the compound eyes were larger than the ocelli. The antennae had nine segments. In a larger nymph (hw. 0.35 mm, tl. 0.47 mm, and tbl. 1.30 mm) the antennae had 12 segments and there were seven pairs of gills. The latest pair appeared on the second abdominal segment. In this nymph and one other (hw. 0.47 mm, tl. 0.52 mm, tbl. 1.80 mm) the gills showed evidence of bifurcation and in the latter specimen the antennal segments numbered 17.

A nymph of hw. 0.55 mm, tl. 0.62 mm, and tbl. 2.5 mm (Fig. 3) bore 14 gills arranged in pairs on the first seven of the nine abdominal segments. The gills on the anterior part of the abdomen of a slightly younger nymph than this are shown in Figure 4; the gills of the first segment were peg-like, those of the second slightly bifid, and those of the third distinctly forked, bearing spines, and differing little from those of segments four, five, six and seven. Apparently as each gill increased in size it became increasingly bifid and spined more like the characteristic *C. humeralis* gill (Fig. 5). Nymphs of this size were partially transparent and pale in colour; the dark brown colour of heavily chitinized structures was limited to the grinding plates, prosthecae, and canines of the mandibles, the gill and leg spines, and the posterior abdominal sternites. The buccal cavity, oesophagus, and rectum were not clearly delimited in the tubular gut. A slight increase of diameter was apparent in the midgut region and there were usually five Malpighian tubules present at the midgut-ileum junction. The ganglia of the nervous system resembled those of older nymphs but were relatively less pigmented and closer together in the abdomen.

At this stage the galea-lacinia and the maxillary palp originate from a common base (Fig. 6) together with a rudimentary axillary gill which already shows evidence of bifurcation. As growth proceeds the maxillary gill of each side bifurcates to form two long white filaments which project into the water below the head; each contains tracheae continuous with the longitudinal head and thoracic region trunks. Maxillary gills have not been recorded previously for this genus but additional gill surfaces have been noted in a number of other genera. In the European genus *Oligoneura* and the North American *Isonychia* there are, in addition to the full series of seven pairs of abdominal gills, a cluster of gill filaments at the base of each maxilla and at the base of each leg (Needham, 1935). The Australian *Coloburiscoides giganteus* has a cluster of filaments on the posterior face of the abdominal gill (Tillyard 1933*b*, Fig. 43) and it seems likely, from Tillyard's descriptions, that a second species in the genus, *Coloburiscoides munionga*, has similar structures The peculiar Chilean genus *Murphyella* lacks abdominal gills but has a single long gill attached midventrally on each thoracic sternite. There is an added pair beside the single gill on the prothorax, as well as two pairs on the maxillae and one pair on the labium (Needham and Murphy 1924).

NYMPH

The forked spiny gills (Fig. 5) of a *C. humeralis* nymph (Fig. 7) distinguish it from all other described mayfly nymphs, with the exception of the Australian genus *Coloburiscoides* which has similar structures. Seven pairs of gills are present on the first seven abdominal segments, those on segments three and four being the largest. Each gill has an upright lamella studded with fine bristles and containing numerous tracheoles; it is borne between a stout inner and outer arm. The latter bears stout spines. Although these structures and the maxillary gills are probably used in respiration, it is not uncommon to find apparently healthy nymphs with up to seven out of the 14 abdominal gills absent or in the process of regeneration. When the nymph is in its normal clinging position among the stones of rapids it is exposed to swift currents, and it seems likely that the gills, which are held vertically, may sometimes be broken off by current-borne objects.