

is facing towards the water current. Body movements of the host drive water into the cavity between the elytra which are then depressed, expelling water at the posterior end of the worm. That the bivalves should be attached upside down can be explained by assuming that this position would allow the maximum freedom for entry of the inhalant current seeing that they lie in a relatively deep depression.

One specimen contained incubated larvae at the prodissoconch stage, and larvae, if liberated from the mantle cavity as swimming veligers, would probably pass out of the host with the respiratory stream. How the new host is located is unknown, but the young bivalves may possibly enter by chemotaxis in the inhalant stream. A juvenile measuring 1.05mm in length was amongst the specimens suggesting settlement at an early juvenile stage.

After the above was written two juveniles and two adults of this species were found attached to a specimen of *Aphrodita australis* from off Portland Island, Hawke's Bay, 39° 42.2' S., 177° 28.8' E., dredged in 42 fathoms by the New Zealand Oceanographic Institute (Station C826). One specimen showed ferric oxide staining.

DISCUSSION

The Leptonacea are a large group of conchologically rather featureless genera and species. Until satisfactory anatomical work is carried out the systematic position of many genera will remain in doubt. The genus *Arthritica* is clearly a member of the family Leptonidae as defined by Pelseener (1911). The tentaculate mantle margin, double ctenidium and lack of shell reduction when compared with most galeommatids, are characters shared by all the members of the family. The characteristic morphological features of the genus are as follows:—

1. The mantle tentacles are short and of equal length.
2. The mantle edges do not overlap the shells.
3. The foot is large but is not capable of great elongation, tending to remain spread along the whole ventral margin when the animal is crawling. It has a well formed posterior heel and long byssal groove.
4. The peculiar lateral pedal apertures leading to a glandular or sensory part of unknown function.
5. The anterior inhalant siphon is hood-like.
6. The labial palps are notably larger than those of other leptonacids.

Primitive features of the genus include the well developed hinge and completely closed shell, small mantle tentacles and absence of any reflection of the mantle over the shell. *Arthritica* also shows several specialised structures including the foot which has departed from the primitive digging "tongue" of "normal" lamelli-branches. The peculiar lateral pedal pores are undoubtedly specialized as is the well-developed anterior siphon.

The presence of free living and commensally associated species within the same genus showing very similar shells and with few (if any) noticeable morphological differences points to a relatively recent evolution of commensalism.

Incubation of larvae has been observed in *A. crassiformis* and *A. hulmei* and probably occurs in *A. bifurca* also. Incubation is a deep-seated feature of the Leptonacea enabling them to live in highly specialised habitats, because their young will not stray far away. One group, the Erycinidae have even developed a high tidal form, *Lasaea*, which incubates its young to a stage where they can crawl, thus eliminating the need for a planktonic stage.