Contributions

to the Study of the Liponeuridae Loew

(Blepharoceridae Loew, olim),

by

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The scope of the present paper is principally critical. Since my short article in the Berl. Ent. Z. 1891 (Synopsis of the described genera and species of Blepharoceridae) and even earlier, I have had but little opportunity for continuing my studies on this family in nature, or even in collections, but I have not ceased to keep up with its progress in entomological literature. A critical survey of recent, as well as of older publications, has afforded me some results which I deem worthy of communication.

In quoting the principal publications on the family, I shall, for brevity's sake, give the author's name, and the date and page of the publication only, referring in all cases to the following list:

Loew, Stett. Zeit. 1844, p. 118. *Liponeura* n. gen.
— Monographs of the Diptera of N. Am. Vol. I, p. 8. 1862.
— Bull. Soc. Ent. It. 1869. La famiglia dei Blefaroceridi.
— Schl. Zeitschr. f. Ent. 1877. Revision der Blepharoceridae.
O. Sacken, Deutsche Ent. Z. 1878, p. 405. Bem. üb. Blephar., ein Nachtrag zu Loew's Revision etc.
— Berl. Ent. Z. 1891. Synopsis of the described genera and species of Bleph.
Dr. Fritz Müller, Archivios do Museo Nac. Rio Jan. IV. p. 47—85, w. 4 plates (1881). A metamorphose de um insecto Diptero.
Schiner, Fauna Austr. Dipt. Vol. I, 1862; Vol. II, 1864.

To avoid repetition, I shall, for the names of the ten existing genera, use the following abbreviations.

Blepharocera, *Bleph.*; *Liponeura*, *Lipon.*; *Bibiocephala*, *Bibioc.*; *Agathon*, *Agathon*; *Apistomyia*, *Apist.*; *Hammatorrhina*, *Hammat.*; *Paltostoma*, *Palt.*; *Snowia*, *Snowia*; *Curupira*, *Curupira*; *Hapalothrix*, *Hapal.*

I. The Name of the Family.

Rondani (Prodr. I, 1856) introduced this family under the name Asthenidae (p. 17, Astenidae, p. 39, and stirps Astenina, p. 190), without any definition. The genus *Macropeza* was included in it, perhaps in accordance with Loew, 1844, p. 121, line 18, who expressed the same view. The generic name *Asthenia* Westw. having been given up as preoccupied, Loew introduced for the family the name Blepharoceridae (Monogr. N.A. Dipt. Vol. I, 1862, p. 8). He had no other choice for the name, because the genus *Blepharicera* Macq. (or *Blepharocera*, as Loew amended it) was in 1862 the only published genus in the family. *Liponeura* Loew (1844), was, at that time, considered by Loew as a synonym of *Blepharocera*. And the genus *Tanyrhina*, from Ceylon, which he mentions at the same time with *Blepharocera*, was merely a name without description. The name being preoccupied (*Tanyrhinus* Mannerh.), the genus was described by Loew for the first time in 1869 (Bullet. Soc. E. It.) as *Hammatorrhina*. It is in the interval between 1862 and 1869 that Loew disentangled the two genera *Blepharocera* and *Liponeura*, as far as Macquart was concerned; Schiner's *Blepharicera* (1864) was interpreted by Loew only in 1877, and, as we shall see (in § V), unsuccessfully. In 1877 (p. 58) Loew referred to his publication in 1862, and intimated that he should have preferred to have given to the family the more appropriate name of *Liponeura*, but that it appeared to him unbecoming („es schien mir anmassend") to bestow upon it a name derived from one of his own genera. I do not attempt to explain the evident disagreement between the two statements, that of 1862, where Loew says: „I unite these two genera (*Bleph.* and *Tanyrrh.*) into one family etc." and that of 1877 where he says (p. 58, line 16) „at that time (1862), when I knew only three genera etc.", counting *Liponeura* for one. There is not the slightest doubt, at any rate, that if Loew had been aware in 1862 of the difference between his *Liponeura* and Macquart's *Blepharocera*, no sense of the unbecoming would have prevented him to introduce the more appropriate name. He is perfectly right in saying „that it was much against his inclination (es widerstrebte mir die Wahl nicht wenig) to give a name which means ciliated antennae to a family distinguished from all the surrounding ones by the glabrousness of its antennae". He goes on to say that Liponeuridae (which means „losing its veins") is a much better name for a family with such a variable venation. In his perplexity he suggests the rather desperate remedy of altering the names of genus and family in *Ablepharocera* and Ablepharoceridae, in order to preserve in these names a trace

of Macquart's share in the discovery of the genus. At the time when I was preparing the second edition of my Catalogue (which appeared in 1878) Loew urged me in one of his letters to adopt the new family-name in it, and I confess that I regret not having done so. But there is no reason to prevent me from doing so now that I better understand the propriety of this improvement.

Loew is the founder of the family. His definition of it (1862), at a time when it consisted of two genera only, is just as available now, when there are ten of them: „Three ocelli; wings ample, bare, with creases apparently caused by folding; no discal cell; posterior tibiae with stout spurs, anterior tibiae unarmed."

Both family-names were proposed by Loew, and I deem it just, as well as expedient, to accept the very appropriate name which he preferred, instead of that which he reluctantly adopted. Senseless names of genera may be tolerated, but those of families, as having a wider bearing, should be rejected.[1])

II. Survey of the characters of the Liponeuridae,

arranged synoptically for the purpose of facilitating the task of future describers.

This Survey of the characters of the Liponeuridae is, in the main, an English translation of my publication on the same subject in German in the Deutsche Ent. Zeitschr. 1878, p. 413, but with additions and corrections representing the progress made since that time. It must be borne in mind, in using this Survey, that it was compiled by me long ago, in part from existing descriptions, in part also from notes, taken by me in visiting different collections, principally during my travels in Europe in 1877 und 1878 (comp. O. S. 1878, p. 406). Such a method is liable to bring about inaccuracies, which it would be impossible for me to correct at present. Specimens of this family are comparatively rare in collections; many of them are uniques, scattered over two continents. All I have before me now in my own very small collection, consists of a specimen of *Liponeura cinerascens*, which I took in the Pyrenées, and a male of *Lipon. yosemite*, caught by me in California. If I persist nevertheless in publishing this Survey in an English edition brought up to date,

[1]) There is a dangerous resemblance between the names of *Blepharocera* and *Blepharoptera*, both genera of Diptera. Loew himself fell a victim to this resemblance when, in 1863, he described *Blepharocera capitata* (Cent. IV, 43) as *Blepharoptera capitata*. This is not a sufficient reason, however, for giving up either of these generic names.

it is in order to bring it nearer to the English public, and in the hope that it will be useful to future describers in calling their attention to the variety of characters occurring in this interesting family. This synopsis will also afford them, I trust, a key for an easier access to the existing literature. Loew's „Revision" remains, of course, the foundation for futures studies.

For those who will use my Survey I deem it necessary to give here some explanations. The parts of the mouth I have not mentioned, because they properly belong to the family-character, and have been but little used in describing genera and species. For data about them I refer to Loew's Revision, and especially to Dr. F. M.'s description with figures; also to Westwood's[1]) delineation of the mandibles of the female (Guér. Mag. de Zool. 1842). The mouthparts of *Apist.* Bigot (Ann. 1862) are incorrrectly drawn; compare the statement of Haliday, in Loew, 1869, p. 100, line 15, from bottom. The mandibles of the male Liponeuridae are either entirely obsolete, or less developed than those of the female, as is the case with many other bloodsucking Diptera. The dimorphic females deprived of mandibles, and described by Dr. F. M., require, as yet, a further elucidation.

I should particularly call attention to the various structures of the legs, the relative length of their different parts, and to the different forms of the last joint of the tarsi and the ungues. They afford very good characters, offer unexpected coincidences between different genera, but have, as yet, been little studied.

Very little has been said as yet about the secondary net of crease-like lines on the wings of the Liponeuridae. Do they offer a regular design, subject to some rule? In other words, are they always the same in the same species, in the same genus, or perhaps in the whole family? Or are they arranged at hap-hazard, like the changeable folds of a tissue? Of the two aforesaid specimens of *Liponeura* which are at my disposal at present (*L. yosemite* ♂ and *cinerascens* ♂), the former has brownish wings, and a secondary net of a paler color which forms a very conspicuous design, carried out in all its details over the whole surface. The wings of the other species, *Lip. cin.* are perfectly transparent, and the secondary net

[1]) I cannot resist here to call attention to an instance of the accuracy of Westwood's drawing. In the above-quoted figure of mandibles, their denticulations are pointing backwards, exactly as they are figured by Loew (1877, fig. $3\frac{b}{-}$) and by Dr. F. M. (1881, fig. $21\frac{md.}{=}$). That Westwood did not notice the unfacetted stripe across the eyes may be due to the imperfect condition of this specimen.

is much less distinct, and less developed in its details; it justifies Schiner's (Nov. p. 28) likening it to a delicate spider's web. Nevertheless a close comparison reveals a conformity of the principal lines of the net in the two species. — Haliday, in an Appendix to Loew's paper (in the Bullet. etc. 1869, p. 99) is the only one who paid some attention to this secondary net. But he started from a false premise, founded upon the imperfection of Schiner's figure of the wing of *Paltostoma* (Novara Tab. II, f. 4). The seventh longitudinal (axillary) vein in that figure is represented by a line of the same thickness as the lines of the secondary net. Haliday concluded from it that this vein was meant for a line of the secondary net, and as a representative of the primary axillary vein which was wanting („dove la vena longitudinale ultima e semplice [che succede alla vena biforcata nella *Blepharocera* ecc.], mancando nel sistema delle vene primarie, si trova perfettamente rappresentata nella reticella secondaria"). But this supposition is easily set aside by a reference to Schiner's letterpress (Nov. p. 28, line 13) where it is distinctly said: „Axillarader deutlich und ziemlich lang." The thinness of the axillary vein is therefore a defect in the figure. The genus *Curupira* F. Müll., allied to *Palt.* and represented as having the same venation, is figured with a very distinct axillary vein (Dr. F. Müll., 1881, Tab. VII, f. 7).

A. Characters belonging to all the genera.

Wings. No discal cell. Venation gradually degraded from nine or ten longitudinal veins *(Bibioc., Agathon)*, to only four or five veins *(Hammat.)*.

A secondary net of crease-like lines on the wings.

Peculiar shape of the wings, with a large, angular anal lobe.

Alula, tegula and antitegula absent, or rudimentary.

A small chitinous thickening in the axillary incision (I have observed it in all the species which I have seen; comp. O. S., Berl. Ent. Z. 1892, p. 455. It has not been noticed by any other author).

Strong iridescence of the wings which, in some species *(Lipon. yosemite, Lip. brevirostris, Hapalothrix)* shows a beautiful violet-blue opalescence.

Eyes of a nearly identical structure in both sexes (that is, either holoptic or dichoptic in both sexes; the same identity in the case of bisection by a groove).

NB. In *Blephar. capitata* I noticed that the portion of the eye above the bisecting line is a little smaller in the male than in the female (O. S. 1878, p. 405). I do not know whether a similar difference occurs in other species.

Eyes hairy (a minute, short pubescence in all the species; in *Bibioc.* there is, besides, a secondary, longer pubescence on the lower portion of the eyes; in *Hapalothrix* the eyes are clothed with long hairs).

Ocelli. Three, rather large.

NB. Dr. F. M. (p. 81, line 14 from bottom) observes that the ocelli are smaller in the ♀ (*Snowia,* f. 13), than in the ♂ (*Curupira,* f. 15); in the latter they are placed on a protuberance on the vertex A similar protuberance in *Hamm.* ♂ (Loew, 1877, p. 75 at top), *Apist.* ♀. Do such differences between ♂ and ♀ in the size of the ocelli occur in other genera?

Antennal flagellum with a microscopic pubescence, without verticils (Loew, 1877, p. 64, *Bleph.* „Ohne alle längeren Haare").

NB. In *Lip. yos.* I perceive some longer hairs on the proximal third of the segments. In *Hapal.* the antennal scapus is hairy, like the rest of the body.

Palpi inserted at the base of the proboscis, as far as observed, four-jointed (Dr. F. M. fig. 21 ♂), sometimes apparently five-jointed.

In *Palt., Hamm.,* and *Apist.* the palpi are more or less abortive. In this case these flies seem to follow the law which prevails with many other flies with a long proboscis, the palpi of which are stunted, like *Geranomyia, Toxorrhina, Elephantomyia*; most of the Cyrtidae etc.

NB. Bigot describes the palpi of *Apist.* as „triannulati, subcylindrici" (Ann. 1862, p. 110). This description is just as exact as his description of the palpi of the Midaidae „palpes étroits, non-lamelleux" (Ann. 1857, p. 536). Mr. G. Tos writes me that he could not distinguish any palpi in the specimen in the Turin Mus.

Thorax with a distinct transverse furrow, interrupted in the middle.

Body glabrous (hairy in *Hapal.*).

Legs comparatively long; the hind pair longer than the others.

Spurs developed on the posterior tibiae only; on the two anterior pairs they are wanting, or only rudimentary (no spurs in *Hapal.*).

Pulvilli none; empodia rudimentary.

Ungues generally somewhat incrassate at the base; sometimes beset with stiff, minute bristles on the under side. (Comp. Dr. F. M., fig. 10, *Curupira* ♂.) In *Hapal.* the ungues are abnormal, pulvilliform.

Forceps of the male somewhat like those of the *Limnobina*, but flatter, with many modifications. (Comparison of the forceps *Bleph.* and *Lipon.* in Loew, 1877, p. 66.) Figures in Loew, 1877, f. 4, *Bleph. cap.*; in Dr. F. M., f. 24, *Curupira.* — In *Bibioc.* and *Agathon*, the forceps is projecting, as in the Asilid *Erax.*

Ovipositor, two short, rather obtuse lamels. — (Loew. 1877, p. 83; Dr. F. M., fig. 23.)

NB. The females of *Bibioc., Agathon, Lip. bilob., Lip. yos., Hamm., Palt., Hapal.*, are as yet unknown.

B. Characters that are different in different genera.

Antennae, 14- or 15-jointed; in three genera 9- or 10-jointed.

In the genera of the first group (comp. the Anal. table) I counted 15j., except in *Bleph. ancilla* and *Lip. yosem.* where I counted 14, with an indication of a 15th joint (O.S. 1878, p. 409). In the second group, *Snowia* and *Curupira* have 14 joints; in some rare cases Dr. M. counted 15 (p. 81, l. 7 from bottom). In *Paltostoma* Schiner counted only 13; Loew in *Hamm.* 10(?); Bigot in *Apist.* 9, ♀; Verrall 10, ♂, *Hapal.* has 10(?). Ant. longer than the head, joints of the flagellum elongate: *Bleph., Lip.* Ant. but little longer, or shorter, than the head: *Bibioc., Agathon, Apist., Hamm.. Palt., Snowia, Hapal.* (The latter genus has the joints of the flag., especially the middle ones, short and stout; *Hamm.* has the last joint conspicuously large.) First joint of the antennal scapus smaller than the second: *Bleph., Lip., Apist., Hamm., Bibioc., Snowia, Palt.(?)*

NB. In *Bleph. ancilla* I described the joints of the scapus as of nearly the same length, the second a little stouter (O.S. Cat. N.A. Dipt. 1878, p. 266).

Second joint of ant. scapus somewhat arcuated: *Apist., Bibioc.*

Eyes.

A. Contiguous on the front: *Bibioc.. Agathon, Bleph., Hamm., Hapal., Curupira.*

NB. *Bleph.* (in both sexes, Loew, 1877, p. 64), *Agathon* and *Curupira* (Dr. F. M. ♂ fig. 7) have the eyes subcontiguous, with a very narrow, linear front between them. Loew (1877, p. 74) supposes this may also be the case with *Hamm.*

b. Bisected by an unfacetted stripe; facets larger above the stripe than below: *Bleph., Hamm.*

bb. Bisected by a deep groove, or by a mere line; facets larger above the stripe than below.
Bibioc.; Agathon; Bleph. ancilla.

AA. Separated by a more or less broad front.

c. Bisected by an unfacetted stripe; facets larger above the stripe than below.[1]) — *Apist.*

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[1]) Bigot answered to Haliday, upon his inquiry about this point: 1° „che la differente grandezza delle faccette nelle due regioni degli occhi existe di fatto, sebbene non facile a constatarsi sull' unico esem-

cc. Bisected by a mere line; facets larger above the line than below. — *Lip. yosemite* ♂ (O. S. observed in life).

ccc. Not bisected; facets of an equal size.

Lip.(?), Palt., Snowia.

NB. Both females, described by Dr. F. M. as bloodsucking *(Snowia)* and flowersucking (of a still doubtful genus), have the eyes separated by a broad front, but the eyes of the former are described and figured (fig. 14, head) as larger than the eyes of the latter (fig. 13, head).

I place *Lip. cin., brevic.* and *bilob.* in the division ccc with a query, because I have no positive data about their eyes.

Apist. and *Lip. yosemite* are two very rare instances of bisection of the eye connected with a dichoptic head. As a rule, it occurs only in holoptic heads.

Proboscis. Long: *Apist., Palt., Hamm.*

Short: *Bibioc., Agathon, Bleph., Lip., Snowia, Curupira, Hapal.*

Palpi. Compare above, under § A.

Legs. Their proportions vary in different genera and species, but, as already stated (under A), the last pair is always the longest.

In some cases the hind femora are somewhat incrassated (*Bleph. fasc., Lip. yos., Snowia).*

In *Hamm.* the middle pair of legs is remarkably short.

In *Bibioc.* and *Agathon* the fore coxae are somewhat distant from each other; in *Bleph.* and *Lip.* much less.

In *Lip. cin.* ♂ the hind tarsi are short, about half as long as the tibiae; this is principally due to the shortness of the 4th joint, which is much shorter than the fifth.

Bibioc. has the front tibiae somewhat curved; the closely related *Agathon* has them straight.

The last joint of the tarsi is subject to different variations. In *Lip. cin.* ♂ it is hollowed out on the underside, and provided at the proximal end of the curvature with a bunch of short hairs.

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plare della collezione" (Loew, 1869, p. 100). But his specimen was a ♀, in which the difference, as Bigot's figure represents it, is small. According to Verrall, in the ♂, the difference is quite striking. It is also worthy of notice that the unfacetted stripe across the eye is not mentioned at all in Bigot's description, and therefore that the statement of Loew about it reposes merely on its delineation in the figure.

The same structure occurs in *Curupira* ♂ (Dr. F. M. fig. 10). Similar structures among Limnobina, comp. Mon. IV, p. 29. In *Lip. cin.* ♀ the structure is nearly the same, only the curvature is shallower (Mik, in litt.). *Bleph. fascip.* ♂ has last joint straight (Mik); *Lip. yosemite* ♂ has the same structure; in Dr. F. M. 1881, fig. 8 the last joint of the flowersucking ♀ is represented in the same way.

The relative length of the tarsal joints of *Apistomyia* is incorrectly rendered in Bigot's figure (Ann. S. E. Fr. 1862, tab. I, f. 1): they are gradually diminishing from the first to the last. Comp. the communication of Bigot to Haliday, in Loew, 1869, p. 100.

Spurs. The two spurs on the hind tibiae are described as rather long in *Hammat.* (sehr gross, Lw. 1877, p. 75) and in *Apist.* (comp. Haliday's Remarks, in Loew, 1869, p. 100: „two very distinct, rather elongated spurs." In Bigot's own descript. Ann. 1862, p. 110 he says: „tibiis haud calcaratis"! And the figure shows minute spurs on all the tibiae!). They are short in *Bibioc.* („short and stout" O.S. Dipt. Colorado) and *Agathon* (? „zwei kräftige Sp." Röder); of unequal length in *Bleph.* (Loew, 1877, p. 65, line 13), *Lip. yosemite* (O.S.), and in the bloodsucking female of *Snowia* (Dr. F. M., 1881, fig. 11). There is only a single spur on the hind tibiae in *Paltost.* (O.S. 1878), and in *Lip. cin.* (O.S. and Loew, 1877, p. 65, line 14).

On the middle tibiae I have noticed minute spurs in *Bibioc.* Such are also figured in the *Curupira* ♂ (Dr. F. M. 1881, f. 7). Other data are wanting.

No spurs in *Hapal.* (Lw. 1877, p. 79).

Ungues. (Compare above, under § A.) In *Lip. cin.* ♂ the ungues are somewhat curved and provided with a comblike row of bristles on the underside (Loew, 1877, p. 65; also my observation of a very distinct pectination on all the ungues); also in *Hammat.* ♂ (Loew, 1877, p. 75); and in *Curupira* ♂ (Dr. F. M., fig. 10). *Bleph. fasc.* has more straight ungues, without pectination (Mik in litt.). *Lip. yos.* ♂ has rather short ungues; proximal half of them stout. The straight last joint of the tarsi and the short curved ungues of this species show a striking likeness to the corresponding parts of the tarsus of the flowersucking female of Dr. F. M., as represented on his fig. 8. No pectination.

Such structures of the last joints of the tarsi and the ungues seem to be nearly the same on the three pairs of legs: but in some cases they are less distinct in one pair than in the others.

Wings.

An incomplete vein on the hind margin.

Second vein consisting of two branches: *Bibioc.*, *Agathon.*

Second vein simple, without branch.

A crossvein betw. the veins 4 and 5.

Submarginal cell sessile: *Lip. bilob.*

Subm. c. with a long petiole: *Lip. yosem.*, *Bleph. ancilla.*

No crossvein betw. the veins 4 and 5: *Bleph.*, *Lip. cin.*, *Lip. brev.*

No incomplete vein on the hind margin.

A longitudinal vein betw. veins 1 and 4.

A short submarginal cell *(Palt.*, *Snowia*, *Curupira*, *Hapal.).*

No submarginal cell *(Apist.).*

No longitudinal vein betw. veins 1 and 4 *(Hammat.).*

NB. The auxiliary vein is distinctly visible in *Bibioc.*, *Agathon* and *Lip. yos.*; in *Lip. cin.* only a beginning of it. Other data are wanting.

In my paper 1878, p. 411 I have stated, upon comparison of the original specimen in Bigot's collection, that the second vein, shaped somewhat like an S, is incorrectly represented in the figure (Ann. etc. 1862, Tab. I, f. 1) as ending in the first vein; its tip runs for a short distance closely alongside of the first vein and ends in the costa. Loew's figure of the same wing (1877, I, f. 1a) is nothing but a copy from Bigot, and reproduces this error. About Verrall's communication on this subject, comp. below, p. 169. I called this vein second longitudinal. Loew (1877, p. 73) gives it a different interpretation. For want of specimens I cannot decide this question.

C. General remarks.

Genera.

Blepharocera, with two closely allied sp. (in Eur. and N. Am.); a third *Bl. ancilla* (Cal.) differs in the venation, and has a bisecting groove, instead of an unfacetted stripe across the eyes.

Liponeura with four sp. showing considerable differences especially in the venation.

Paltostoma with one sp. from Colombia (S. Am.); specimens from Mexico and the West Indies, seem to belong to a different species.

The remaining genera are known but in a single species.

Sexes.

Both sexes are known of *Bleph. fasc.* and *cap.*, *Lip. cin.* and *brevir.* and *Apist.*

The male alone is known of *Bibioc.*, *Agathon*, *Lip. bilob.*, *Lip. yosem.*, *Hamm.*, *Paltost.*, *Hapal.*

The female alone is known of *Snowia* and *Bleph. ancilla.*

Behaviour.

Lipon. cin. ♂ has been seen executing aerial dances (Macq. Ann. etc. 1844; his *Bleph. limbip.* ♂); I found *Lip. yosem.* engaged in the same manner; *Hapal.* was observed disporting themselves above water. *Bleph. cap.* I caught with the catcher in the grass, in both sexes. — Other data are wanting. Schiner (Fauna, II, p. 637, footnote) relates an observation of Mik that *Bleph.* uses to hang on leaves, by holding on with their long legs.

III. The subdivision of the Liponeuridae in groups.

As I said above, for several years past, I have had but little opportunity for continuing my studies on Liponeuridae in nature, or even in collections. I am therefore compelled, with regard to the natural grouping of the known genera, merely to repeat what I said about them in 1878 (p. 412).

At that time I recognized three groups in the family, two principal ones, distinguished by the presence or absence of the incomplete vein on the posterior margin of the wings, and an abnormal one, containing the single genus *Hapalothrix.*

The first group contains at present two subgroups, each represented by two closely related genera: *Bibiocephala* and *Agathon*; *Blepharocera* and *Liponeura.* I noticed in 1878 that the genera of this group seem to prevail in the temperate zones of the continents, and even to reach the cold zone. *Bleph. capitata*, described by Walker as *Asyndulum tenuipes* (!) was found at S. Martin's Falls, Albany river, Hudson's Bay. The latitude of this locality is 52°, about the same as Berlin, a latitude which, in the Western hemisphere, almost corresponds to an arctic fauna. The yearly isotherm of S. Martin's Falls passes considerably north of the North Cape; its isotherm for Juli passes through the North of Scotland (compare Dr. Hann's Atlas der Meteorologie, 1887, in the new edition of Berghaus's Physic. Atlas). *Bibiocephala* and *Agathon* were found in the temperate zone (Rocky Mts. and Nevada), but at rather high altitudes.

The second group contains now five genera: *Apistomyia*, *Hammatorrhina*, *Paltostoma*, *Snowia* and *Curupira.* They occur in the tropical zone, and in the warmer regions of the temperate zone.

In 1878 (p. 412) I noticed a certain relationship between *Apist.*, *Paltost.* and *Hamm.* not only in the venation, but also in the coloring, distinguished by silvery and velvet-black spots that occur upon them. *Curupira* has not yet been described in its mature form; as to *Snowia*, its short proboscis notwithstanding, it is undoubtedly related to *Paltostoma*.

„The relationship of *Hapalothrix* with the second group seems to be a very distant one, and appears merely in the resemblance of the venation. The remarkable structure of the ungues, the want of spurs on the hind tibiae, and the hairiness of the whole body separate this genus from all the known forms of the family" (O.S. 1878, p. 412). This was written seventeen years ago, soon after I had seen specimens of both genera. In the absence of new facts I have no reason to change my opinion, and, with all respect for Loew's authority, who considered them as closely related, I keep my jugdment in suspense.

Speaking of the spurs of *Palt.*, Loew writes as follows (1877, p. 79): „Ihr wirkliches Fehlen bei der mit *Palt.* so überaus nahe verwandten Gattung *Hapal.* lässt es mir aber als ausserordentlich wahrscheinlich, ja als fast gewiss erscheinen, dass sie (die Sporen) in Schiner's Figur von *Palt.* keineswegs bloss aus Versehen weggelassen worden sind, sondern dass sie der *P. superbiens* in der That fehlen. . . . . Sollte sich die Voraussetzung, dass *Palt.* ungespornte Schienen habe, wider Erwarten als unrichtig erweisen, so würde ich doch dabei beharren müssen, beide Gattungen wegen ihres so überaus ähnlichen, von dem aller anderen Blepharoceridae recht verschiedenen Flügelgeäders in eine eigene Gruppe zu stellen, zu deren Characterisirung das Fehlen der dritten Längsader und der Schulterader, sowie die Gabelung der zweiten Längsader vollständig ausreichen würde."

This passage stands in a strange contradiction to another passage concerning the spurs of *Palt.* on the preceding page (p. 78) of the same paper. Here Loew says: (Schiner's) „figure shows no trace of spurs, the absence of which is the more improbable, as they exist in all the other genera which we have just described, and we find no information in Schiner's letterpress about them." And yet, in his Analytical table Loew placed *Palt.* among the genera without spurs!

Brauer (Zool. Anzeiger, 22 March 1880) pushed the proof of the relationship of the genera much farther, in declaring that *Curupira torrentium*, figured by Dr. F. Müller belongs to the genus

Palt. and that the latter is a synonym of *Hapal.*, which identification he founded on the comparison of Loew's type of *Hapal.*: „Die sehr gelungene Abbildung (von *C. torrentium*) beweist, dass die Gattung identisch ist mit der von Schiner beschriebenen Gattung *Palt.* aus Bogotà, mit der auch Loew's Gattung *Hapal.* nach Vergleich des Original-Exemplars zusammenfällt, obschon die Art letzterer Gattung vom Monte Rosa stammt!"

I have shown (1878, p. 411), after examining a *Palt.* in Turin, that its hind tibiae are provided with a single, long spur, so that on this ground at any rate, its identification with *Hapal.* is impossible. I have also shown in the present paper (§ VI) that *Palt.*, with its long proboscis, cannot be the same as *Curupira*, which has a short one. As to the typical specimen of Loew, which Braner pretends to have compared with *Paltostoma* and found generically identical, all I can say is that B. must have never read the original description of *Hapal.* by Loew (Berl. Ent. Z. 1876, p. 211) in which the enumeration of the differences alone between this genus and *Palt.* fills a whole page. What kind of typical specimen he has compared I do not know, but certainly it was not a genuine one.

To those who will continue the work on Liponeuridae I would humbly recommend, as a result of many years of experience, not to multiply the genera unnecessarily. It would have been easy for Loew to form a new genus for his *Lip. bilobata*, or for me, to do the same for *Lip. yosemite*, and especially for *Blepharocera ancilla*. Genera have been formed on much less important characters than those which distinguish these species from their congeners. But it must be borne in mind that the Liponeuridae belong to one of those groups which may be called decadent, groups that seem to have seen better times, when the rows of their species were more dense and the genera more converging. In such genera it often happens that almost every species offers characters which, in more flourishing groups, would have been considered as generic. Such is the case with the above-quoted species of Liponeuridae. Such is the case also in the section Ptychopterina, and especially the subsection Tanyderina (Tipulidae, comp. Berl. Ent. Z. 1887, p. 226—230). When in such decadent groups we multiply the genera too much they, in the end, become all monotypical, and thus baffle the purpose of classification, as the survey of their mutual affinities becomes more difficult. The true end of classification is an easier survey of affinities, a temporary aid to the memory. In space and time all divisions become convergent and finally confluent.

IV. Analytical table of the genera of Liponeuridae.[1])

(The figures referred to are those of Loew's Revision, etc. 1877.)

I. The incomplete vein near the posterior margin of the wings is present.

A. Second longitudinal vein with two branches (fig. 6).

a. Origin of the anterior branch of the second vein coincident with the origin of the third vein (fig. 6).

Anterior tibiae curved in the ♂.

Bibiocephala O. S. *B. grandis* O. S, ♂ — Rocky Mts., Colorado.

aa. Origin etc. not coincident etc. but distad of the origin of the third vein.

Anterior tibiae straight in the male.

Agathon v. Röder. *A. elegantulus* v. Röd. ♂ — Nevada, U. S.

AA. Second longitudinal vein simple, without branches.

a. Eyes contiguous, bisected by an unfacetted crossband, or by a simple groove.

Blepharocera Macq.

b. Eyes bisected by an unfacetted crossband, fig. 3a; submarginal cell sessile; no crossvein between the fourth and fifth longitudinal veins (fig. 3c).

B. fasciata Westw. ♂♀. — Europe, Centre and South.

B. capitata Lw. ♂♀ — U. States, Dist. Columb.; reaches far North.

bb. Eyes bisected by a simple groove; submarginal cell with a long pedicel; a crossvein between the fourth and fifth veins.

B. ancilla O. S. ♀. — California.

aa. Eyes separated by a broad front.

Liponeura Loew.

b. A crossvein between the $4^{\underline{\text{th}}}$ and $5^{\underline{\text{th}}}$ veins.[2])

Submarginal cell sessile (fig. 5).

L. bilobata Lw. ♂. — Southern Europe, Greece, Italy.

Submarginal cell with a long petiole.

L. yosemite O. S. ♂. — California.

[1]) Loew's analytical table in the „Revision" is primarily based upon the presence or absence of spurs on the hind tibiae. But he supposed erroneously that *Paltostoma* has no spurs. I have preferred therefore to adopt the presence or absence of the incomplete vein, as a primary character of subdivision.

[2]) It must be borne in mind that the fourth longitudinal vein of the Liponeuridae is the vein immediately preceding the large posterior fork (the incomplete vein not being counted).

bb. No crossvein between the 4th and 5th veins.

Larger species *L. cinerascens* Lw. ♂ ♀. — Europe, Centre and South.

Smaller and darker species *L. brevirostris* Lw. ♂ ♀. — Europe: Bohemia, Silesia.

II. No incomplete vein near the posterior margin of the wings.

A. Eyes bisected by an unfacetted crossband.

a. Eyes separated by a broad front (fig. 1b); a longitudinal vein betw. 1th and 4th veins; Venation fig. 1a.

Apistomyia Bigot. — *A. elegans* Big. ♂♀ [1]) Corsica, Cyprus.

aa. Eyes contiguous (♂); no longitud. vein betw. the 1th and 4th veins; venation fig. 2a.

Hammatorhina Lw. — *H. bella* Lw. ♂. — Ceylon.

AA. Eyes not bisected by an unfacetted crossband. A longitudinal vein between the 1th and 4th veins.

b. Eyes separated by a broad front.

c. Proboscis long, palpi but little developed; wing fig. 7a.

Paltostoma Schin.

P. superbiens Schin. ♂. Columbia, S. A. — Mexico; W. Ind. [Willist.] diff. sp.

cc. Proboscis not longer than the vertical diameter of the head; well developed 4-jointed palpi; venation very like *Paltostoma*.

Snowia Will. — *S. rufescens* Will. ♀. — Rio Janeiro.

bb. Eyes contiguous.

d. Ungues of the ordinary structure; tibiae with spurs at the tip.

Curupira F. Müll. — *C. torrentium* F. Müller ♂. — Brazil, Prov. S. Catharina.

dd. Ungues abnormal, pulvilliform. No spurs at the tip of the tibiae.

Hapalothrix Lw. — *H. lugubris* Lw. ♂. Monte Rosa, Europe.

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[1]) Loew, Revision etc. p. 71 says that Bigot calls a ♂ the specimen which he describes and figures, whereas in the figure it appears to be a ♀. I have hesitated to accept this conjecture in my former paper (1891), but since the ♂ is found, it proves to be correct. The specimen from Cyprus, in Bellardi's collection (O.S. 1878, p. 411), at present in the Turin Museum, has been examined by Prof. G. Tos at my request. He kindly informed me that he had compared it with Bigot's description and found it to agree perfectly; except that the surface of the thorax is velvet-black, and not orange (just as I stated it in 1878). The abdomen is broken off so that the sex could not be ascertained; the antennae also broken, except the scapus. Palpi were not visible.

V. Notice on Loew's synonymy of Blepharocera fasciata and Liponeura cinerascens

in his Revision etc. 1877.

Having found occasion, recently, to study Loew's Revision etc. again, I discovered to my astonishment that the synonymy of *Bleph. fasciata* and *Lip. cinerascens*, on p. 87 and 88 of his paper (1877) which I had formerly confidently relied upon, was not correct. In attempting to point out Schiner's error (in his Fauna, II, p. 637, 1864) Loew, l. c. p. 59 and 60 misunderstood Schiner. It was very natural that the genera *Bleph.* and *Lipon.* should have become the stumbling-block of Dipterologists, as they offer a most remarkable exception to the general rule prevailing among Diptera: that the males have holoptic heads, and the females dichoptic ones. In *Blepharocera* both sexes are holoptic, in *Liponeura* both are dichoptic. Both genera are very much alike in coloring, and sometimes occur at the same time, and in the same locality. Macquart received (1843) a *Blepharocera* ♀ which, for its holoptic head, he took for a ♂. In 1844 he received a *Liponeura* ♂ from the same locality, and described it as the male of the *Bleph.* which in 1843 he had taken for a ♂, and which he now recognized for a ♀ (as in reality it was).[1]) Schiner, in preparing the 2. vol. of his Fauna had specimens of *Bleph.* ♀ and of *Lipon.* ♀ (not ♂ like Macq.), which he also united under same specific name, taking (as Macq. had done in 1843) *Bleph.* ♀ for the male; *Lipon.* ♀, with its dichoptic head, became his *Bleph.* ♀. Had Schiner attentively read Macquart's letterpress, he would have noticed that Macquart's *Blepharocera* of 1844 is described as having the ♂ dichoptic (*Liponeura* ♂) and the female holoptic (*Bleph.* ♀), and that Macquart expressed his astonishment at such an anomaly. Instead of which Schiner, not noticing that it was an exceptional case, took the holoptic *Bleph.*

[1]) The name of the first discoverer of specimens of the two genera, *Blepharocera* and *Liponeura* has been preserved. It was Mr. Arnaud, young lawyer and good observer, as Macquart calls him, of Le Puy, a town near the source of the Loire in the Cevennes Mountains. In June 1841 he took specimens of *Bleph. fasciata* ♀ in his vicinity and sent them to Macquart, who encouraged him to continue his researches. The next year Arnaud took other specimens of what he believed to be the same species, as they were taken in the same locality, only at a higher level, while executing an aerial dance (just as I found *Lip. yosemite* in the spray of the Yosemite Fall in 1876). These specimens proved afterwards to be *Lip. cin.* ♂, but were (1844) erroneously taken by Macquart for the males of his *Bleph. limb.*

females of which he had specimens, for males and the dichoptic ♀ of *Liponeura*, which was also among his specimens, for the ♀ of his *Bleph.* ♂. If Loew had noticed this disagreement between Macquart and Schiner, he would not have had any reason to say (Revis. p. 60, 1877): „Whether Schiner was led into the confusion of both genera by a similar confusion as Macquart, or for some other reason, I am unable to decide (kann ich nicht beurtheilen)."

In consequence of this mistake Loew's synonymy of the two genera and species on p. 87 and 88 (Revis. etc. 1877) must be replaced as follows:

Blepharocera Macq. (1843).[1])

Syn. *Asthenia* Westw. 1842. *Blepharicera* Macq. Amended in *Blepharocera* by Loew 1862.

1. **fasciata** Westw. (♀). Loew, Bull. Soc. Ent. Ital. 1869.

Syn. ♂. The male has not been described yet, although it has been found in several localities; for instance by Mik, near Görtz, in 1864.

Syn. ♀. *Asthenia fasciata* Westw. Guérin, Mag. 1842, ♀ (Lw. 1877, p. 63, l. 17 from bottom).

Blepharicera limbipennis Macq. Ann. S. E. Fr. 1843 (taken wrongly for a ♂); 1844 (recognized as ♀).

Blepharicera fasciata ♂, Schiner, Fauna II, p. 637 (1864) (wrongly taken for a male).

Liponeura Loew, Stett. Z. 1844.

1. **cinerascens** Loew, Bull. Soc. Ent. Ital. 1869, p. 97, ♂♀.

Syn. ♂. *Blepharicera limbipennis* Macq. 1844. ♂.

NB. This is the *Lip. cin.* ♂, which Macquart 1844 took for the male of his *Bleph. limbip.* (comp. above).

Syn. ♀. *Liponeura cinerascens* Lw. 1844, p. 118 (erroneously taken for a ♂).

Blepharicera fasciata ♀ Schin. Fauna II, p. 637 (1864).

NB. In this case Schiner mistook a ♀ *Liponeura*, for the ♀ of his *Bleph. fasc.* ♂; the latter, in reality, was a female (comp. above).

The historical account of the Blepharoceridae by Loew (1877) is correct as far as p. 60 at top, where, instead of: „sondern auf dasjenige von *Lip. cin.*", must be put: „sondern auf *Bleph. fasc.* ♀". And farther on, line 13 and the rest, must be read:

[1]) I do not know why Loew, Schl. Z. 1877, p. 87 puts it: *Blepharocera* Lw. 1858?

„*Lip. cin.* als selbständige Art derselben anzuführen, und *Bleph. limb.* Macq. 1844 ♂, als Synonym des ♂ derselben beizufügen; *Lip. cin.* Loew 1844 ♀ (nicht ♂, für welches Loew es anfangs hielt, 1844, p. 119 oben), and *Bleph. fasc.* Schin. ♀ sind Synonyme von *Lip. cin.* ♀."

If, in doing my duty as a critic, I have noticed some errors in Loew's „Revision", it was without the slightest intention of disparaging his excellent Essay. These shortcomings may be explained by the circumstances under which this paper was written. The „Revision" (1877) was the last but one[1]), of Loew's publications. It must have been written at the end of 1876, or at the beginning of 1877, because Loew quotes his own paper on *Hapalothrix* (1876) in it. In Sept. 1877 I spent two weeks in Guben (Loew's residence at that time), occupied with revising, packing, and finally shipping for Cambridge, Mass., the type-collection of N. Am. Diptera. Although, for that purpose, I spent most of my time in Loew's house, I saw very little of him, much affected as he was by a nervous ailing which required rest and seclusion, and which ended with his death in April 1879. It must have been under the influence of this approaching illness that he wrote his „Revision"; because although, as a whole, it bears the stamp of Loew's usual lucidity and conscienciousness, there are passages in it (especially those about *Paltostoma* and *Blepharocera*, in connection with Schiner) that betray hurry, restlessness and ill-temper. It is so rare to find Loew at fault, that I felt impelled to give this explanation.

VI. Curupira F. Müller and Snowia Willist. two genera of Liponeuridae (Dipt.).

Since the publication of Dr. F. Müller's admirable monograph on the metamorphoses of some forms of Liponeuridae in Brazil (Archivio Mus. Nac. in Rio Janeiro, in 4°, 1881), and the discussion which arose about them (Ent. M. Mag. London, Vol. XVII, p. 130, 206 and 225), this discussion has been left in suspense, for the reason that mature specimens of the three forms of imagos have not been forthcoming, and without them it was impossible for a dipterologist to come to a final conclusion. Recently, Prof. Williston, of the Kansas University, kindly sent me a paper of his on a new genus *Snowia*, from Rio Janeiro, in which, owing to the exactness of the description, I easily recognized the bloodsucking female of Dr. F. M.'s

[1]) A short, merely descriptive paper, dated 1878, but which must have been written much earlier.

paper, the head of which is represented in his Tab. VII, fig. 14. Dr. Williston apparently had no copy of Dr. F. M.'s at hand, otherwise he would probably have come to the same conclusion. Williston's wording: „proboscis directed downwards, a little longer than the vertical diameter of the head, palpi slender, about as long as the proboscis, apparently composed of four joints," and especially the words: „ungues large, simple," as well as other data, agree with the above mentioned female. Dr. F. M. describes two females: a bloodsucking one, provided with mandibles, with large eyes and long claws (fig. 14 head, fig. 9 tip of leg); and a flowersucking one, with small eyes, short claws and no mandibles (fig. 13 head, fig. 8 tip of leg). Dr. Williston's description says nothing about the mandibles, nor about the comparative size of the eyes, but the words „ungues large, simple" are decidedly in favour of the bloodsucking female.

The specific identity of Dr. F. M.'s bloodsucking female with Williston's *Snowia rufescens* is rendered probable by the vicinity of the locality (S. Catherine and Rio). If my supposition be correct, *S. rufescens* would be the first species described in the mature state among the group of larvae studied by Dr. F. M. The question of the other forms must remain open, until we likewise obtain mature specimens of them.

The holoptic male (fig. 7 and 15, head) was taken by Dr. M. for the male of the dimorphic females. He says (p. 81): „The eyes of the males, as in many other Diptera, occupy nearly the whole surface of the head, being more or less contiguous up to the vertex." But he was not aware that, in this respect, the Liponeuridae form an exception among Diptera. As far as our experience goes, the eyes of the two sexes in this family have nearly the same structure, they are, in both sexes, either holoptic, or dichoptic, either bisected or not. Therefore, according to our present notions, the holoptic male fig. 7 and 15, cannot belong to dichoptic the female fig. 14. I have expressed the same opinion in my notice in the Ent. M. M. XVII, p. 130. At that time I formed my opinion upon Dr. F. M. article in „Kosmos" only. Now, that I can compare the principal work, my doubts have even gained strength, because I perceive that the eyes of the male are not only contiguous, but at the same time bisected. The eyes of the females, in the figures, are neither contiguous nor bisected, and in this they agree with the statement of Williston about *Snowia*: „eye-facets uniform" (p. 120, line 7 from top). The mexican *Paltostoma* which I saw in Turin (O. S. 1878, p. 411) also has uniform eye-facets. The letterpress of Dr. F. M. p. 81, on the contrary, says distinctly of the eyes of the male: „the

line which separates the larger, hexagonal facets from the smaller ones (fig. 15, l), begins near the insertion of the antennae". I have examined the eyes of living specimens of the holoptic *Bleph. capitata* in both sexes, and have found that the only sexual difference in the structure of their eyes consists in the relative size of the two halves separated by the bisection; the upper half is smaller in the male than in the female (O. S. 1878, p. 405).

To conclude: none of Dr. F. M.'s forms belong to the genus *Palt.*; the bloodsucking ♀ (Dr. F. M.'s fig. 14, head; fig. 9 last joint of tarsi; fig. 21. mouthparts) is, very probably, a *Snowia;* the holoptic ♂ (fig. 7, whole fly; fig. 15, head; fig. 10, last j. of tarsi; fig. 20, 22 mouthparts; fig. 24 forceps) must belong to some new genus, which should better retain the name *Curupira torrentium* F. Müll.; the flowersucking ♀ (fig. 13, head; fig. 8, last j. of tarsi) is still doubtful; if it proves to be a dimorphic ♀ form of *Snowia*, it will add a new and interesting fact to the history of the family.

The name *Paltostoma* has been erroneously introduced in this connection by Brauer, who misnamed the genus, in spite of the evidence he had before him, as Dr. F. M. had sent him a photograph of his plate VII, in advance of its publication. Comp. the statement of Dr. F. M. about it in the Ent. M. Mag. XVII, p. 226.

As far as I am acquainted with *Snowia* from the description, the genus seems to be closely allied to *Paltostoma*, except that it has a short proboscis and fully developed palpi. The presence of a crossvein between the fourth and fifth veins, as pointed out by Williston, may also constitute a difference; nevertheless our experience with *Liponeura* proves that this character may not be of generic importance (comp. this last genus in the Analytical table in § 4 of this paper; two species of *Lipon.* mentioned in it, are provided with that same crossvein, and two others not). Schiner's figure of the wings of *Paltostoma* shows no crossvein; neither does that of the wing of *Curupira* ♂ (fig. 7) of Dr. M. — The coloring of *Snowia*, according to Williston (yellow and black), resembles that of the S. American and Mexican *Paltostomae* described by Schiner and seen by me.

A parallelism worthy of notice, occurs between two couples of genera: on one side the holoptic *Blepharocera* and the dichoptic *Liponeura*, both belonging to the first group of Liponeuridae, being provided with the incomplete vein; on the other side the holoptic *Curupira* and the dichoptic *Snowia*, both belonging to the second group of the family, in which the incomplete vein is wanting. Now both of these couples were discovered under somewhat similar

circumstances. Specimens of the genera of the first couple were found nearly in the same locality, and at the same season in the Cevennes. We have a right to suppose therefore that their larvae lived in the running waters of that region. In the same way the larvae of *Curupira* and *Snowia* were found promiscuously in the waters of Southern Brazil. Dr. M. says: The two sexes seem to occur in about equal numbers. One day, from 70 pupae I extracted 20 males and 20 females, and of these 13 had small eyes, short claws and no mandibles, whereas 7 were provided with mandibles, and had large eyes and long claws." (Dr. F. M., Ent. M. M. XVII, p. 225, March 1881). *Bleph.* and *Lip.* differ principally in the structure of the head; in other respects they are closely related to each other in the venation, and other characters. Just the same relation exists between *Curup.* and *Snowia*, although as I have said above, they belong to another group of the family: like the first couple they differ principally in the structure of the head, and agree in the venation etc. The difference, however, between the cases of the two couples consists in the fact, that the genera of the European couple are known in both sexes, while the two genera from S. America, are known in one sex only (*Curup.* ♂, *Snowia* ♀), and that there is a second flowersucking form of female of still uncertain position, connected with the second couple. Whether these evident coincidences between two cases of a promiscuous occurrence of two different, although closely related genera are merely fortuitous, or foreshadow some unexpected discovery of a hitherto hidden connection between them, remains to be seen.

It has often been noticed that remarkable scientific discoveries were made almost at the same time in different places, and independently of each other. Such is the case with the discovery of the most anomalous forms of Diptera: The enigmatic *Scenopinus* was described by Latreille 1802, and, in the next year 1803 by Schrank as *Atrichia*, by Meigen as *Hypselura*, and by Schellenberg as *Cona*. The refractory *Orphnephila* was described by Haliday in 1831, and in the same year, as *Thaumalea*, by Ruthe; three years later by Macquart as *Chenesia*. The first *Blepharocera* ♀ was discovered by Mr. Arnaud in June 1841, and the first *Liponeura* ♂ by him in 1842. Westwood in 1842 described his *Asthenia*, from Albania, on the Balkan Peninsula; the exact date and the author of the capture are not given. Loew, before he knew anything about the publications of Westwood and Macquart, published the genus *Liponeura* (1844), which he had received from Silesia (perhaps from Zeller?). Finally, the descriptions of the anomalous larvae of the

Liponeuridae, by Dr. F. Müller, Dewitz, and Wierzeijski, were published in the same year 1881, and the discoveries were made a short time before, and quite independently of each other![1]) The coincidence of scientific discoveries admits of a plausible explanation in the simultaneous working of contemporaneous minds in the same direction. But coincidences like those in question are the more remarkable as they seem to be due to mere chance.

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[1]) I insist upon the word independently, because, in a passage in the Wien. Ent. Z. 1882, p. 2, at the top, Prof. Brauer flatters himself with the illusion that his short article in the „Zool. Anz." 1880 has put Dewitz and Wierzeijski on the track of their discovery. B. says: „I have no doubt that my article, and Dr. F. M. paper in the „Kosmos" (1880) called the attention of observers to the European species of these larvae, because in the autumn of the same year, Dewitz, and soon after him Wierzeijski etc. discovered such larvae." This illusion of B. is very easily disposed of: Dewitz has a Postscript to his paper (Berl. Ent. Z. 1881, p. 66), in which he says: „This paper was already in the press, when I found short notices on the early stages of the Blepharoceridae by Brauer, (Z. A.) and F. Müller (Kosmos), both foreshadowing more detailed publications."

On the other hand, Wierzeijski (O przeobrazeniu muchy *Lip. brevirostris* Lw.? Krakow, 1881) quotes Brauer's article in the Zool. Anz. with the remark: „I had not seen this publication of Dr. Brauer in March 1880, when, in July of the same year, I discovered this curious metamorphosis." — From the fact that Dr. B. did not take any notice of these passages of Dewitz and Wierzeijski, we may safely infer that he has read their papers with very little attention, or perhaps not read them at all.

Postscript. The present paper was going through the press, when I received a communication from G. H. Verrall, the principal contents of which I have been able to incorporate in the proofsheets, but of which, at the same time, it is necessary to give a separate notice.

G. H. Verrall informs me, that Bigot's collection, now in his possession, contains a male specimen of *Apistomyia*, besides the specimen which Bigot described as a male, but which in reality is a female. This ♂ has distinctly ten-jointed antennae, the last joint being more pointed than in Bigot's figure. The upper facets of the eyes in this ♂ are much larger than the lower ones, while in the ♀ the difference is but slight. There is a stout anal ending of the abdomen, with a large forceps, consisting of a pair of elongate appendages, not unlike the forceps of *Bleph.* (Loew, 1877, Tab. I. f. 4), although distinctly different. Finally, the ending of the undulating vein, near the anterior margin, is exactly as I described it above, p. 157, line 18 from top, after seeing Bigot's other specimen. Verrall's communication is accompanied by very good drawings of the ends of the abdomens ♂ and ♀, of the antenna, and of the front part of the wing.