

On the genus *Apiocera*.

By

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The simultaneous possession of specimens of the Australian genus *Apiocera* and of its American relative *Anypenus* has enabled me to inquire into the hitherto doubtful question of their position in the system. I have come to the conclusion, that their supposed connection with the Midaidae is a very distant one, and that they are Asilidae. I will begin with a survey of the literature on this question.

The first who described an insect of that group, Wiedemann, at once recognized an Asilid in it. *Laphria brevicornis* Wied. A. Z. II. 646, 1830, from Australia, is an *Apiocera*, placed in the genus *Laphria* probably on account of the structure of its antennae. Wiedemann adds however: „Uebrigens von schlanker Statur und darin mehr einem *Asilus* ähnlich.“

Westwood introduced the genus *Apiocera* in the Lond. and Edinb. Phil. Mag. 1835, and described two species; as to the place of the genus, he hesitated between the Midaidae and the Nemestrinidae. He expressed the same doubts in his Synopsis of the Midasidae (Arcana Entomol. I, pag. 50, 1841), where a third species is added. With his usual accuracy, he did not overlook the characteristic macrochetae of *Apiocera*; they are mentioned in the letterpress and figured on the plate.

Macquart, taking notice of the peculiarities of *Laphria brevicornis* as described by Wiedemann, followed his usual method of work in proposing a new genus of Asilidae, *Tapinocera* (D. E. I, 2, 1838), for a species which he had never seen. From Wiedemann's data he even constructed an imaginary figure of the head (l. c. Tab. 6, f. 5) and, as Wiedemann does not mention the extraordinary palpi, the palpi on the figure are represented as those of an ordinary Asilid. No wonder therefore that when nine years later, Macquart came across a specimen of *Apiocera*, he did not recognize his *Tapinocera* in it, but redescribed it again, as a new genus *Pomacera*. The new family *Pomaceridae* is placed next to the Therevidae („se place naturellement avant les *Xylotomes*“, D. E. Suppl. II. p. 47—49), probably on account of the shortness of its face. At the same time Macquart acknowledges that the venation „ne se retrouve que dans les genres *Erax* et *Proctacanthæ*.“

Loew, in the first volume of the Monographs on the N. Amer. Diptera (1862), as well as much later, in his correspondence with me,

had no decided opinion about the place of *Apiocera*, but preferred the *Midaidae*, „until its true place be found“ (l. c. p. 22). — I do not know whether he ever had an opportunity to examine a specimen, or merely based his opinion on the descriptions.

Dr. Philippi, in establishing the genus *Anypenus*, was led by a correct instinct in placing it among the *Asilidae* (Verh. Z. B. Ges. 1865.)

Dr. Gerstaecker, in his paper on *Midaidae* (Stett. Ent. Z, 1868) acknowledges the coincidences between *Apiocera* and that family, but very properly observes that the differences ought to have more weight than the resemblances. „These differences consist, not only in the presence of three distinct ocelli, in the large, foliaceous, spoonshaped palpi, in the almost obliterated face, and in the short antennae, ending in a slender style, but above all in the shape of the legs, which belong to quite a different type of structure, and in their weak development, remind one very much of those of the *Bombylidae*. To determine the systematic position of this genus must be left to some future time, when its near relatives may perhaps be discovered; at present it cannot be placed satisfactorily in any of the known families, neither among the *Midaidae*, nor elsewhere.“

Dr. Schiner, Novara p. 152, sees in *Apiocera* a natural link („ein ganz natürliches Bindeglied“) between *Midaidae* and *Asilidae*, but insists upon the importance of the venation in the classification of the *Diptera*, and for this reason is very decided in favor of putting *Apiocera* among the *Midaidae*. *Anypenus* he unites with *Apiocera*.

Dr. Brauer (Charakteristik der mit *Scenopinus* verwandten *Dipteren*-Familien, 1882) sees in *Apiocera* and *Anypenus* a transition from the *Midaidae* to the *Therevidae*, rather than to the *Asilidae* („mir scheinen letztere Formen einen Uebergang zu den *Thereviden* anzudeuten, deren zarte Beine sie zeigen,“ l. c. p. 48); the same relationship is indicated in the grouping on p. 51 and 52. In this respect, Dr. Brauer reproduces Macquart's view. He also follows Macquart in establishing a separate family: *Apiocerina*, for the two genera.

Until recently I had no independent opinion about the forms in question, and followed the prevailing view in placing them, at least temporarily, among the *Midaidae* (see my *Western Diptera* and my *Catal. N. Am. Dipt.* 1878). It is only since I began to pay more attention to chaetotactic characters, that my eyes were opened to the fact that *Apiocera* is an *Asilid*.

The *Midaidae* have no cephalic and thoracic macrochaetae at all, which is very remarkable considering their assumed relationship to the *Asilidae*. *Apiocera* is provided with such macrochaetae,

and this constitutes a new link between it and the Asilidae, besides those noticed before, as the presence of ocelli and palpi etc.

I will now attempt a detailed comparison between *Apiocera* and the genera *Erax* and *Proctacanthus* (Section *Asilina*) the nearest to it among the Asilidae, and will begin with the distribution of the macrochaetae.

On the head, the occipito-orbital bristles of *Apiocera* are as dense, although not quite as strong as in the *Asilina*; the ocellar bristles, generally existing in the latter, are absent here. — On the thorax the following macrochaetae may be observed: 1. A collarlike row on the prothorax, a little less conspicuous than in the *Asilina*; 2. Humeral bristles, hardly deserving the name of macrochaetae; 3. A row of bristles between the humerus and the root of the wing; it is characteristic and replaces the praesutural bristles present in the Asilidae (one, two or more large bristles inserted in the angle formed by the mesothoracic and dorsopleural sutures); 4. An irregular row of supra-alar bristles, along the edge of the supra-alar cavity; they seem to vary in number in different species; similar bristles in the *Asilina*; 5. Bristles on the post-alar callus, as in the Asilidae; 6. A pair or two of praescutellar bristles; 7. Scutellar bristles, very distinct, although less numerous than in the *Asilina*.

The fan-like row of bristles on the metapleura (*trichostichus* Arrib.) common among Asilidae, does not exist here.

The legs are somewhat weaker than in most *Asilina*, however the importance of this weakness as a family-character has been much over-rated. I have a new Australian species whose legs are not much weaker than those of a *Proctacanthus* of a corresponding size. — The front femora are beset with bristles on both sides; the middle pair principally on the underside; on the upper side, I perceive only a couple of bristles before the tip; the hind pair has bristles on the underside only. *Proctacanthus* has a similar distribution, only the bristles on the underside of the front femora form a more conspicuous row; on the middle and hind femora the bristles are more numerous on the upper side, although not along the central line. In both genera the tibiae have scattered bristles. The tarsi of *Apiocera* are weaker; the joints of the fore tarsi are less coarctate at base, and therefore less capable of a strong grip; the bristles on them are less numerous. Ungues and pulvilli have the same structure.

(The legs of the Midaidae are generally deprived of characteristic bristles; a few weak ones exist on the posterior tibiae of some genera only, for instance *Leptomidas*. The genus *Midas*, which comprises the majority of the species of the family has no such bristles and the structure of its legs is very different from that of the Asilidae: the

two front pairs are comparatively weak, the hind pair on the contrary, very strong, with stout femora, provided with rows of spines on the underside, the hind tibiae often have a strong hook at the end; all these characters are foreign to the Asilidae, as well as to Apiocera.)

The vertex of Apiocera is but little excavated between the eyes and the existing excavation is nearly filled out by a broad, flat and but little marked ocellar tubercle, separated from the eyes by a deep furrow on each side; the ocelli are rather large, far apart, especially the anterior one, which is not on the tubercle, but a little in front of it. (In the Asilidae, the ocelli are closer together, on a well-marked tubercle, placed at the bottom of a more or less deep excavation of the vertex. The Midaidae have no ocelli; except the genus *Rhaphiomidas* O. S., which as will be shown below, is probably an Asilid.)

The face is so short, that the antennae are inserted immediately over the oral opening and almost touch the palpi; there is no room for the mystax, so characteristic among many Asilidae.

The palpi consist of a long subcylindrical basal joint, and of a large spatulate pubescent second joint; I do not know of any similar structure among the Asilidae. The Midaidae have no palpi at all, or they must be rudimentary, and the rudiments* have not been discovered yet.

The scapus of the antennae is beset with conspicuous bristles, and, in that respect, resembles that of many Asilidae; the oval third joint, with a short, stout, pointed style, is unlike that of the Asilina, but similar structures occur among the Dasypogonina.

The proboscis (more or less long in different species) has narrow, but distinct fleshy lips at the tip.

The prothorax is much less developed than in the Asilidae, and hence, the head is more approximate to the thorax; the latter, on the contrary, is more developed in front of the wings than in the Asilina; the mesonotum is more flat than in *Proctacanthus* or *Erax*. The scutellum is like that of the Asilidae, strongly projecting, and concealing the narrow metanotum. (In the Midaidae the scutellum is very different, a narrow parallelogram, not projecting and not overshadowing the metanotum at all.)

The abdomen does not differ much from that of *Proctacanthus* or *Erax*, except that it is a little broader and flatter at the base. The forceps (♂) is very like that of those two genera in its outward appearance, and very different from the hidden forceps of most Midaidae. The ♀ has at the end of the abdomen a coronet of spines like *Proctacanthus*, and several other Asilidae, Midaidae, Therevidae.

The coloring of the body, the gray lines on dark ground of the thorax, the white and gray spots of the abdomen, resemble those

of the *Asilina* very much; three american species (*A. brevicornis* Phil., Chili; *haruspex* O. S., Calif.; and n. sp. from Mexico) have white abdominal segments, preceding the male forceps, exactly like *Erax*. However, a new australian species in my possession has an entirely different coloring.

The venation of *Apiocera* is remarkable for the curvature of the veins in the apical portion of the wing, which naturally suggests a comparison with the venation of the *Midaidae*. But the same tendency of the veins to turn forward exists in many South-American species of *Erax* and in some *Proctacanthus*; both branches of the third vein often end before the apex; often they are distinctly arcuated (see Macq. D. E. I, 2, Tab. 9 f. 9; Suppl. IV, Tab. 8, fig. 3 and 7; compare also *E. griseus* Guérin); in some species even the anterior branch ends in the first vein, instead of in the margin, just as in *Midas* or *Apiocera* (see *Erax heteropterus* Macq. D. E. Suppl. I. 83; also *Erax albescens* Schiner, Novara, p. 180 and *E. cellatus* Schin., ibid. p. 181.) Among the species of *Apiocera* hitherto discovered, the following forms of venation occur:

I. As to the fork of the third vein:

1. The anterior branch of the fork ends in the first vein, the posterior branch ends in the margin (species from Australia and Chili).
2. Both branches of the fork end in the margin of the wing, that is, beyond the tip of the first vein (the californian *A. haruspex* O. S. and n. sp. from Mexico).

II. As to the veins issuing from the discal cell:

1. The first of these veins ends before, the second behind the apex of the wing (this happens in all the known australian species, in the californian *A. haruspex* and in my new species from Mexico).
2. The first and second of these veins end before the apex (this is the case with the chilian species).

We find therefore an equal proclivity to variation among the *Asilidae*, as well as among the species of *Apiocera*. The only link, as yet missing, in order to complete the transition from the venation of certain forms of *Erax* to *Apiocera*, consists in the position of the first vein issuing from the discal cell. We have no *Asilid* yet, in which this vein ends before the apex and no *Apiocera* in which it ends behind it. And this is the only point in which *Apiocera* is like the *Midaidae*.

In all other respects we find that the characters of the venation in which the *Asilidae* differ from the *Midaidae*, all belong to *Apiocera*: 1. The *Midaidae* have a remarkably long and irregular discal cell, with the first posterior cell often bulging into it; the discal cell of *Apiocera* is shorter and broader, like that of the *Asilidae*. — 2. The *prae furca* of the *Midaidae* is remarkably short, almost obsolete, as the

bifurcation of the second and third veins takes place almost immediately after the origin of the second; in *Apiocera* and the *Asilidae* the praefurca is longer. — 3. The majority of the *Midaidae* have only four posterior cells, one of the veins, issuing from the discal cell being obliterated; *Apiocera*, like the *Asilidae*, has five posterior cells. Those few *Midaidae*, that have five posterior cells (the Australian genus *Diochlistus* and *Triclonus* and the Chilean *Mitrodetus*), still differ from the *Asilidae* and from *Apiocera* in the characteristic shape of the discal cell and the shortness of the praefurca.

It seems therefore that when Schiner insisted on the venation as a proof of the relationship of *Apiocera* with the *Midaidae*, he had not given sufficient attention to the subject.

The alulae of *Apiocera* are large, the tegulae have long, soft, wooly cilia, like those of *Proctacanthus* and *Erax*. The cilia in *Midas* form a short, stiff fringe; those of *Leptomidus* are microscopic.

To sum up; *Apiocera* differs from the *Midaidae*:

1. In the presence of ocelli; 2. In the presence of macrochetae on head and thorax; 3. In the structure of the scutellum; 4. In the structure of the legs; 5. In the presence of palpi; 6. In the venation; 7. In the structure of the ♂ forceps; 8. In the structure of the antennae; 9. In the usual character of the coloring.

And in *all* these characters *Apiocera* is like the *Asilidae*.

The real differences between *Apiocera* and the *Asilidae* would thus be reduced to the shortness of the face, to the shape of the palpi, and to the course of the first vein issuing from the discal cell. Would we be justified in introducing a new family on the strength of these differences, and notwithstanding the overwhelming coincidences between *Apiocera* and the *Asilidae*? I think not.

We may therefore conclude by saying that *Apiocera* is an *Asilid* adapted to peculiar and as yet unknown conditions of life. Its somewhat weaker and less bristly legs may indicate that its prey is perhaps easier to catch and to hold; the weaker proboscis, ending in fleshy lips, may prove that the prey is easier to pierce etc. What the purpose of the spoon-shaped palpi and of the short, beardless face may be, is more difficult to foreshadow.

It strikes me, as another result of my comparison between the *Asilidae* and the *Midaidae*, that the relationship between those families is somewhat less close than was heretofore supposed.

The relationship to the *Therevidae*, suggested by Macquart and Brauer, rests principally on the shortness of the face. But the short face of *Thereva* depends more on the oblique emargination of the mouth than on the low insertion of the antennae. The venation of *Thereva*, on account of the shortness of the first longitudinal vein, belongs to a

different type, far remote from that of the Asilidae and Apiocera etc. Some other resemblances which may be pointed out between the forms in question, are insignificant when compared to the differences, and when contrasted with the homologies between Apiocera and the Asilidae.

Granted that Apiocera is an Asilid, it remains to decide in which of the three sections of that family it must be placed. After what has been said above about the relationship of Apiocera to Erax and the section Asilina in general, the alternative would consist merely between placing Apiocera in that section, or forming a separate section for it. I would prefer the former, and would consider Apiocera as an Asilid whose terminal antennal arista has been contracted into a short style. My reason for this preference lies in the consideration that the existing distribution in three sections is confessedly an artificial one (see about it the observations of Dr. Schiner in the Verh. Z. B. Ges. 1865, p. 997 and 1866, p. 651), and that it would be less disturbed by the introduction of Apiocera among the Asilina, than by the adoption of a separate section Apiocerina, which, in other respects, is a natural group.

Here is the place to mention the remarkable californian genus *Raphiomidas*, described by me in the Western Diptera, p. 281 (1877), but which, unfortunately, I cannot compare in the original now and must rely on the incomplete data of my description. I placed it among the Midaidae, from which it differs in having distinct ocelli (I could distinguish only two), and a shorter discal cell; the venation approaches the Chilean genus *Mitrodetus* and is therefore nearer to the Asilidae than to the Midaidae; that is, there are three cells intervening between the forked cell and the posterior margin. The proboscis is elongated, like that of *Mitrodetus*. My description is silent about the presence or absence of macrochaetae and palpi and about the shape of the scutellum, but Dr. Hagen, who at my request, kindly examined the original type in the Museum of Comparative Zoology, Cambridge, Mass., informs me that thoracic and scutellar macrochaetae are present, and that the scutellum is *Asilus*-like. It would seem therefore that *Raphiomidas* is an Asilid of a peculiar type, having, like *Anypenus*, a Midaid-like venation, but antennae of a different structure and a much longer proboscis.

It remains for me to examine whether *Anypenus* Phil. should be considered a synonym of Apiocera or kept separate from it. Dr. Brauer (l. c. p. 51) has pointed out quite correctly, that the difference consists in the course of the second vein issuing from the discal cell, which in *Anypenus* ends before, in Apiocera behind the apex of wing. The adoption of these two groups would be justifiable, if they received an additional weight from their geographical distribution; if all the *Anypenus* belonged to America, and all Apiocera to Australia. But, as I have

shown above, there are a californian and a mexican species, in which the course of that second vein is like that of the australian species. More than that, those two species differ from all the known species of *Apiocera* and *Anypenus* in having both branches of the fork of the the third vein ending in the margin of the wing (and not the anterior of them in the first vein). If therefore we adopt the genus *Anypenus*, on account of its venation, there is no reason why we should not form a third genus for those two species, and for every change in the venation which may occur. The species are not numerous enough for such a process, and moreover they agree too much in all the other characters. It will be better therefore to drop *Anypenus* for the present.

Synopsis of the known species of *Apiocera*.

Mr. Westwood (l. c.) described three species from Australia, *Apiocera moerens*, *asilica*, *fuscicollis*. He observes however (*Arcana* p. 56): „I am by no means satisfied of the specific diversity of these three insects, my specimen of *A. asilica* being in a very mutilated state.“

Mr. Walker (List etc. VI, p. 376) quotes *A. asilica* Westw. but inadvertently (?) reproduces verbatim the description not of that species, but of *moerens* Westw. *Pomacera Bigoti* Macq. D. E. Suppl. II, 19 is quoted as a synonym. The synonymy may perhaps be correct, as to *moerens*; observe however that Macquart's specimen was from Tasmania and that the design on the thorax is different from that of Mr. Westwood's species; the figure in Macquart represents the antennae as concave; the palpi likewise are peculiar. — Dr. Schiner's statement (*Novara* 12) that *Pom. Bigoti* is a synonym of a *A. asilica* is merely a repetition of Walker's. — Wiedemann's *A. (Laphria) brevicornis* is not sufficiently described for an opinion of any kind about it. — A gray australian *Apiocera* before me is certainly different from *moerens* Westw. and from *Bigoti* Macq.; but the insufficiency of the other descriptions does not enable me to place it elsewhere. Thus we have five specific names, although we cannot tell how many species they may represent. The whole subject requires a revision, based upon more abundant materials. It is evident at the same time that the genus is quite common in Australia and that it is represented by good many species. I have seen four different species in collections.

Philippi described two chilian species in his new genus *Anypenus*. As I said above they slightly differ from the australian species in their venation. The californian species (*A. haruspex*) described by me and the new mexican species in my possession have a different venation again, although they share all the other characters of the genus.

Thus all in all there are at least eight species of *Apiocera* in the collections.

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