

The Development of Penæus is only approximately known. Fritz Müller's statement¹ that the brephalos is a Nauplius has been fully accepted by some and cautiously received by others, and the recent researches of Professor Brooks on the genus *Leucifer* have strengthened the belief that the brephalos of *Penæus* may be in the Nauplius form also.

The observations made on the development of other forms of Macrurous Crustacea have shown that many closely associated species produce their young in very distinct stages of development. Thus the brephalos of *Crangon vulgaris* differs largely from that of *Crangon arcticus*, the former being in the Zoea, and the latter in the Megalopa stage, and that of *Homaralphæus* differs in the same degree from that of *Alphæus*, and yet the parents cannot be distinguished from each other.

Fritz Müller described a Nauplius which he found in the open sea, and supposed to be the young of *Penæus*.² It is destitute of distinct somites, pyriform in shape, rounded in front, 0.4 mm. in length, and 0.2 mm. in breadth at the widest part, which is just behind the head, and gradually narrowing posteriorly until at its caudal extremity the breadth is just one-fifth of the length of the animal, and it terminates on each side in one long and one short spine. In the centre of the anterior margin is a small, black, clearly defined ocellus. To the ventral surface are attached three pairs of appendages. The first is single-branched, furnished with a few simple hairs, and situated close to the frontal margin; the second is immediately behind the first, it is biramose, and has both its branches furnished with ciliated hairs. These two pairs of appendages are nearly as long as the animal, but the third pair is only half that length, and like the second it is biramose and furnished with ciliated hairs on each branch.

The animal at this stage is rather opaque and of a brownish colour, darkest towards the extremities of the appendages. It is by these little appendages that the young creature swims, lashing the water, as Fritz Müller says, like a man swimming perpendicularly with outstretched arms, and having slender willow branches in his hands.

In the next developmental stage the animal is 0.5 mm. in length. The colour and appendages are the same, but the posterior extremity of the animal is prolonged into two thick processes, at the apices of which there still exist the two long spines as in the previous stage; to these several less prominent ones have been added. The number of hairs attached to the anterior appendages has increased also. At this stage the first indication of the carapace is seen in the presence of a transverse line across the dorsal surface of the animal.

¹ Fritz Müller, Die Verwandlung der Garneelen, Erster Beitrag., pp. 8-23, Taf. xi., 1863; *Archiv f. Naturgesch.*, Jahrg. xxix. Bd. i. pp. 8-23, 1863; *Ann. and Mag. Nat. Hist.*, vol. xiv. p. 104, 1864.

² Fritz Müller, *loc. cit.*, p. 9, pl. xi. fig. 1.