with that species has been considered insufficient by some investigators. The same species has recently been reported (Smith and Welch, 1919, p. 4) from various localities in North America near the shores of the Arctic Ocean and has previously been known in similar latitudes in Europe and western Siberia."

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