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Morphologische und Biologische Untersuchungen der Putzapparate der Hymenopteren Summary

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"Morphologische und biologische Untersuchungen der Putzapparate der Hymenopteren"

Arch. Naturgeschichte, Berlin, Abt. A, 88 (12): 1-63, 65 text figures.

A comparative-morphological study of the grooming apparatus in a series of examples of insects representing 20 families of Hymenoptera. The family, Apidae, is represented by a miscellany of 13 species. The work is based largely upon observation of total mounts (glycerine), although some features were examined histologically.

After describing his technique and referring briefly to older publications on the subject, the author presents a rather detailed description of the foreleg and of the grooming apparatus in particular of the honeybee.

A section relating to the anatomy and histology of the foreleg brings out that the author was unable to find any trace of muscles connected to the spur, and that he feels that this structure is capable only of passive movement. He feels that the spur is a chitinous evagination, and disagrees with Janet's opinion that it is a sensitive articulated large hair. Serial sections reveal the presence in the honeybee of a group of cells at the bases of the comb-teeth - one for each tooth - and the author assumes that these cells laid down the teeth and later took on a glandular function. It may be possible that these correspond to the cells described by Janet for *Myrmica*, in which case the author disagrees with Janet's idea that they are nervous in function.

There follows a series of detailed descriptions of the grooming apparatus in the various forms. Occasional remarks compare the author's findings with those of earlier investigators.

Author concludes that it is unlikely that this or even a more extensive morphological study is likely to give the answer to the biological significance and the very great variation in the grooming apparatus. He is not able to agree with the report of Canestrini and Berlese that the apparatus is employed for cleaning the tongue (honeybee). He feels that the spur and metatarsus cannot grasp the antennae all the way around. The method of cleaning various parts of the body are discussed.

In connection with phylogenetic significance of this structure he cites Buttell-Reepen's observations that honeybee pupae show signs of spurs on the hind legs that are lacking in adults. Suggests further studies of the distribution of spurs in adults and embryos may prove fruitful. He is unable to conclude that the spur problem as known has significant value for systematics.

Conclusions of the Author

- 1) Forms of spurs previously not properly understood.
- 2) Foreleg spur (honeybee) moveably articulated, but lacks muscles of its own.
- 3) Cells of the metatarsal comb teeth take on a glandular function (bee)
- 4) Form of the tibiotarsal apparatus extraordinarily manifold.
- 5) Foreleg apparatus especially cleans feelers with at the spur and metatarsus grasping them. Tarsal segments clean the mouthparts.
- 6) Hindleg apparatus cleans wings and the edges of abdomen (also ovipositor).
- 7) Sex differences in the apparatus are very much cleared out.
- 8) Phylogenetic evidence seen in the bee suggests similar situation in other forms.
- 9) At present the grooming spurs lack significance for systematics.
- 10) Further studies, especially regarding phylogeny, should be productive.