this is so. (In practice movement of normal bugs during the usual dispersal phase in early spring is difficult to detect from changing proportions of the flying and flightless morphs (Young, 1966) but emigration away from recognisably unfavourable or deteriorating conditions in summer is readily demonstrated.)

In the third period, during summer, and the longest of the four, there is heavy recruitment from the larval population, loss of the overwintering imagines through death, and migration of normal bugs. This complex period, however, lacks any natural indicator through which changes in population size or structure can be assessed. The numbers of both morphs increase through the period and the distinctly pigmented early morphs that could be used in this way in corixid populations in England make up either too small a part of the population here to be useful, or, as in the Notonectidae, are apparently lacking altogether. Even so, some interpretation of the changing structure is still possible from the way the polymorphism develops in the population.

The most important features for the analysis of the developing population structure are as follows. Firstly, the period in which recruitment of imagines is occurring can be defined by recognising late fifth instar larvae and newly moulted imagines. Secondly, overwintered bugs, through differences in cuticle, pigmentation and fat bodies remain recognisably distinct from the new imagines in early summer and the collapse of their numbers is easily followed. Thirdly, the changing proportions of the morphs over a long period, generally a steady build up in the frequency of one at the expense of the other, give a fair, overall picture of the way recruitment has been occurring—assuming all the time there has been negligible change in the numbers of the normal morph through migration or differential mortality. Fourthly, in both the Corixidae and the Notonectidae teneral bugs developing to the normal morph are easily recognisable through their intermediate pigmentation and muscle development and provide a certain indication of the recruitment of this morph. Fifthly, in the Notonectidae, but alas not clearly in most corixid species, the two morphs are separable on the basis of differences in the appearance of the indirect flight muscles from the end of the last larval stadium. This last finding provides a powerful tool for the interpretation of changes occurring in notonectid populations not generally available in studies of corixids. Similar information for the Corixidae on the identify of the morphs being recruited to the population has been determined elsewhere by holding collections of late instar larvae in cages in the habitat until the two morphs as adults became separable by inspection. The most critical pointers for the analysis are the last two listed because they define the periods in which the various morphs are developing and allow correlation of development of the polymorphism with physical or climatic factors in the environment.

The Polymorphism of A. assimilis

The following mature morphs and developmental stages are recognisable in populations of this species; remembering that it is analysis of the immature stages that contributes most to the success of attempts to interpret the changes found.

Normal and flightless morphs as late fifth instar larvae. The development of the indirect flight musculature in the two morphs diverges during the fifth stadium. In the normal morph the muscles grow steadily through the stadium whereas in the flightless one it scarcely enlarges from its condition at the start of the stadium. By the end of the stadium the two morphs are perfectly distinct in this species, the muscles completely fill the mesothorax of normal bugs but remain as thin slivers of tissue, well separated by the fat body in flightless bugs. As growth takes place through the stadium, the morphs may be confused unless examination is confined to the end of the stadium. Analysis of these late-instar larvae also ensures that only those larva very soon to moult to adult are considered, increasing the precision