

THE PROPER USE OF THE TERMS PARAPSIDES
AND PARAPSIDAL FURROWS.¹

BY GEORGE S. TULLOCH

The terms parapsides and parapsidal furrows are very frequently misapplied by morphologists and systematists working with Hymenoptera. An examination of the literature reveals the fact that the term parapsidal furrows has been used to designate either of two pairs of longitudinal furrows that may be present on the mesonotum of certain Hymenoptera, viz., certain Xiphydriids, Ampulicids, Formicids (*pf* and *no* of Figs. 1, 2, 4, and 5). Likewise, the term parapsides has been used to designate the lateral regions delimited by either pair of the so-called parapsidal furrows (*pa* and *sc* of Figs. 1, 2, 4, and 5, II of Fig. 3). Since it is quite obvious that two distinct pairs of furrows or two distinct sets of regions cannot have the same terms applied to them, it may be of interest to persons working with Hymenoptera to have the correct application of the terms re-established as intended by their author. Moreover, as these characters are diagnostic and widely used in the classification of Hymenoptera, it is quite essential that the correct terms should be brought to the attention of present workers so that their usage may be stabilized and unnecessary confusion eliminated in future literature.

The term parapsides was first used by Macleay, 1830, (page 148, footnote 1) to designate certain lateral regions occurring on the mesonotum of *Polistes billardieri* Fabr.² Naturally the furrows delimiting these regions are the parapsidal furrows although Macleay does not specifically designate these furrows as such. Figure 3 of this paper is

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² Dalla Torre, 1904, considers *P. billardieri* Fabr. a variety of *P. crinitus* Felton.

a portion of the mesonotum of *P. billardieri* Fabr. bearing the parapsides and parapsidal furrows taken from Macleay's original figure and is enlarged to twice the size of his figure. In his explanation of the plate he designated the parapsides of the mesonotum with the Roman numeral II. Since it is perfectly clear from his figure as well as from his description (page 148, footnote 1) that he intended the term parapsides to be applied to the lateral regions of the mesonotum delimited by the longitudinal (parapsidal) furrows, it is logical that all homologous regions and furrows in other Hymenoptera should be similarly designated as it

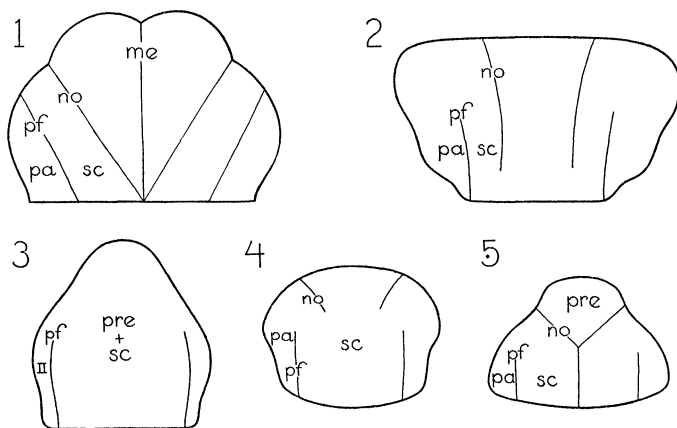


Fig. 1. Portion of the mesonotum of *Xiphydria*.

Fig. 2. Portion of the mesonotum of *Ampulex*.

Fig. 3. Portion of the mesonotum of *Polistes billardieri* Fabr.

Fig. 4. Portion of the mesonotum of *Myopopone castanea maculata* Roger.

Fig. 5. Portion of the mesonotum of *Paraponera clavata* F. Sm.

is one of the important principles of comparative morphology to apply the same term to the homologous anatomical parts in different groups.

If all Hymenoptera had a mesonotal structure similar to that of *P. billardieri* Fabr. the matter would have been much simplified and no confusion would have resulted in the literature. However, in certain Hymenoptera (*Xiphydria*, *Ampulex*, *Paraponera*, Figs. 1, 2, and 5) another pair of longitudinal furrows appears extending backward from the ante-

rior margin of the mesonotum and converging more or less in their course. It is these furrows that have been erroneously identified by some workers as parapsidal furrows for years; likewise, the lateral regions delimited by them and the true parapsidal furrows have been erroneously identified as parapsides. Since the correct term which should be applied to these furrows is little known, it may be of interest to review briefly the terms that have been applied to them, and, also to indicate the term which should have priority over the others as determined by its commonly accepted and correct usage in the literature.

Morphologically these furrows which extend backward from the anterior margin of the mesonotum a varying distance and at a varying angle of convergence have been considered to form the lateral limits of the prescutum when they converged sufficiently to fuse into a single median line. They have been correctly referred to as "prescutal sutures" by Crampton, 1926. In such cases as *Paraponera* (Fig. 5) they clearly limit the prescutum, but in many forms like *Ampulex* (Fig. 2) they open out and approximate parallel lines. It is obvious in such cases that the prescutum is not clearly delimited and that it fuses with the scutum to form the general region prescutum plus scutum.¹ Although, as just stated, the failure of these furrows to converge and fuse makes it impossible to determine the posterior lateral limits of the prescutum; their presence, if even of short length extending backward from the anterior margin of the mesonotum, indicates at once the lateral limits of the prescutum in the anterior region. In some forms such as *Polistes* these furrows are absent (Fig. 5) and in a similar case it has been assumed by a recent worker that the prescutum extends laterally to the parapsidal furrows. An examination of the immature pupal stages of *Polistes* reveals the presence of these prescutal sutures which gradually disappear as the chitin hardens before attaining the adult condition. In at least one species of *Polistes*

¹The writer is cognizant of the fact that when the furrows converge and fuse, Snodgrass, 1926, does not consider the region delimited by them as the prescutum but as a part of the scutum. The writer does not on the basis of the evidence presented accept this view.

the prescutal furrows are present in the adult. In *Pepsis*, a somewhat similar form, the mesonotum is, at first glance, composed of a large central area bounded laterally by the parapsidal furrows. A closer examination of the mesonotal surface reveals the presence of a pair of short indistinct furrows extending backward from the anterior margin. These are the remains of the prescutal furrows and delimit the anterior lateral borders of the prescutum. From the foregoing it is quite evident that the huge, apparently undifferentiated area present in *Polistes* and *Pepsis* is a combination of prescutum plus scutum and in no case does the prescutum extend laterally to the parapsidal furrows.

Mayr, 1861, was the first to mention these furrows which morphologically limit the prescutum in some forms and in his early writings applied to them the indifferent term "*convergirende Furchen*." Later, 1878, he identified them erroneously with the furrows of Macleay calling them *Parapsidenfurchen*. Kokouyew, 1898, designated these furrows as *notauli*. Emery, 1900, noted the misinterpretation of Mayr and designated the central furrows as *Mayrian furrows*. Morley, 1903, used the term *notauli* in the same sense as Kokouyew. Schmeideknecht, 1907, uses the term *notauli* for the central furrows but gives it as a synonym of *Parapsidenfurchen* which is obviously incorrect. It may be seen from this brief sketch of the terms applied to these furrows that *convergirende Furchen*, *notauli*, and *Mayrian furrows* are synonymous. Since the term *notauli* has been used more widely than the other two terms and is perhaps the most appropriate of the three because, by derivation, it means "hollows on the back," present workers who have not already adopted this term to indicate the central furrows should do so and thus aid in avoiding any further confusion in the literature.

Some very clear distinctions between parapsidal furrows and *notauli* are evident upon an examination of different Hymenoptera. Both pairs of furrows are extremely variable in character, yet the following generalizations may be made. The parapsidal furrows may be present and the *notauli* absent, or vice versa, and occasionally in some forms both parapsidal furrows and *notauli* may be absent. In

forms such as *Xiphydria* (Fig. 1) the parapsidal furrows extend from the transcutal suture of the mesoscutum to the anterior margin of the mesonotum. In forms like *Paraponera* (Fig. 5) they extend only halfway to the anterior margin of the mesonotum. Other gradations may be noted by simply examining other forms which always exhibit the tendency of the furrows to be lost in the anterior region and to be retained in the posterior region of the mesonotum. This would seem to indicate that the parapsidal furrows extend forward from the posterior region of the mesonotum or from the transcutal suture of the mesoscutum a varying distance in different forms. Another feature of the parapsidal furrows is that they usually extend forward parallel to each other (Figs. 4 and 5) or they diverge (Figs. 1 and 2) and rarely, if ever, have their terminal points at a position which is convergent from the assumed starting point at the transcutal suture. In the form of *Polistes* (Fig. 3) figured in this paper the parapsidal furrows appear to converge though their terminal points are at a position which is divergent from the points of intersection of the parapsidal furrows and the transcutal suture. The distinctive characteristics of notauli are to some degree the converse of the characteristics of parapsidal furrows. In forms like *Paraponera* (Fig. 5) and *Xiphydria* (Fig. 1) they converge backward from the anterior margin of the mesonotum, and fuse to form a median line. In forms like *Ampulex* they extend backward in a course closely approximating parallel lines but do not reach to the transcutal suture of the mesoscutum. In forms such as *Myopopone* (Fig. 4) they extend but a short distance backward and in *Polistes* (Fig. 3) they are absent. From the above facts the following generalizations may be made: notauli apparently extend backward from the anterior margin of the mesonotum a varying distance and at a varying angle of convergence, occasionally approximating parallel lines in their course but rarely, if ever, diverging from their assumed starting points at the anterior margin of the mesonotum.

Occasionally in some forms such as *Xiphydria* (Fig. 1) a median line (*me* of Fig. 1) is present extending longitudinally along the central region of the mesoscutum. The pres-

ence of this median line is of minor significance since it is used in the classification of only one group of Hymenoptera. However, its presence along with the notauli and parapsidal furrows illustrates the complete number of longitudinal lines of furrows that have been observed on the mesonotum of Hymenoptera.

Much of the confusion existing in the literature has resulted from the mistaken impression that the terms parapsidal furrows and notauli are synonymous. From the foregoing discussion it should be clear that this is not the case, since they are two distinct pairs of furrows, each pair so completely localized in position and possessing such distinct characteristics that misidentification should be impossible.

The terms discussed may be defined as follows:

1. Parapsidal furrows—longitudinal furrows extending anteriorly from the posterior region of the mesonotum or from the transcupal suture of the mesoscutum and varying in length and in their course from one approximating parallel lines to one which is strongly divergent but very rarely, if ever, converging from the original point in the posterior region of the mesonotum.

2. Parapsides—(sing. parapsis) lateral regions delimited by the parapsidal furrows and the tegulae.

3. Notauli—(sing. notaulus) longitudinal furrows extending posteriorly from the anterior margin of the mesonotum, varying in length and in angle of convergence, and occasionally approximating parallel lines but rarely, if ever, diverging in their course from the anterior margin of the mesonotum.

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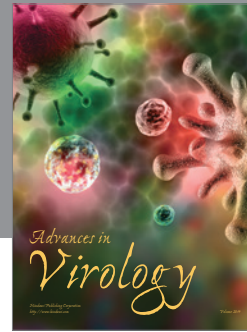
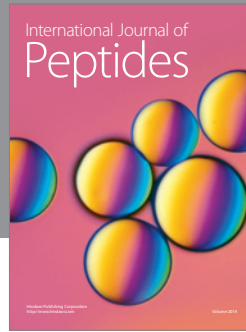
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ABBREVIATIONS

me. median line.	pf. parapsidal furrows.
no. notauli.	pre. prescutum.
pa. parapsides.	sc. scutum.
	ll. parapsides (Macleay's original designation)

EXPLANATION OF TEXT FIGURE

- Figure 1. Portion of the mesonotum of *Xiphydria*.
- Figure 2. Portion of the mesonotum of *Ampulex*.
- Figure 3. Portion of the mesonotum of *Polistes billardi* Fabr.
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