

force it out. It is certain, however, that they have some connection with the respiratory system. The functions of the pile were long since recognized by Burmeister.<sup>9</sup>

Hereafter follow the notes made from the various instars bred :

Ovum.—Shape: Imperfectly oval, the upper end being the more pointed, the lower rounder. Size: Long., 2 mm.; lat. 1 mm. at widest part. Colour: Light yellowish-brown, shading into dark brown, nearly black at the upper end. When freshly occluded, the ova are of a light yellowish hue. Markings: Under a high power (150 diameters) the corium is seen to be shagreened with very small graining, otherwise entirely free from the more usual condition of ornamentation in the Hemiptera. During incubation the ovum increases in size and changes in form. Just before emergence it is as follows:—Shape: Elongate oval, noticeably tapering from the apex to the base. Size: Long., 3 mm.; lat., 1.1 at greatest breadth.

The ova, as already noted, are deposited by the female on the back of the unwilling male. They are embedded about half their length in the waterproof glue mentioned previously. The preceding descriptions of the ovum are not perhaps as accurate as they should be, since they have been drawn up from alcoholic material. The peculiarity of growth during embryonal development is not unusual, the ova of the various water-bugs I have bred showing it more or less, but none so markedly.<sup>10</sup>

The 200 or more ova occluded in my aquaria had a period of incubation of between six and twelve days. The ova from which were raised the three individuals carried through to maturity, took respectively seven and two eleven days. As a general rule, the greater part of the eggs hatch simultaneously, and the male then sheds its unwelcome burden, the unhatched remainder, if fortunate, emerging a day or two later. The nymph comes out through a round lid that splits off the top of the egg and is attached thereto by a hinge extending about one-quarter the circumference. The process of emergence I very fortunately saw, and the following account is a transcript of my notes made as the little bug came out of its shell. After the round lid is split off, the head is gradually pushed out. By slow successive heaves, the remainder of the body is drawn out until it stands erect, with the chorion as a base, holding the posterior

9. Handbuch, Vol. II, p. 195.

10. Cf. Bueno, Journal New York Entomological Society, Vol. XI, p. 168.