

Es wäre somit für Herrn Scudder eine neue Vertheidigung seiner Bestimmungen nöthig, die aber nicht, wie die gegenwärtige, nur Irrthümer enthalten darf, wenn er seine Ansichten von der Wissenschaft angenommen zu sehen wünscht.

## 7. The Morphology of Cyclops and the Relations of the Copepoda.

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(Abstract.)

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This paper opens with a full anatomical description of *Cyclops brevicornis* Claus, worked out in great part by the method of sections. The chief new points made out are as follows: — In the skeleton a free entosternite is demonstrated in the maxillary region, and homologised with the tendon of the adductors of the valves of the bivalve Entomostraca. A large post-maxillary apodeme in all Copepoda gives attachment on either side to the great flexors of the trunk. A spring arrangement is shown to relax the flexed male antennule used as a clasper. Pore-canals, cells, or cutaneous glands each receive a nerve-fibre at their proximal end. The hypodermal cells have a polygonal outline.

Under the mesoblastic tissue, Friès discovery of amœboid cœlomic corpuscles is confirmed. The apparatus of deglutition is fully described, and the author has made out a pair of salivary glands in the epistoma whose ducts join to open on the back of the labrum by a median pore. In connection with the alimentary canal, the mechanism of circulation and anal respiration is described, the efficiency of the latter being strongly maintained.

The kidney or »shell gland« is shown to be a simple much-coiled tube, with chitinous lining, opening at the base of the outer maxilliped. Incidentally the presence of this organ is noted in several divisions of the marine *Copepoda*, and the author suggests that it is identical with the »antennary gland« of similar structure of the Nauplius larva, which would have shifted its aperture.

A full description of the nervous system follows. The presence of ganglion-cells in the circumœsophageal cords is noted and used as an argument for regarding the (2nd) antennae innervated therefrom as oral rather than postoral appendages.

The presence of corneal facets to the lateral ocelli is noted, and an attempt is made to connect what the author has described elsewhere as auditory organs with the unicellular pore-canal glands.

The views of Gruber on the reproductive organs are confirmed. The sexual ducts are described as outgrowths from the sexual glands, themselves derived from a pair of cells of the serosa of the gut of the Nauplius as stated by Frič. About 32 spermatozoa appear to be formed from each male ovum or spermatospore. The author is inclined to accept Gruber's view that the expulsive bodies of the spermato-phore are a second form of spermatozoa.

The author then proceeds to a discussion on the position of the *Copepoda*. He adduces the following points.

a. The plasticity of the eye, derived from the triune inverted eye of the Nauplius and the absence of paired compound eyes.

b. The biramous condition of the swimming-feet, and the characters of the appendages generally, especially the plasticity of the maxillæ.

c. The slight development of the pleura.

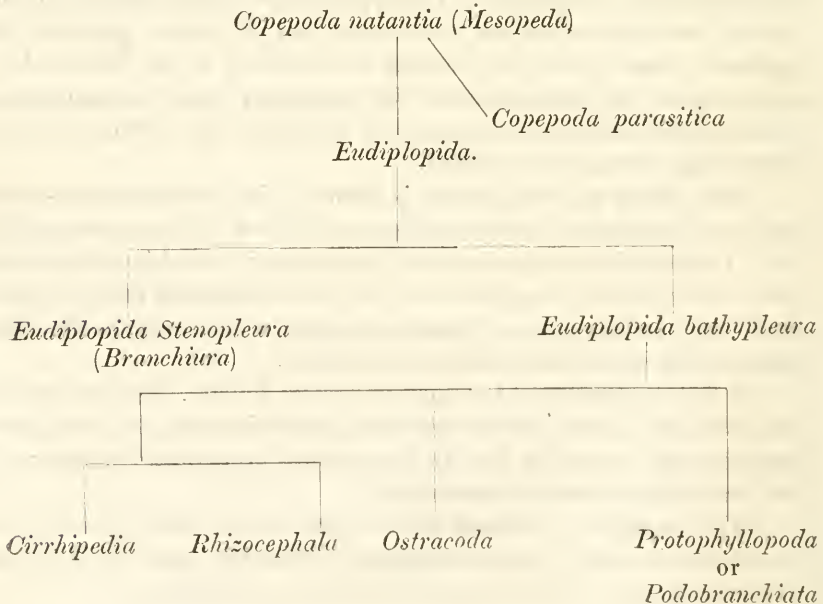
d. The absence of gills, and the functional anal respiration.

e. The plasticity of the fore part of the alimentary canal.

f. The circulation and heart.

g. The general correspondence of the form of the body with that of the Protozoa and Zoea larva.

By converging arguments from these points, it is shown that *Copepoda* would represent the most primitive Crustacea, from which the others can be derived according to the following phylogeny.



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