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NOTES ON TWO ORTHOPTERAN GYNAN-
DROMORPHS

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ALTHOUGH gynandromorphism in the Orthoptera is not so prevalent as in some of the other orders of insects, rather numerous instances of this phenomenon have been reported. It is probable that the occurrence of various degrees of intersexuality is greater in this group than has been indicated. Various mosaic patterns may occur without the marked external evidence exhibited by those which have received attention. Furthermore, many authors have pointed out that the critical examination of large series would probably reveal more gynandromorphs than have been reported. Chopard (1938) devoted some attention to the subject and listed an extensive bibliography. Severin (1943) indicated other literature on the occurrence of gynandromorphs in the Orthoptera and other orders of insects, and, in addition, figured a gynandromorph of *Melanoplus mexicanus mexicanus* (Saussure).

The two orthopteran gynandromorphs discussed here belong to the subfamily Oedipodinae, in which group gynandromorphism appears to be less common than in some of the other subfamilies of Orthoptera. One is a specimen of *Paridalophora phoenicoptera* (Burmeister) collected by me at

Welaka, Putnam County, Florida, on June 12, 1940; the other is an example of *Camnula pellucida* (Scudder) collected by T. H. Hubbell on the Hughitt-Rawson Preserve, Gogebic County, Michigan, on August 15, 1919.

With the exception of the slightly wider thoracic sternites and larger abdominal segments than usual in males of this species, the gynandromorph of *Pardalophora phoenicoptera* is essentially male in external morphological characters (Pl. I, Figs. 1-3). However, the presence of a right, ventral ovipositor valve, arising from beneath the eighth abdominal sternite, is striking. This valve causes a distortion of the apex of the abdomen, and there is an elongation of the right side of the eighth abdominal sternite which approaches the elongate form of the female subgenital plate. This sternite has been ruptured mesially for part of its length because of the pressure placed upon it by the ovipositor valve. The swollen right side of the distal part of the ninth sternite (subgenital plate) increases the dorsal width considerably over that in a normal male. On the dorsolateral face of this subgenital plate and on the right side of the pallium there are highly chitinized and elevated areas which may represent primordia of a dorsal ovipositor valve. All except the distal abdominal segments have the brownish dorsocephalic pigment spots restricted to the left half. Bilateral pigment spots in this position are characteristic of most males of this species. The abdominal tergites on the right side are more maculate than are those on the left. This maculation is typical of the majority of females of the species.

No dissection, other than a superficial examination after pulling back the pallium, was performed to study the internal genitalia. The typical male phallic structures do not appear to be deformed or undeveloped. Closer examination must wait until a later date when it is hoped that a study may be made of the internal anatomy and histology of this specimen in serial section.

The gynandromorph of *Camnula pellucida* (Scudder) shows a much greater extent of intersexuality than does the one just

discussed. For the most part, its intersexuality is bilateral, but a more complex mosaic is evident.

This individual is somewhat larger than the average male, but, in the series of specimens examined from Gogebic County, Michigan, it does not approach the average size of females. The length and width of the head are approximately intermediate between the averages for the two sexes. The cephalic and median legs on both sides are of the same size as those of average males. The right caudal leg is missing, and no comparison with the left one is possible. The supra-anal plate is that of a typical male. The right cercus, although not fully developed, in no way approaches the cercus of the female, but is similar to the left, which is typically male. The entire abdomen, with the exception of the apex and some other minor characters discussed below, is of the size and form as that of the male. In all of these characters this specimen shows a mosaic of intersexuality which is not bilateral.

The bilateral nature of the intersexuality is best shown by the presence of both dorsal and ventral ovipositor valves on the right side, and by the typical male subgenital plate on the left side (Pl. II, Figs. 1-3). The right paraproct is also that of a female, whereas the one on the left is male. The eighth abdominal sternite is elongated on the right side beneath the ventral ovipositor valve; it approaches the elongate form of the female subgenital plate. The abdominal segments are laterally immaculate on the left side, except for the dorso-cephalic spot on all but the terminal segments, which is characteristic of most males. On the right side, the abdominal segments are laterally brownish maculate as in most females of the species. The left side of the face is more maculate than the right. The line of pigmentation down the frontal costa and clypeus is as if it were drawn with a pen and rule, so exactly does it separate the right from the left side. Although a difference in maculation is not a distinguishing character between the sexes of this species, it is interesting that this pigmentation should be so bilaterally distributed in this specimen. Bilateral intersexuality is shown also in the teg-

mina; the right tegmen is 1.4 mm. longer than the left and is 0.4 mm. wider across both the proximal and distal portions. The wings are more nearly equal in size, although the right is slightly the larger.

Examination of the genital chamber, after relaxation of the dried specimen, revealed only the left half of the male phallic and epiphallic structures (Pl. II, Fig. 4). The epiphallus is most distinctive in showing the division into one-half the normal structure (Pl. II, Fig. 5). The dorsal and ventral aedeagal valves are deformed and aborted, and represent only the left halves of the normal structures (compare Figs. 6 and 7, Pl. II). The ventral lobe appears to be almost lacking, except around the extreme base of the ventral aedeagal valve. The basal fold is not well formed. Its chitinization in certain parts may be the rami of the cingulum, which have become incorporated with the basal fold.

This gynandromorph is very different from that of the same species figured by L. C. Paul (1941) in which both ventral ovipositors are present, and in which there is the rudiment of a dorsal valve on the right side.

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PLATE I

Gynandromorph of *Pardalophora phoenicoptera* (Burmeister)

FIG. 1. Dorsal view of the apical abdominal segments.

FIG. 2. Ventral view of the apical abdominal segments.

FIG. 3. Right, lateral view of the apical abdominal segments.

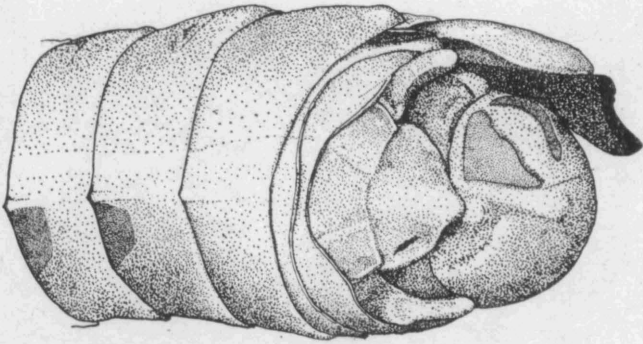


Fig. 1

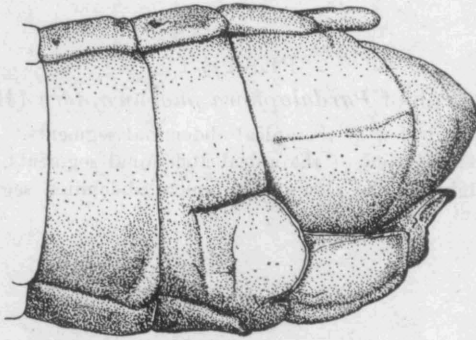


Fig. 2

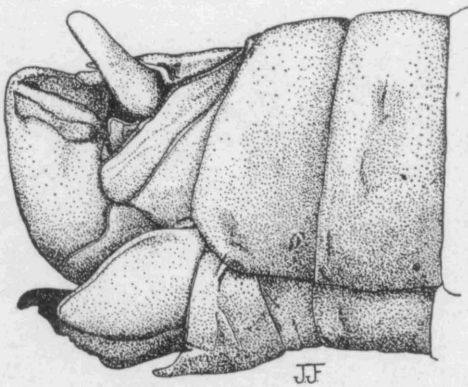


Fig. 3

PLATE II

Gynandromorph of *Camnula pellucida* (Scudder)

- FIG. 1. Right, lateral view of the apical abdominal segments.
FIG. 2. Ventro-caudal view of the apical abdominal segments.
FIG. 3. Left, lateral view of the apical abdominal segments.
FIG. 4. Dorsal view of the phallic and epiphallic structures.
FIG. 5. Dorsal view of the epiphallus of a normal male of *Camnula pellucida* (Scudder).
FIG. 6. Aedeagal valves of the gynandromorph. Lateral view.
FIG. 7. Aedeagal valves and ventral lobe of the phallus in a normal male of *Camnula pellucida* (Scudder). Lateral view.

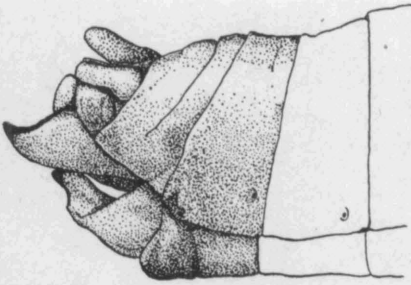


Fig. 1

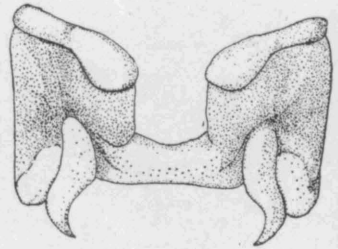


Fig. 5

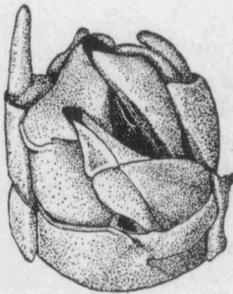


Fig. 2



Fig. 4



Fig. 6

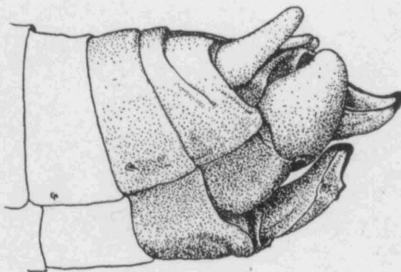


Fig. 3

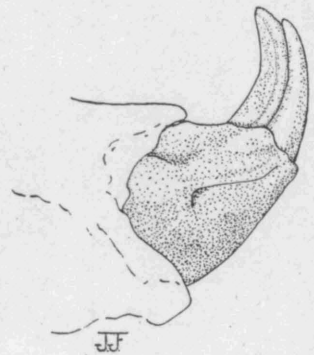


Fig. 7