

three sting regions. The **Index of Reduction (IR)** is a measure of the length of the sting relative to the size of the ant (sting shaft L / pronotal W).

Hopefully, most other terms will be clear from the labeled illustrations, but some need further illustration (See also Kugler, 1978a). **Intervalvifer sensilla** are a cluster of trichodea on the oblong plate just anterior to the articulation of triangular and oblong plates, the intervalvifer articulation. **Ramal sensilla** are a row of trichodea inside the ramus of the oblong plate. The **fulcral arm sensilla** are in two clusters of campaniformia(?) along the ventral edge of the oblong plate: one cluster just anterior to the fulcral arm, the other in the base of the fulcral arm (a + b respectively in setal counts). The **dorsoterminal chaeta** of the gonostylus is a conspicuous chaeta located on the dorsal surface at the tip of the gonostylus. The **companion seta** is longer than other setae and located adjacent to the dorsoterminal chaeta.

Phylogenetic analyses were performed with Swofford's PAUP 3.0 program for Macintosh. The *Gnamptogenys* phylogenetic analysis used eleven sting apparatus characters that varied among species. The Ectatommini phylogenetic analysis used seven characters that varied among genera. Correlated characters were avoided. Polarity was assigned to all character states *a priori* by outgroup comparison with sting apparatuses of the primitive ponerine genus *Amblyopone*. Characters were scored as "Dollo" if it seemed unlikely that a derived character state evolved more than once. Characters were scored as "irreversible" if it seemed unlikely that a derived state would have reverted to an ancestral condition. Characters were scored as "ordered" if derived states could have reversed or have arisen more than once. No characters were weighted. Trees were produced by an exhaustive branch-and-bound search with the default options.

## Results

### A. Descriptions

#### 1. *Paraponera*

**Specimens examined:** *P. clavata*, 2 workers, Ecuador, Piedrero, 16-I-69, M. Deyrup; 2 workers, Peru, Putumayo, La Chorrera to La Sombra, 21-VIII-1920, Cornell Univ. Expedition.

**Spiracular Plate** (Fig. 3). Body oval, ringed with wide ridges; dorsal half of posterior edge excavated somewhat, as in *Discothyrea* and *Procer-*

*atium*. Large dorsal notch. Medial connection a wide band narrower at midline than on either side.

**Quadrangle Plate** (Fig. 4; some terms in Fig. 9). Body much larger than apodeme and extending over much of the posterior arm of the oblong plate; narrower dorsally to accommodate a lateral anal plate. Apodeme with medial lobe and large lateral lobe that extends a third of the way down the posterior edge of the apodeme.

**Anal Plates** (Fig. 4). Medial plate subtrapezoidal with about 14-16 large marginal setae. Lateral plates more or less Y-shaped and fitting around the corners of the medial plate; posterior edges ill defined; no sensilla.

**Oblong Plate** (Fig. 4; some terms in Figs. 11, 19, 23). Anterior apodeme short, rounded. Dorsal ridge with a dorsally projecting tubercle anterior to intervalvifer articulation. Posterior arm with narrow median lobe along whole length; no subterminal tubercle or medial projection at apex. Ventral arm separated by a large postincision that extends to dorsal ridge; fulcral arm large, triangular, heavily sclerotized on anterior and ventral edges. Plate with about 10-15 intervalvifer, 32-39 ramal, and 5+15-18 fulcral arm sensilla.

**Gonostylus** (Fig. 4; some terms in Figs. 12, 13). Long, slender, two-segmented; distal segment much shorter than proximal; apex notched. Proximal segment with setae and chaetae scattered along sides, then densely setose posteroventrally. Distal segment densely set with longer setae dorsad and shorter setae ventrad; no dorsoterminal chaeta nor an especially long terminal seta.

**Triangular Plate** (Fig. 4; some terms in Fig. 14). Thick, subrectangular body constricts abruptly at junction with ramus. Dorsoapical and ventroapical processes short; no dorsal tubercle; medial tubercle large.

**Lancet** (Fig. 5). Long, very slender, heavily sclerotized, with two equally large valves. Apex strong, acute, with about 12 well developed dorsal barbs.

**Sting** (Figs. 6, 7; some terms in Figs. 15, 16, 29). Long, slender, more or less evenly tapered to apex, heavily sclerotized. Sting shaft long (62-63% of StingL; IR 0.64-0.66), slender, upturned except at tip, which is wider than high and without barbs; hemocoel small. Valve chamber 24-27% of StingL; low; not differentiated externally from base of sting shaft. Sting bulb shorter than valve chamber; sting base transversely arched, with heavy basal ridge.