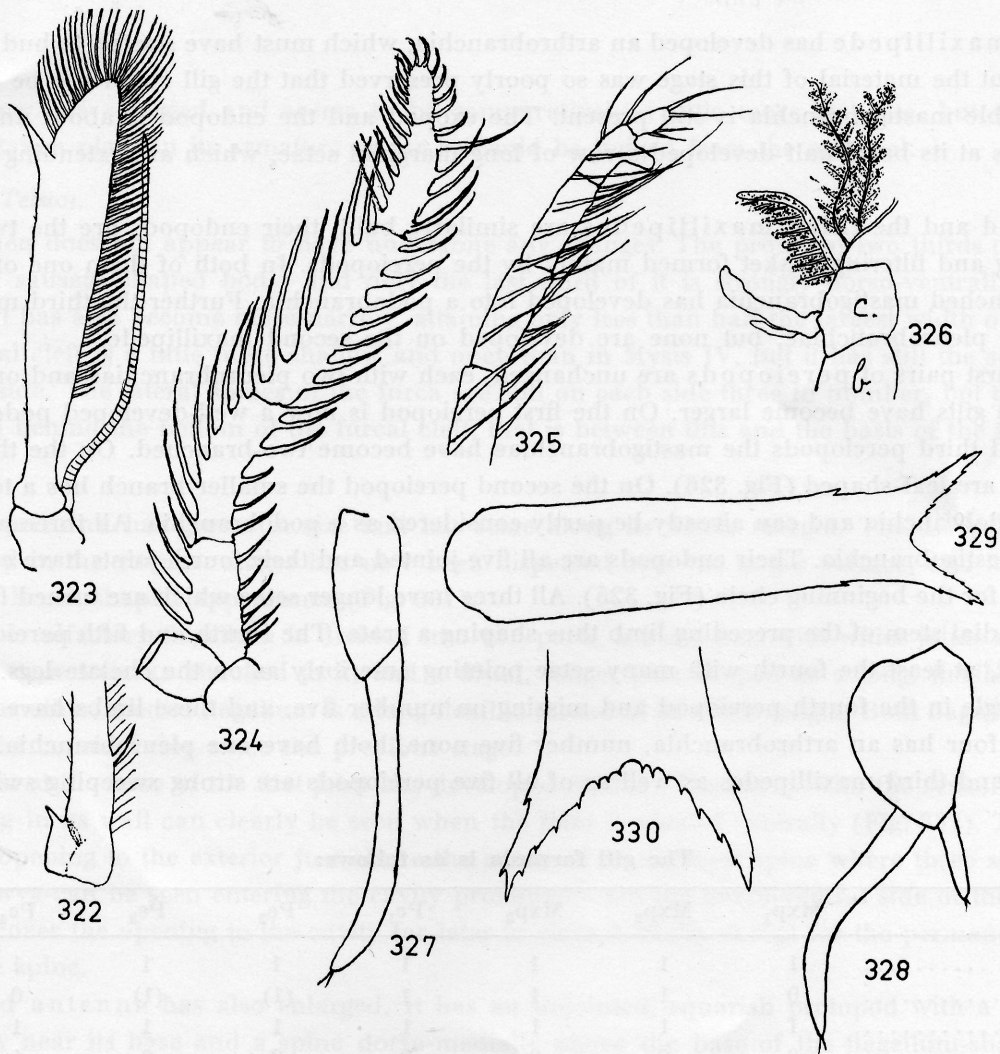


*Abdomen and Telson.*

The abdomen has grown from 10 to 16 mm in length. It is especially the sixth segment which has grown, and it is now a little longer than the preceding five segments together. The spines on each segment are still prominent, and the three first segments have developed large pleura, the last segment has no pleura and the fifth only small pleura.

The furcal cleft of the telson has become a little more shallow, and the proximal half of the telson has swelled into a sausage-shaped body tapering distally so that its distal third is shaped as a flattened plate.



Figs. 322-330. *Cerataspides longiremis*. Fourth Mysis. Fig. 322, basal part of first antenna from ventral. — Fig. 323, second antenna. — Fig. 324, endopodial branch of second maxillipede. — Fig. 325, endopodial branch of first pereopod. — Fig. 326, protopod of third pereopod with gill filaments. — Fig. 327, first pleopod, showing protopod and exopod and no endopod developed. — Fig. 328, fourth pleopod with the larger exopod and the smaller endopod. — Fig. 329, telson. — Fig. 330, tip of telson.

Inside the furca are still seven spines on each lobe, and laterally on the telson are on each side the characteristic three spines of the Penaeidae.

*Appendages.*

The first antenna has developed setae along nearly its whole length, laterally as well as medially (Fig. 322). These setae were in the previous stage only placed terminally on the second joint and from the third joint to the tip of the appendage. Laterally at the base is a well-developed statocyst spine, but the cavity

for the statocyst is only very narrow. Both flagella of the first antenna have grown in length and are annulated from base to tip.

Also the second antenna has changed. The antennal scale has a large antennal spine more laterally pointed than in the younger stages, and from this spine along the rest of the lateral margin, around the tip, and almost to the basis of the medial margin is now the usual fan of setae. The endopodial flagellum is now nearly as long as the antennal scale.

The mandible has developed a few more setae on the palp. The palp on the first maxilla is now longer, but more delicate. The second maxilla has lost the segmentation of the endopod, and the four endites have enlarged.

The first maxillipede has developed an arthrobranchia, which must have started to bud already in the third Mysis, but the material of this stage was so poorly preserved that the gill could not be observed. The large and double mastigobranchia is still present. The exopod and the endopod is about unchanged, only the exopod has at its basal half developed a row of long marginal setae, which are extending medially over the endopod.

The second and the third maxillipedes are similarly built, their endopods are the two first "ribs" in the catching and filtering basket formed mainly by the pereopods. In both of them one of the branches of the two-branched mastigobranchia has developed into a podobranchia. Further the third maxillipede has developed two pleurobranchiae, but none are developed on the second maxillipede.

The three first pairs of pereopods are unchanged, each with two pleurobranchiae and one arthrobranchia, but these gills have become larger. On the first pereopod is now a well-developed podobranchia. On the second and third pereopods the mastigobranchiae have become two-branched. On the third pereopod both branches are leaf-shaped (Fig. 326). On the second pereopod the smaller branch has a toothed surface as the later podobranchia and can already be partly considered as a podobranchia. All three pairs of pereopods have a mastigobranchia. Their endopods are all five-jointed and their fourth joints have each developed a lateral bulge for the beginning chela (Fig. 325). All three have longer setae which are turned forward reaching the endopodial stem of the preceding limb thus shaping a grate. The fourth and fifth pereopods are now well developed, at least the fourth with many setae pointing anteriorly as on the chelate legs. The mastigobranchia is single in the fourth pereopod and missing on number five, and these limbs have no podobranchia. Number four has an arthrobranchia, number five none, both have one pleurobranchia. The exopods of the second and third maxillipedes as well as of all five pereopods are strong sweeping swimmerets.

**The gill formula is as follows:**

	Mxp <sub>1</sub>	Mxp <sub>2</sub>	Mxp <sub>3</sub>	Pe <sub>1</sub>	Pe <sub>2</sub>	Pe <sub>3</sub>	Pe <sub>4</sub>	Pe <sub>5</sub>
Mastigobranchia .....	1	1	1	1	1	1	1	0
Podobranchia .....	0	1	1	1	(1)	(1)	0	0
Arthrobranchia .....	1	1	1	1	1	1	1	0
Pleurobranchia .....	0	0	2	2	2	2	1	1

In the pleopods a division has taken place between the protopod and the rest of the limb. In the first and second pairs no trace of an endopod is visible, but there is a normal-sized protopod and a rather long exopod tipped with two small, embryonic setae (Fig. 327). On the third pleopod the protopod and the exopod are about the same as in the previous stage, but there is a minute bud on the protopod near the basis of the exopod representing the coming endopod. On the fourth pleopod the protopod is large and swollen, and the endopod has developed to about one third the length of the exopod (Fig. 328), both are tipped with two embryonic setae. The fifth pair of pleopods has a still larger endopod of about two thirds the length of the exopod. The protopod is here of the same shape as that of number four.

In the uropods the endopod has retained its normal shape, whilst the long, band-like exopod, serving as a buoyancy organ, has become even longer.

*Dimensions.*

Total length 40 mm; length of carapace 6.5 mm, height of same 4.5 mm; length of rostrum 14 mm; length of abdomen 16 mm; length of telson 4 mm.

**Mysis V.**

Figs. 300, 331-344.

This stage was represented by two badly damaged specimens, but from the size of the carapace and the further development of the appendages the stage can be assumed to be the stage following the last described stage.

*Carapace.*

The carapace has enlarged and seems to be comparatively a little more elongate, but no outstanding changes have taken place in its armature as far as could be judged from the material.

*Abdomen and Telson.*

The abdomen does not appear to have undergone any changes. The proximal two thirds of the telson is swollen into a sausage-shaped body, and only the last third of it is strongly dorso-ventrally compressed. This distal part has also become more narrow, attaining only less than half the largest width of the proximal part. The furcal cleft is a little more shallow and open than in Mysis IV, but it has still the seven teeth-like setae on each side. The lateral spines of the furca are still on each side three in number, but the central one is now situated behind the bottom of the furcal cleft, that is between this and the basis of the telson.

*Appendages.*

The first antenna has grown in size and has setae along its whole margin. The distal brush of setae which appeared in the younger stages has now been dispersed over the larger surface, and it therefore has lost part of its brush-shaped appearance (Fig. 331).

The lateral or olfactory flagellum is divided into two parts, a basal part with wider joints and with some olfactory hairs or aesthetascs attached to it, and a distal, longer part shaped as a long, flexible thread with many rings. The other, medial flagellum is a long flexible thread in its whole length. Both flagella have increased their lengths considerably since the previous stage.

The statocyst at the base of the first joint has developed further. The cavity with the sensory-static nerve-cells developing in its wall can clearly be seen when the joint is viewed ventrally (Fig. 332). The cavity has its permanent opening to the exterior just above the antennal or statocyst spine where three small hairs are placed. The nerve can be seen entering the cavity proximally. On the latero-ventral side of the cavity a flap has started to cover the opening to the cavity for later to close it totally except for the permanent opening at the base of the spine.

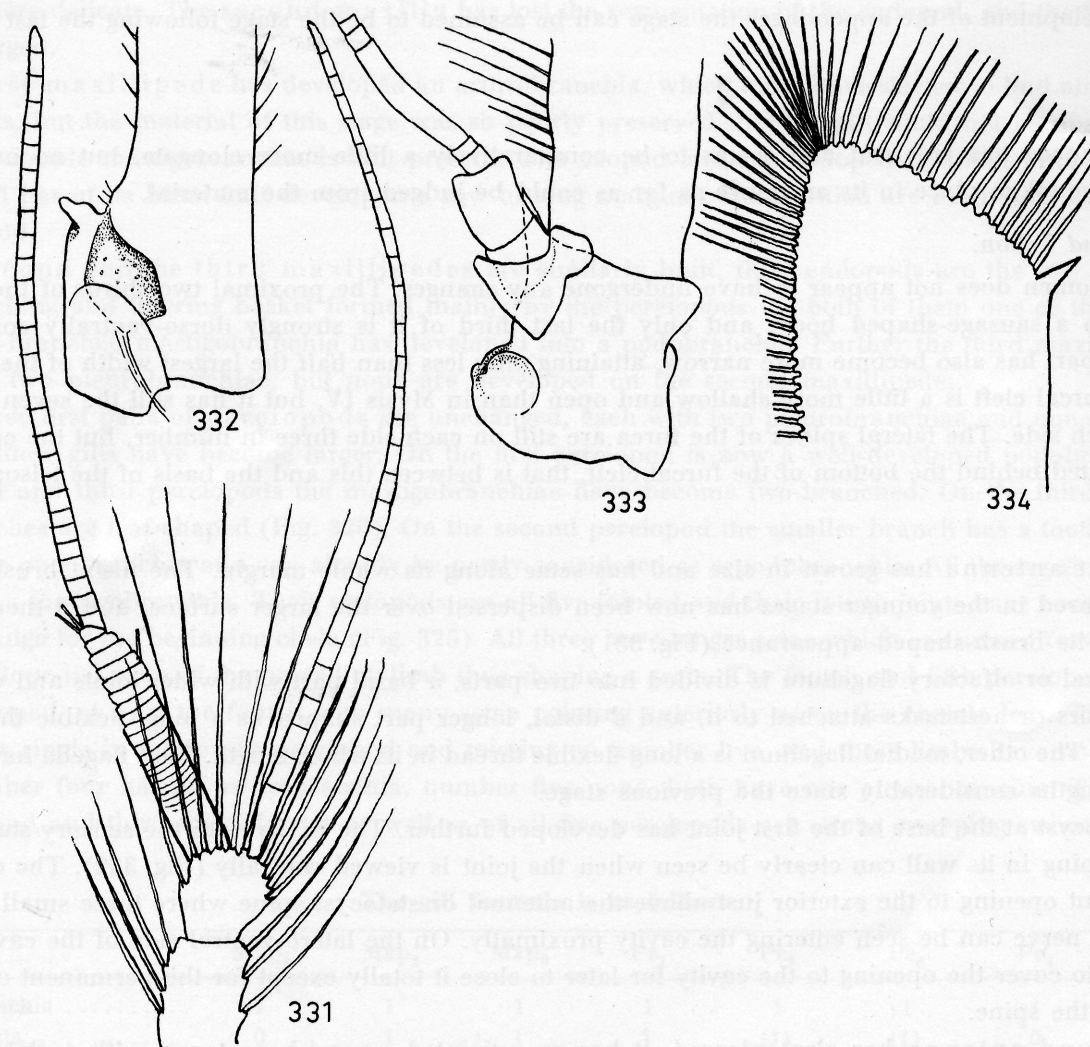
The second antenna has also enlarged. It has an unjointed, squarish protopod with a globular bulb ventro-medially near its base and a spine dorso-medially above the base of the flagellum-shaped endopod (Fig. 333). The endopod has three basal joints followed by a long flagellum which now is longer than the antennal scale. The exopod or antennal scale has become more squarish distally (Fig. 334) and has a well-developed disto-lateral spine, thus differing from *Cerataspis* where this spine either was missing or only vestigial.

The mandible has a large corpus mandibulae. The pars incisiva has still only a single tooth from which a long cutting edge runs to the molar part. This edge is merely knife-shaped without any single teeth, and is so very characteristic for both *Cerataspis* and *Cerataspides*. In *Cerataspides*, however, the edge is especially long and nearly straight. The molar part is only very small and seems rather unimportant. The palp is still three-jointed, and several more setae have developed on it.

On the first maxilla the basi-endite is the largest and furnished with strong, setiform cutting and tearing teeth. The coxa-endite has now several more brushing setae. The palp has grown a little longer and is tipped with three setae.

The second maxilla is provided with four long endites and an endopod which has become un-jointed, but the setae on its medial margin are placed in indentations indicating the previous divisions between the joints. Very characteristically the endopod has a series of setae along its lateral margin towards the exopod. The exopod is large and curved with both an anterior and a posterior lobe.

The first maxillipede has developed a second series of setae behind the marginal ones on the lateral side of the flattened protopod. The endopod is five-jointed with the basal joint being the largest. The exopod



Figs. 331-334. *Cerataspides longiremis*. Fifth Mysis. Fig. 331, tip of first antenna. — Fig. 332, basal part of same from ventral. — Fig. 333, basal part of second antenna from ventral. — Fig. 334, distal part of antennal scale.

has a long, unjointed basal part terminating in a shorter and weakly jointed part with a pair of short, vestigial setae on each joint. This distal section is bent a little medially and appears with its small size as an only vestigial appendix. The lateral margin of the basal part of the exopod is extended into a lunular lobe with long setae along its margin and bent along its longitudinal axis over the stem of the exopod so that the lateral marginal setae are pointing medially. The appendage has a large double mastigobranchia and a smaller arthrobranchia.

The second maxillipede is a grasping and filtering organ. On the coxa is an elliptical mastigobranchia, a shorter podobranchia, a large arthrobranchia, and a small pleurobranchia. Especially in this stage it was very difficult to count the gills on the different limbs because some of them had decayed and a few had been lost, but I have tried as far as possible to examine their placement. For this stage I am in general agreement