

INQUIRY INTO THE RELATIONSHIPS AND TAXONOMY
OF THE MUSCOID FLIES.

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Dissections of the female reproductive system and studies of the eggs, first-stage maggots and reproductive habits of these flies, carried on for the past five years, have proved a golden key for unlocking many of the secrets connected with their relationships. Throughout the work, however, the problem of harmonizing these characters with those of the external adult anatomy has been a difficult one. At first sight the results seemed to indicate that the family groups heretofore recognized do not exist in the commonly accepted sense. The ordinary divisions seemed almost untenable, being often at variance with the results of the dissections or with external adult characters of well known utility.

It was soon evident that no satisfactory classification could be built up on the reproductive system characters alone. As examples of the disagreement between reproductive and external adult characters, the *Phasiidae* show in part flat-ovate macrotype eggs without uterus, in part elongate eggs deposited subcutaneously, also without uterus; and, if the Rutiline and related flies are included in the family, in part elongate subcylindrical eggs hatching in an elongate uterus. The *Exoristidae*, after being restricted greatly from their former limits, are still more markedly differentiated in type of reproductive system and egg, showing not only the three Phasiid types but a half dozen or more additional ones as well.

It is now quite apparent that the external adult characters can not be subordinated to the reproductive characters in quite a good many cases, though they can so be in other cases. It seems practically certain, for example, that parallel specializations of the reproductive system have arisen quite independently in these flies, and that marked and parallel differentiations of the facial plate have so arisen with far less frequency. Facial plate differentiation is largely dependent on a greater or less lapse of oral and antennal functions, and such lapse is not of frequent occurrence. Reproductive system and egg modifications manifestly play an extensive part in the economies of these flies, wherefrom we may conclude that the reproductive system is plastic in a greater degree