

that of other Crustaceans which pass through this same larval stage. Since the development of the Copepoda is supposed to be a highly typical one, and since the comparison of these animals with the higher Crustaceans presents no great difficulties, the aim of the researches has been to homologise parts of the body—and especially the appendages—of the Cirripedia with those of the Copepoda. In this department the papers of Claus<sup>1</sup> take the first place. His last publication on the subject appeared in 1876, and in it he proposes the following homologisation of the appendages:—

The first pair of appendages of the Nauplius becomes in Cirripedia, as well as in Copepoda, the first antennæ. In the Cypris-stage of the Cirripedia these antennæ are well-developed, in the full-grown animal only rudimentary.

The second pair of appendages of the Nauplius, which in Copepoda develops into the double-branched second antenna, is cast off by the Cirripedia.

The third pair of appendages (*loc. cit.*, p. 76) in Copepoda changes into the mandibles, and in the development of the Cirripedia is cast off like the second pair (according to Metschnikoff,<sup>2</sup> and v. Willemoes Suhm).<sup>3</sup> According to Claus, it becomes the mandible. If the latter suggestion be right—but it is only supposed and has not been actually observed by Claus—the mandibles of both orders of Crustaceans are homologous.

Behind the third pair, a fourth pair of appendages has appeared. This pair, in the development of the Copepoda, becomes the maxillæ; in the advanced Nauplius-stage of the Cirripedia a double pair of knobs make their appearance in the same place; from the outside one, according to Claus, the maxillæ may develop, while the other one evidently produces the second maxilla (inner maxilla, Darwin). According to Metschnikoff, the mandibles and the maxillæ of the Cirripedia are together developed from this fourth pair of outgrowths.

As to the following pairs of appendages, the Copepoda will be spoken of first: a fifth pair of appendages has made its appearance behind the fourth; these are the maxillipeds, which, though double-branched, represent only one pair of limbs. Behind the maxillipeds are two new pairs of double-branched outgrowths; these eventually become the first two pairs of thoracic appendages (paddles, rowing-feet). The fourth and fifth pair of appendages belong to that part of the body, according to Claus,<sup>4</sup> which is covered by the cephalic shield; this seems to prove that he considers the sixth and seventh pair as not being placed under this shield, a suggestion which is, moreover, in accordance with his figure 4 on pl. xix. Neither is the carapace of the full-grown animal truly cephalic, since it also covers the first somite of the thorax; four distinct thoracic somites, each furnished with a pair of appendages, succeed the carapace, and behind this

<sup>1</sup> Claus, C., Die morphologischen Beziehungen der Copepoden, Phyllopoden, Cirripeden, &c., *Würzburger Naturw. Zeitschr.*, iii. 1862; Die Cypris-ähnliche Larve der Cirripeden und ihre Verwandlung, *Schrift. der Ges. zur Beförd. d. gesamt. Naturw.*, 1869; Untersuchungen zur Erforschung der genealogischen Grundlage des Crustaceen-Systems, Wien, 1876.

<sup>2</sup> *Sitzungsber. der Versamml. deutsch. Naturf. zu Hannover*, 1865, p. 218.

<sup>3</sup> Willemoes Suhm, R. von, On the development of *Lepas fascicularis*, *Phil. Trans.*, clxvi., 1875.

<sup>4</sup> *Untersuchungen, &c.*, p. 75.