been hypothesized for the ants (e.g., Brown, 1954; Wilson, Carpenter, and Brown, 1967), so comparison of tiphiid and formicid mouthparts was considered relevant to this investigation.

Methods

Mouthpart Preparations

Although fresh specimens or specimens preserved in alcohol were preferred for the examination of the mouthparts, dried specimens were used where necessary, and were relaxed by immersing them in a solution of distilled water, 95 percent ethyl alcohol and trisodium phosphate, for 24 hours or longer. After relaxation the specimens were transferred to 70 percent ethanol. The mouthparts of specimens relaxed in this way suffered little distortion or damage to any of the structures studied, except the glossa. This primarily membranous structure was usually deformed even in materials preserved in alcohol. In preparation for study, the mouthparts were first entirely removed from the head capsule of the specimen and were separated into individual components or combinations of components. These were usually as follows: the labium; 1 labial palp; the galea and lacinia; the stipes, cardo, and maxillary palp; the labrum; and each of the mandibles. In smaller specimens the maxillae were left intact, and the palpi were left attached to the labium.

After dissection, the mouthparts were dehydrated and stained with a 0.5 percent solution of eosin Y in 95 percent ethanol. The labrum and mandibles were dehydrated without staining. After 10 minutes of dehydration and staining, the mouthparts were placed in clove oil for a minimum period of 20 minutes. Each component or group of components was then mounted on a microscope slide in Canada balsam. A degree of structural distortion was produced in some of the mouthpart components by the pressure applied to the cover glass, because structures had necessarily to be positioned and partially flattened for thorough observation. This was particularly true for the galea, which had to be flattened from its curved spatulate form. The labium was also subject to distortion in balsam mounts, and it was necessary to preserve some of the largest labia in small vials of glycerin. But in all instances distortion was kept at a minimum, and its effects were taken into account in the subsequent morphological observations.

Voucher specimens (either the specimens dissected, specimens from the same nest series as those dissected, or specimens compared with those dissected) have been deposited in the Museum of Comparative Zoology, Harvard University. Each pin of voucher specimens is indicated as such by a green label that reads: *Voucher specimen, Gotwald study, 1968.*