

Over the last four stadia two pointed lobes appear on the posterior border of sternite nine (Figs. 8 and 9) which contain the developing claspers in the male and the egg valve in the female. Males can be distinguished at this stage by the presence of two segments in each lobe, in contrast to the unsegmented lobes of the females. Segment ten is rounded and consists, according to Needham (1935), of the epiproct and paraprocts of segment 11 in addition to its own elements. As in many Siphonuridae the median caudal seta is short. The lateral setae consist of tapering segments each bearing a circle of large spikes at the posterior ends and smaller spikes and bristles intersegmentally. The caudal setae are used in swimming, particularly when the nymph is rising to the surface before emergence as a subimago, and are also probably sensory; nymphs crawling backwards swing segment ten and the setae from side to side and tap the substratum with the latter.

The thorax is heavily chitinized and humped dorsally. The pronotum is narrow longitudinally and wide transversely; its posterior limit with the metathorax is marked by an emarginate suture. The mesothorax accommodates, in the later instars, the large developing wing muscles and wing buds, and is fused to the metathorax which bears the smaller hind wing buds, the two forming a synthorax. The prothoracic legs consist of basal coxa, trochanter, a large flattened femur, tibia and tarsus, the latter with a single claw. The meso- and metathoracic legs are similar. Both the pro- and mesothoracic legs have two parallel lines of bristles on the anterior edge of the femora which are used, as discussed later, in feeding.

The larger part of the head capsule consists of the epicranium (Fig. 10) which is considered to be composed of fused vertex, occiput and genae. It is bisected medianly by the epicranial (or coronal) suture which bifurcates anteriorly into two frontal sutures. The fronto-clypeus occupies the area between the latter and the antero-lateral margin of the head and contains the median ocellus and antennae. The clypeus is distinct, rectangular, and overlies the labrum. The basal scape of the antenna is short and thick, the pedicel is twice the former's length, and the antennal segments number up to approximately 40. The compound eyes of the male nymph are relatively larger than those of the female and are reddish in their inner halves (cf. Figs. 10 and 11). In contrast the female eyes are relatively wider apart, uniformly dark brown, and the distance between the lateral ocelli is less. The mouth-parts of the nymph, consisting of labrum, mandibles, maxillae, hypopharynx, and labium have been described and figured by Phillips (1930).

FEEDING

Most mayfly nymphs are herbivorous, feeding on diatoms, algae, and detritus (Lubbock (1886), Eaton (1888), Murphy (1922)). *Chiloptera*, *Ameletopsis*, and *Prosopistoma* are considered carnivorous and *Chirotenetes* is said to feed on insect larvae and vegetative detritus (Needham 1935) thereby utilizing two sources of food. In describing the mouth-parts of *Coloburiscus* Phillips (1930) suggested "the fringes of hair on the forelegs and mouth-parts . . . would seem to form a plankton straining apparatus." Observations on this point were not made in the present study on nymphs in their natural habitat since they inhabit the undersides of stones in comparative darkness; however, laboratory observations tend to substantiate Phillips' suggestion.

To make these observations, each nymph was placed on its back under a dissecting microscope, being almost sandwiched by two sheets of glass. The weight of the upper sheet of glass was supported by two strips of cardboard arranged in a large V with the head of the nymph facing a small opening in the apex. The lower sheet lay on a tray fitted with a water outlet. A large tank containing