Observations on the Constitution and Subfamilies of the Family Melandryidae

(Coleoptera)

BY

R. A. CROWSON.

(Glasgow)

The important work of M. G. de Viedma, published earlier in this volume, indicates that previous ideas on the definition, subdivisions and relationships of the *Melandryidae* need to be reviewed. The first question raised by Viedma's larval studies is that of the distinction between *Melandryidae* and *Tetratomidae*. If he is right in his identification of the supposed *Mycetoma* larva, then that genus is certainly not Tetratomid. There is in fact an excellent character of the adults to support this conclusion; in *Penthe* and *Tetratoma* the front coxal cavities are open internally as well as externally, whereas in *Mycetoma,* as in most true *Melandryidae,* they are internally closed. The met-endosternite in *Mycetoma* (fig. 7) is likewise unlike those of *Penthe, Tetratoma* etc. and resembles those of *Hallomenus* and *Eustrophus*. The constitution and characterisation of *Tetratomidae* have been recently reviewed by Miyatake (1960).

The second important question arising from the larval study is that of the relationships of *Synchroa*. This genus has a larval form so similar to that of *Hallomenus* that even the conservative-minded van Emden (1942) felt compelled to segregate the two genera in a special family *Synchroidae*. Dr. Viedma, on the other hand, has pointed out that some of the differences between *Synchroa* and *Hallomenus* may be more significant than van Emden supposed — the interesting point being that in all these points of difference, *Synchroa* larvae resemble those of *Zopheridae, Cephaloidae,* etc. where *Hallomenus* larvae resemble those of true *Melandryidae*. A similar generalisation applies to the more conspicuous imaginal differences between the two genera. In adult *Synchroa,* the antennal insertions are hidden under the edges

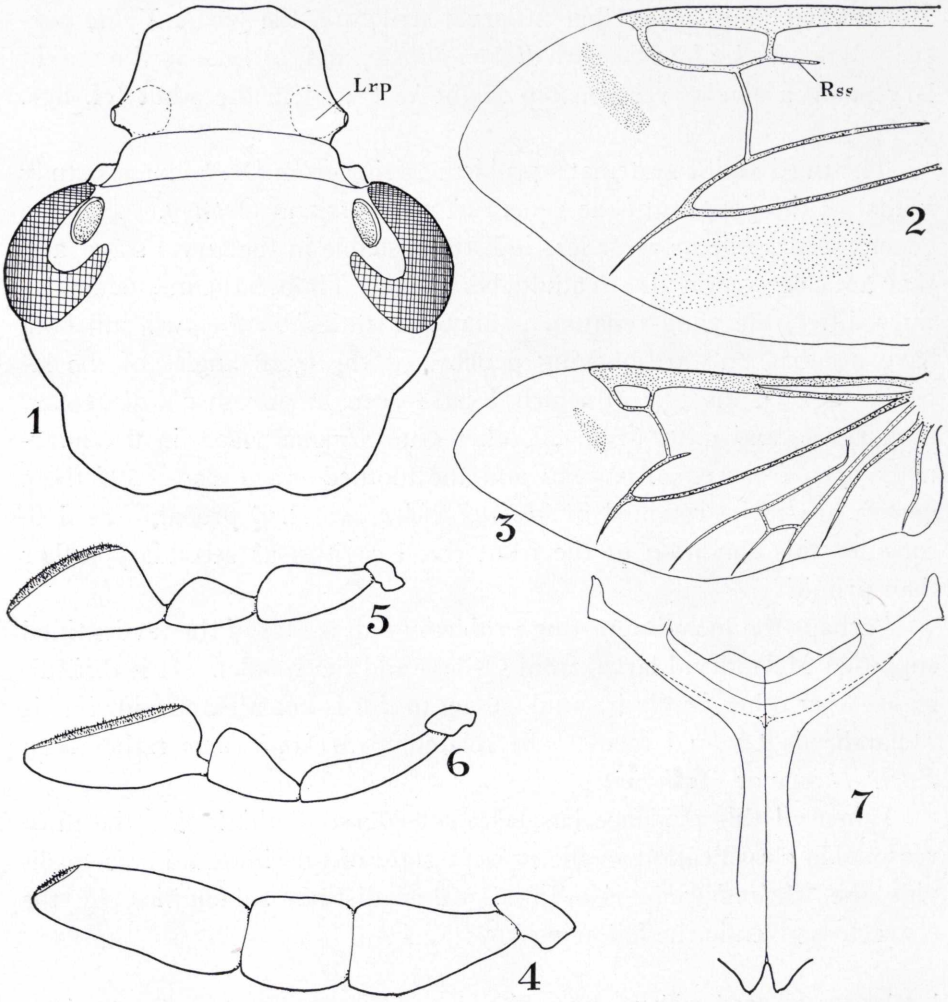
of the frons, the first 4 ventrites seem to be connate, there is a distinct stalk of Rs basad of the Radial cell in the wing (fig. 2), the aedeagus is of the inverted Heteromeran type, and the front coxae scarcely project above the level of the prosternal process. Furthermore, the met-endosternite in *Synchroa* is quite unlike those of *Hallomenus, Mycetoma* etc.

Considering all these facts, I think there is a strong case for placing *Synchroa* in a family distinct from all the other forms here studied. It also appears to me that the *Synchroidae* are probably akin to *Zopheridae* and *Cephaloidae;* in the latter family it is particularly the genera *Stenotrachelus* and *Stenocephaloon* Pic which manifest affinities to *Synchroa,* in both adult and larval structure (for the opportunity of examining *Stenotrachelus* larvae I am indebted to Thure Palm of Lund). *Stenotrachelus* was itself formerly placed in *Melandryidae,* from which group it differs *inter alia* in the form of the tarsal claws, the inverted aedeagus, and in the distinct stalk of wing-vein Rs. The larva of *Stenocephaloon,* according to the description of Hayashi, and the adult of *S. metallicum* Pic, of which I have examined the type from the Paris Museum, agree with *Synchroidae* and *Cephaloidae* in the characters which I regard as diagnostic, though Hayashi referred the genus to *Melandryidae.* According to my observation of the holotype, in the British Museum, *Synchroa crepuscula* Lewis, from Japan, belongs in the genus *Enchodes* Leconte, and is probably a true Melandryid.

Having disposed of *Synchroa,* the question which naturally follows is where to place *Hallomenus* and its allies. It appears that a natural group may be constituted by the genera *Mycetoma, Hallomenus, Eustrophus, Holostrophus, Synstrophus* and perhaps some others which I have not studied. In the adult stage, this group may be separated from typical *Melandryidae* by the completely linear tarsi, with no trace of lobing of the penultimate segment even on the front legs, by the palpi being scarcely if at all securiform, and by the presence of regular rows of punctures on the elytra. The first two of these characters, incidentally, are shared with *Synchroa,* the third is not. The group could well take the status of a subfamily, for which the best name may be *Eustrophinae.*

In larval characters, the *Eustrophinae* would seem to be more primitive than typical *Melandryidae,* and to some extent annectant between the latter group and *Tetratomidae* (the larvae of some of which, e.g. *Pisenus,* have been shown by Miyatake to have a mandibular mola). It

appears that the common larval features of *Zopheridae, Stenotrachelus, Synchroa* and *Eustrophinae* may be carried over from a type of larva which occurred in the ancestral group of most modern Heteromera. In



Figs. 1-7.—1) *Osphya bipunctata* F. ♀, head, dorsal view (Lrp, pouch of librum); 2) *Synchroa* sp., apex of wing (Rss, spur of Radial sector); 3) *Hallomenus binotatus* Quens., wing; 4) *H. binotatus,* maxillary palpus; 5) *Xylita laevigata* Hell., maxillary palpus; 6) *Osphya bipunctata,* maxillary palpus; 7) *Mycetoma suturale* Panz., metendosternite.

the adult stage the more primitive character of *Eustrophinae* as compared with *Melandryinae* is less evident, the tarsi and maxillary palpi being the only familiar characters in which such a relation is manifest. In the met-endosternite (Crowson 1938, 1944), various *Melandryinae*

such as *Xylita, Hypulus* and *Melandrya* appear to be more primitive than *Eustrophinae* in possessing a well developed lamina (present also in *Synchroa);* however, some specialized Melandryine types, such as *Clinocara* and *Orchesia,* have the Eustrophine type of met-endosternite. Viedma has pointed out that in larval structure, the genus *Xylita* partially links *Melandryinae* with *Eustrophinae,* and, at least in the maxillary palpi, a similar relationship might be traced in the adult (cf. figs. 4, 5).

The third major systematic problem arising from Dr. Viedma's study is that of the position of the genera *Conopalpus* and *Osphya.* The two genera seem to be more or less indistinguishable in the larval stage, and they are closely akin also in adult characters. Though the met-endosternites differ, the wing-venation is almost identical in the two and both have peculiar outward-opening pouches at the basal angles of the labrum (fig. 1), the like of which I have seen in no other *Coleoptera;* both agree, and differ from all other true *Melandryidae,* in the internally open front coxal cavities and the toothed tarsal claws. If these genera are to be retained in *Melandryidae,* we shall probably need to consider this condition of the front coxal cavities as secondary rather than primitive.

Perhaps the most interesting problem of all is that of the unidentified supposed Melandryid larva, from Ordesa and Sevenoaks. It is difficult to see what other family it could belong to if it is not Melandryid; if it is Melandryid, it would seem to be related to *Melandryinae* rather than *Eustrophinae* or *Osphyinae.*

When all this evidence has been considered, I think that the most reasonable classification in the present state of our knowledge is to divide the *Melandryidae* into three rather distinct subfamilies, by the characters given in the following key:

1. ADULT: all tarsi with no trace of lobing of the penultimate segment; elytra with more or less distinct rows of punctures; maxillary palpi with apical segment not or slightly securiform (fig. 4), the sensory area confined to the apex of the segment. LARVA: mandibles with distinct mola; urogomphi strongly developed, segments without ampullae; labial palpi more or less widely separated ..... 1. **EUSTROPHINAE.**
   ADULT: at least front tarsi with penultimate segment lobed below; elytra never with rows of punctures; apical segment of maxillary palpi strongly securiform, or with sensory area extending down most of its inner edge (figs. 5, 6). LARVA: mandibles never with mola; urogomphi often weak or absent, abdominal segments often with ampullae; labial palpi usually approximated ..... 2.

2. ADULT: head not notably narrowed behind eyes; tarsal claws simple; front coxal cavities internally closed; labrum simple. LARVA: labial palpi very close together, parallel; head with distinct median epicranial suture and no endocarina ..... 2. **MELANDRYINAE.**
ADULT: head considerably narrowed behind eyes; tarsal claws strongly toothed or split; front coxal cavities internally open; labrum with ventral pouches opening outwardly at its posterior angles (fig. 1). LARVA: labial palpi more or less separated and not parallel; head without median epicranial suture. ..... 3. **OSPHYINAE.**

An interesting question remaining to be solved is that of the relationship between *Melandryidae* and *Mordellidae*. Already in 1931 Böving & Craighead remarked (p. 60) that Mordellid larvae "seem rather closely related to several of the Melandryid genera". More recently, Franciscolo (1957) in his classificatory diagram of the relationships of *Mordellidae* (l. c., fig. A) placed the family in immediate contact with *Melandryidae,* basing his conclusions primarily on imaginal structures. The same author has drawn attention to the affinities of *Mordellidae* to *Rhipiphoridae,* as shown in such transitional genera as *Glipodes* Leconte and *Ctenidia* Casteln. (Franciscolo 1962, 1964?). *Rhipiphoridae,* it seems, represent a parasitic development from true Mordellid ancestors.

The Melandryid affinities of *Mordellidae* seem to be particularly towards the *Melandryinae.* This is very evident in the larval structure; adult characters suggesting a similar relationship include the strongly securiform apical segment of the maxillary palpi, the internally closed front coxal cavities separated by a very narrow prosternal process, the absence of pouches on the labrum, the lobed penultimate segment of the front tarsi, and the lack of rows of punctures on the elytra. One feature of adult *Mordellidae* (shared, incidentally, with *Rhipiphoridae)* might be cited against the possibility of deriving them from Melandryid ancestors — the very distinct stalk of wing-vein Rs. We have already used this as a main feature separating *Synchroa* and its allies from *Melandryidae,* assuming then that the presence of this stalk is a primitive character; if *Modellidae* are to be derived from Melandryid ancestors, we may need to postulate secondary re-development of this stalk in the former group.

Another family which may be allied to *Melandryidae* is *Scraptiidae* (now taken to include *Anaspidinae). Scraptia* itself was included in the *Melandryidae* by Leconte (1861). Some (as yet undetermined)

New Zealand forms collected by me in 1956-7 appear to be annectant between *Melandryidae* and *Anaspidinae* in adult characters. However, the larvae of *Anaspidinae* could hardly be derived from those of *Melandryinae;* a Melandryid ancestor of *Anaspis* must have had at least the mandibles of the *Eustrophinae.* It is noteworthy that one of the main differences between *Anaspis* larvae and the outwardly very similar ones of *Anthicus* is that the maxillary mala in the latter genus has a very distinct uncus — a precise parallel to the difference between the *Hallomenus* and *Synchroa* larvae. The presence or absence of the uncus in larvae of *Heteromera* may be a character of greater phylogenetic importance than has generally been realised.

By now we may perhaps begin to discern dimly some features of the family tree of the *Heteromera.* A common ancestor of the group probably resembled in many respects the existing family *Tetratomidae,* both in larval and adult characters. As direct offshoots from such an ancestor, we might suggest the existing families *Tetratomidae* and *Mycetophagidae,* perhaps also *Pterogeniidae-Cisidae.* From a Tetratomid-like ancestor, a second important ancestral type may have arisen — with larval characters much like the existing *Zopheridae,* and adults more similar to *Synchroa* and *Stenotrachelus.* From such an ancestor, we might derive (1) the Aderid-Anthicid-Meloid line (2) a line leading via *Pythidae* and *Pyrochroidae* to *Salpingidae, Mycteridae, Boridae* and *Inopeplidae* (3) one leading via Synchroid and Zopherid-like forms to *Merycidae* and *Monommidae* and *Colydiidae,* also perhaps to true *Zopheridae* and the Tenebrionid group of families (4) a line to *Melandryidae* and *Mordellidae-Rhipiphoridae,* also to *Scraptiidae.* One or two families, notably *Oedemeridae* and *Prostomidae,* whose relationships are still very obscure, are intentionally omitted from consideration here.

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