weeks later than in the Kainga pond. The same sort of variation among populations in the same area has been found before (Young, 1965a). The most usual explanation is that it is the result of temperature differences during the egg and larval growth period, but such differences were not obvious in the present study. As at Kainga the early imagines laid eggs to give second generation adults in late summer. Egg laying was, however, not as prolonged and few mature bugs of either morph contained eggs after mid-January.

The shortened period of egg laying in summer, with imagines appearing later and laying eggs for a shorter length of time, suggests that fewer eggs were in fact laid and that consequently there were fewer second generation adults in the overwintering population than at Kainga.

### The Life Cycle of S. arguta

*The cycle in the Kainga channel.* The life cycle of *S. arguta* resembles that of *A. assimilis* in the same area except that the egg laying period is longer, beginning earlier and continuing later into the autumn, so that the dates on which the first larvae and first new imagines appear in early summer are much earlier. On November 3, when formal sampling of the channel began, there were already numerous fourth and fifth instar corixid larvae there and some of these became adult by November 10, almost a month before the first adults appeared in the populations of *A. assimilis* in the pond. Imagines of the summer generation continued to mature and lay eggs until the beginning of March, over a fortnight later than eggs could be found in the comparable adults of *A. assimilis* populations. As far as could be determined adults laid eggs in the summer immediately after moulting, overwintered and laid eggs again for the second time in the following spring. This conclusion follows from noting that most adult normal bugs appear in the population in early and mid-summer, and can be expected to lay eggs then, that the proportions of the normal and flightless morphs in the population remain stable through the winter into the spring and that all bugs alive in the spring develop and lay eggs. These species lack the convenient markers of the early, distinctively pigmented morphs that occur in most species of corixids in Britain and which can be traced from the beginning of summer in one season through to spring of the next.

### Changes in the Polymorphic Structure of the Adult Populations

The populations of both species are dispersed about the habitats in very local aggregations that have proved difficult to sample to give a measure of the size of the whole population and an accurate impression of the change in numbers during the season. In this first year no attempt was made to estimate the size of the population by mark and recapture methods. This failure to obtain population numbers means that the analyses were restricted to examination of the relative frequencies of the adult morphs and their developmental stages in the samples.

The analyses show the structure of the population at the date of collection, and because it is possible to recognise developmental stages of each morph, the way the structure is changing through recruitment. It is worth noting that the structure of each sample is the result of all the changes occurring in the population up to the time of collection. It has developed from the accumulative effects of differential recruitment of the various morphs on the one side and the effects of migration and death of bugs on the other. To determine actual recruitment of morphs at each sampling date requires analysis of recently moulted adults, or some equivalent stage. The year can be usefully divided for the examination of the structure of the adult population into four periods as follows:

The expected structure of the population and the changes possible in each period are summarised in Table I. From this summary it can be seen that the