

Notes on *Nesomachilis maoricus* Tillyard, with particulars of a new sense-organ.

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At the suggestion of Dr. Tillyard I have been keeping some specimens of *Nesomachilis maoricus* Till. in captivity in order to determine particulars of their life-history. Some of the following points in connection with their anatomy have not, so far as I am aware, been previously described.

A full grown specimen of *N. maoricus* is 16 mm. long from the front of the head to the tip of the appendix dorsalis.

This insect though having many primitive characters, chief among which is the apterous condition, has acquired certain specializations, among them being the possession of scales; these vary in colour from black to pale brown and in reflected light appear bronze; in form they are very similar to those of Lepidoptera, though lacking cross striations.

The arrangement of the scales is interesting. They are placed more or less radially round a point in the centre of the mesothorax, (Fig. 1), those on the prothorax being directed forwards, while those on the first abdominal segment are directed backwards.

The scales are soon rubbed off, in which case the insect appears white and is very conspicuous, though when covered with scales it blends with its surroundings.

The maxillary palpi which consist of seven segments are long, and project in front of the head. (Figs. 3-5.) They are not held straight out but are bent, the terminal segment being parallel to and held directly under the basal segment. On the inside of the second segment and distally placed is found a sensory organ of unknown function, which occurs only in the male insects. (Figs. 2, 2A.) This organ consists of a projecting finger-like process, which forms the roof of a round pad, also projecting. In this pad are inserted a number of thick black hairs, presumably modified scales, which form a brush almost coming in contact with the upper projection which is transversely striated. At the end of each instar the hairs are mostly rubbed off.

Somewhat similar sense-organs occur in certain Mecoptera and Diptera, *Nannochorista dipteroides* Till. being an example of the former. In this species the organ, which is found in both sexes and occurs on the third segment of the maxillary palp, medially placed, consists of a pit-like structure bearing sensillae, which are hair-like filaments and not modified scales.

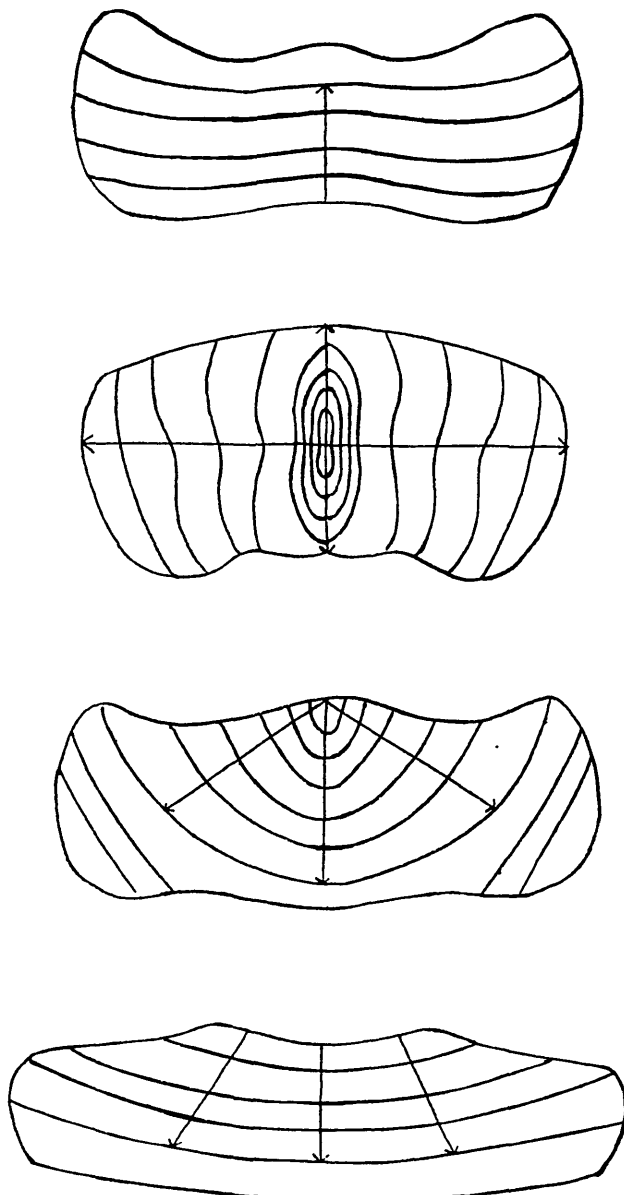


Fig 1

FIG. 1.—Diagram of tergites to show arrangement of scales on the thorax and first abdominal segment. The scales lie at right angles to the lines, their unattached ends pointing in the direction of the arrows. The lines do not correspond in number or position with those actually present.

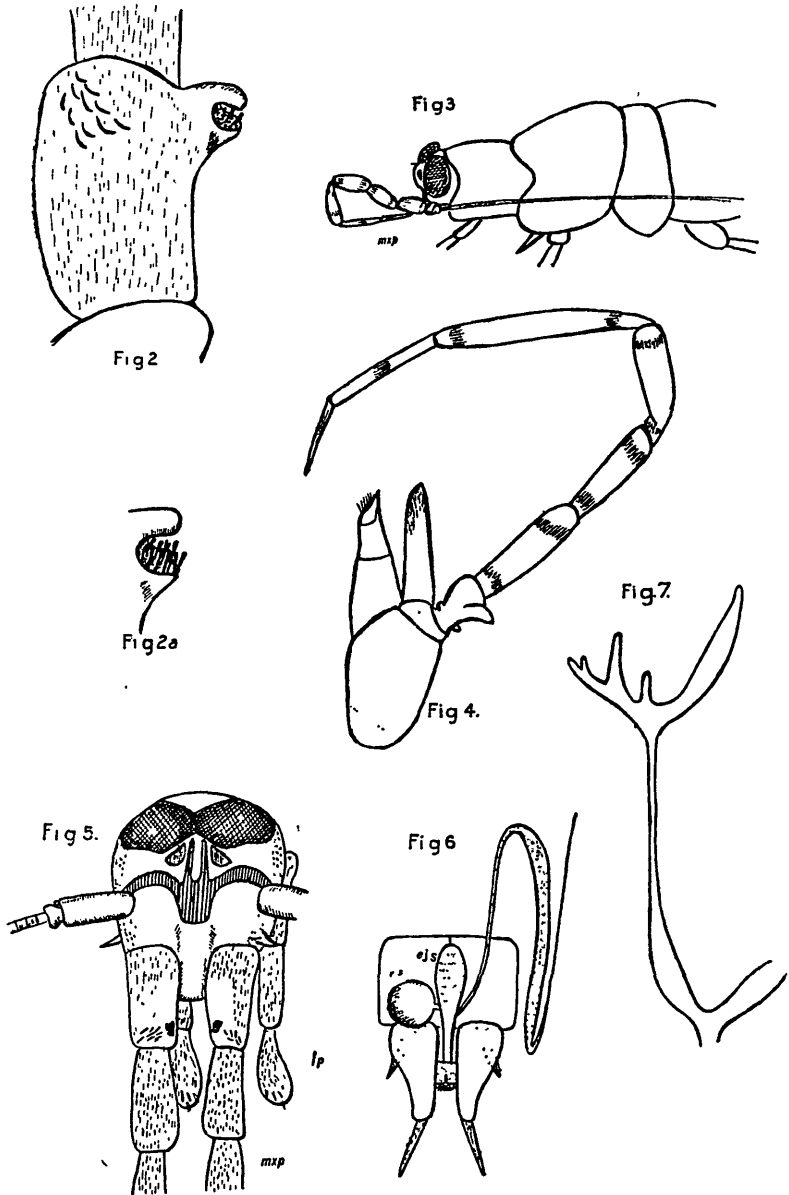


FIG. 2.—Second segment of maxillary palp of male, showing sense organ.
 FIG. 2A.—Sense organ at beginning of instar.
 FIG. 3.—Lateral view of insect. *mxp.* maxillary palp.
 FIG. 4.—Right maxilla of female.
 FIG. 5.—Front view of head of a male insect, *mxp.*, maxillary palp, *lp.*, labial palp.
 FIG. 6.—Male reproductive organs. *vs.*, vesicula seminalis, *ejs.*, ejaculatory sac. (Left testis omitted.)

Edwardsina tasmaniensis Tonnoir. (Diptera Fam. Blepharoceridae) bears a structure similar to that described above, but the depression is more pronounced, the cuticle being invaginated and forming a flask-shaped hollow containing sensillae. This organ also occurs in both sexes and is distally placed on the third segment. A similar structure occurs also in *Simulium*.

In addition to compound eyes there are a pair of lateral ocelli on either side of a ridge bearing two sensory hairs, and a very large median ocellus which extends laterally on either side to the base of the antennae. (Fig. 5.)

The male reproductive organs differ from those of other Machilidae as figured by Grassi and Oudemans. Each testis is an elongated slender organ of which the terminal portion is filamentous, the median comparatively broad; this portion leads posteriorly into the vas deferens, which opens into the base of an elongated ejaculatory sac. A globular vesicula seminalis is also connected with the ejaculatory sac and opens into it anteriorly to its connection with the vasa deferentia. (Fig. 6.)

The ovaries, which are panöistic, are branched but not segmentally arranged, and contain orange-coloured eggs. (Fig. 7.) The figure is of an ovary of an immature female.

Nesomachilis is always found under stones or wood, yet in captivity it exhibits no phototropisms, being equally at home in a bright light or in the dark.

When agitated, the antennae, which are long and normally rest along the side of the body, are waved in front of the head, and the insect advances with sudden jerky movements, sometimes jumping a considerable distance off the ground.

I have to thank Dr. Tillyard and Mr. A. Tonnoir for help and advice, and Mr. E. S. Gourlay for collecting the material studied.

LITERATURE CITED.

- GRASSI, B., 1887. *Anat. Comp. dei Tisanuri e Consid. gen. sull'organizzazione degli Insetti.*
- OUDEMANS, J. T., 1888. *Beit. zur Kenntnis der Thysanura und Collembola.*
- TILLYARD, R. J., 1924. Primitive Wingless Insects. *N.Z. Journ. Sci. Tech.*, vol. 7, p. 232-242.