

AN HYPOTHESIS CONCERNING THE FUNCTION OF THE METAPLEURAL GLANDS IN ANTS

The metapleural glands are organs characteristic of all ants (Formicidae), with the relatively few exceptions that are the main subjects of this note. Situated at the posterolateral corners of the alitrunk (thorax plus propodeum), the glands are marked externally by the presence of a bulla, which covers the atrium or collecting chamber, and a meatus in the form of a slit or pore that connects the atrium with the outside. Proximally, the atrium has a cribriform wall into which enter separately the ducts of single gland cells. The structure of this organ was beautifully worked out for *Myrmica* by Janet (1898), and details have been added by Tulloch (1936) for *Myrmica* and by Tulloch, Shapiro, and Hershenov (1962) for *Myrmecia nigrocincta*.

During grooming, some ant species have been seen to draw the legs, especially the tibiae and tarsi of the forelegs, repeatedly over the meatus of the gland and then to rub these leg parts over the rest of the body. One gains the impression that some substance is being spread over the integument by this means. Among various hypotheses suggested for the gland's function, one that has persisted, especially in informal conversations among ant specialists, proposes that the gland produces a "nest odor" by means of which members of one colony recognize one another. Gösswald (1953) found the gland atrophied in the female of the aberrant workerless parasitic ant *Teleutomyrmex schneideri* (it is absent in the male also) and supposed that, if the gland is connected with nest odor, its loss in *Teleutomyrmex* would be understandable in allowing easier acceptance of the parasite by the host ant species, *Tetramorium caespitum*. A rapid survey of the collection of the ants in the Museum of Comparative Zoology, Harvard University, and some other collections, has turned up additional cases of ants in which, judging now only from externally visible structures, the metapleural gland is absent, nonfunctional, or significantly reduced. It should be emphasized that the presence of a well-developed bulla and meatus, where these occur, is no guarantee that the gland cells within are present and secreting a normal product. Where the meatus is fused shut, on the other hand, the gland may safely be considered as nonfunctional.

Even as based on this wholly external criterion, the survey shows some interesting regularities in the occurrence of gland atrophy. Such cases fall into four classes:

1. Males of army ants, subfamily Dorylinae.
2. Males of a few other genera, mainly in subfamily Myrmicinae (e.g., *Leptothorax duloticus*, *Tetramorium*, *Strongylognathus*, *Rhoptromyrmex*, *Huberia striata*).
3. Workers of the specialized slave makers of genus *Polyergus*.
4. Queens of certain scattered ant species that are known (or assumed, on grounds of other morphological peculiarities) to be social parasites, i.e., those species which found their colonies in the nests of other ant species.