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Occurrence of Pterin Pigments in Hymenoptera

It has been found that pterins exist in tissues of animals belonging to nearly all groups; their occurrence as pigments, however, is restricted to insects and cold-blooded vertebrates^{1,2}. Among Lepidoptera, they are always present in the wing-scales of the Pieridæ and appear to be a biochemical characteristic of that natural family^{3,4}. Becker and Schöpf⁵ and Becker⁶ also found pterins in the integument of Hymenoptera and gave evidence of their wide distribution within this order.

In 1947, E. B. Ford⁴ described a new 'murexide test' for the recognition of pterin pigments in the wings of intact butterflies. This consists in exposing specimens to chlorine and then fuming with ammonia. Following this treatment, pterin pigments develop a brilliant purple colour. We have applied this method successfully to the pterins of the exoskeleton of Hymenoptera.

The yellow and yellowish spots of adult Hymenoptera give the reaction. One exception only was recorded: the yellow of *Urocerus gigas* L. (Siricidæ) seems to be due to light melanin and not to pterins.

Hymenoptera show, therefore, a striking difference in that respect from Lepidoptera. Pterins are found as pigments among Symphyta, parasitic and aculeate Hymenoptera, in primitive as well as in highly specialized groups. There is scarcely any family which shows pterin pigments in all its representatives; but there are several tribes and generic entities which do so (Philanthinæ, Bembecinæ, *Crabro*, *Ectemnius*, *Lestica*, *Odynerus*, etc.). Moreover, a large number of families and genera are entirely devoid of pterin pigments (Siricidæ, Trigonalidæ, Formicidæ, Chrysididæ, Pseninæ, etc.).

Preliminary conclusions can also be drawn suggesting relationships between the occurrence of pterins in the integument and geographical and morphological features. Groups mostly distributed in the northern hemisphere often have large spots of yellow pterin pigment (Pamphiliidæ, Cephidæ, Tenthredinidæ, Metopiinæ, Ichneumoninæ, Crabroninæ of the genera *Crabro*, *Ectemnius* and *Lestica*; Vespidæ of the genera *Vespa*, *Pterochilus*, *Psiloglossa*, *Celonites*, *Jugurthia* and the parasitic bees *Nomada*). On the other hand, groups mostly distributed in the southern hemisphere and in the tropical regions are

often devoid of yellow spots (Arginæ, Aulacidæ, Trigonalidæ, Stephanidæ, Evaniidæ, Pelecinidæ, Trypoxyloninæ and Vespidæ of the genera *Zethus*, *Montezumia*, *Icaria*, *Polybia*, etc.). Among aculeate Hymenoptera, the genera with strongly petiolated first abdominal segment are usually without yellow spots; whereas it can be said tentatively that the Sphecidæ and Vespidæ with bright yellow spots on the abdomen should be generally referred to forms with sessile first abdominal segments.

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