presternum of the third segment, where M-shaped presternal plate is fused broadly to the inner sides on the pretergum (Fig. 14).

In some members of Formicidae, such as Myrmicinae, Cerapachyinae and the ponerine tribe Proceratiini, a different type of skeletal modification occurs, where the presternum of the third segment is strongly convex ventrally, projecting beyond the lower margins of the pretergum (Figs. 5, 6 & 7) and the sternum of the second segment forms a concave floor without the incisions (Fig. 12).

In Tiphiidae, Mutillidae, Scoliidae, Vespidae and Formicidae, the second segment lacks apodemes on the tergum.

Development of the pretergum and presternum on the fourth abdominal segment are found only in the ceratin members of Formicidae. In the ponerine tribe Ponerini the pretergum and presternum are represented by broadly expanded anterior portions of the segment (Fig. 15). In the ponerine tribes Amblyoponini and Ectatommini, the pretergum and presternum form a convexity in profile and slightly narrow posteriorly (Fig. 24). In Cerapachyinae, Pseudomyrmecinae, Myrmeciinae and Myrmicinae, the pretergum and presternum are distinctly narrow posteriorly to form a ball-like projection (Fig. 16). In addition, in Myrmicinae pretergum is expanded ventrally so that the anterolateral parts of pretergum protrude downwards beyond the junction of the pretergum and presternum (Fig. 25).

In formicids having the developed presclerites on the fourth segment, the tergum and sternum are narrowly overlap and immovably welded together, at least on the anterior part of the segment. Apodemes on the fourth segment in these formicids exist on the anterior margins of the pretergum and presternum, though they are smaller than those in other aculeates in size.

In Myrmicinae and ponerine tribe Ectatommini, an internal cuticular lobe is developed from the anterior margin of the pretergum of the fourth segment (Figs. 27 & 28).

Musculature

Musculature in the second segment to move the third segment

1) Ground plan: Seven pairs of muscles (Nos. 1 to 7) in the second abdominal segment are generally found in the Aculeata (Figs. 17, 18 and 19). In the ground plan, the positions of these muscles are illustrated in Fig. 30. The origins, insertions and functions of them are described in Table 2.

2) Modifications: In the members of Tiphiidae, Mutillidae and Scoliidae, the muscles No. 3 are inserted to the anterolateral margins of the pretergum of the third segment (Figs. 20 & 31). Because in these aculeates the anterolateral corners of pretergum slightly project below the juncture level of the sternal plates of the second and third segments, the insertions of the muscles No. 3 have the lowest point of anterior part of the third segment. In Formicidae and Vespidae