

rior borders are midway between the snout and opercular margin; the distance from each other is as seven to three, but the interorbital space is only as five and a half to three.

The roof of the mouth is studded with papillæ, especially in a transverse line on the palate.

The lips are thick and minutely papillated.

The maxillary barbels are attenuated at their ends, and extend to or beyond the caudal base.

The teeth are straight and compressed, with parallel sides, and imbedded in the gums; the distance between each is equal to its width. There are more than forty in the upper, and more than fifty in the lower jaw. Behind the teeth there is a papillated ridge, but no teeth.

There are eight branchiostegal rays.

A distinct pectoral pore is present.

The dorsal commences behind the second fourth of the length of the fish, and its anterior ray is longest, and almost equals the height of the body.

The adipose fin is very long and abruptly truncated posteriorly; it is distinctly striated, so as to present a finely rayed appearance.

The caudal fin is deeply lunate; its central rays form an eleventh of the extreme length, and its longest are equal to a fifth.

The pectorals are pointed, and equal a fifth of the length.

The ventrals are shorter than the pectorals, and the second ray is longest.

The following formula indicates the number and character of the rays:—

$$D \begin{matrix} 1 \\ 1 \end{matrix} 1, 5 - 0; A \begin{matrix} 1 \\ 1 \end{matrix} 4, 8 -; C \ 19, I, 7, 8, I, 13; P \ I, 12; V \ I, 15.$$

The color is silvery beneath, and above merges into a light purplish hue. Along the side there are a number of distinct, nearly round dusky spots. The fins are pearly, opaque at the bases.

The specimen from which this description has been taken, was presented by Mr. A. Edwards to the Lyceum of Natural History, of New York. It was obtained from the Amazon River, with *Cetopsis candiru* Ag., *Enctenogobius bodius* Gill, *Sternopygus macrurus* M. and T., and other species.

New genera and species of North American TIPULIDÆ with short palpi, with an attempt at a new classification of the tribe.

BY BARON R. VON OSTEN SACKEN.

Little attention has been paid by former authors to the North American species of the genera *Limnobia* Meig., and *Erioptera* Meig., and the number of those already described is not at all in proportion to the great number of species of some other genera, which have been made known, (as, for instance, *Tabanus*, *Anthrax*, and the family of *Asilidæ*.)

In my Catalogue of the described Diptera of North America, published in 1858 by the Smithsonian Institution, not more than 23 species, coming within the scope of the present publication, are enumerated.* The considerable number of new species of this family contained in my collection of North American Diptera, induced me to undertake their publication.

It was only natural to expect that among so many new species, some new genera would occur. Whosoever has paid any attention to the classification of the *Tipulidæ with short palpi*, knows how very imperfect this classification is, and how the principal genera are established on the habitual and artificial characters. It became necessary, therefore, before proposing new genera to revise the old ones, and to establish them on better characters. I have attempted this, but in judging what I have done, it should be borne in mind, that this 1859.]

part of my task was in my purpose only a secondary one. I wanted to publish new American genera and species; in order to establish the former I found it necessary to give more precise definitions to already existing genera; I hope these definitions will hold good; but the grouping of these old and new genera according to their natural affinities is the task of a monographist; it requires a study of the family in its totality, embracing the species from all parts of the world; what I have given in this respect is nothing but a temporary arrangement, adopted here, because an arrangement of some kind was required.

It would have been the task of a monographist, for instance, to define more precisely the subdivision of the family of the *Tipulidæ terricola* in two tribes, those *with short*, and those *with long palpi*. This subdivision (first adopted by Latreille in 1805, in the 14th volume of his *Histoire naturelle des crustacés et des insectes*), although excellent, is not sufficient, since there are intermediate forms which it does not embrace; the character itself, on which it is founded, cannot stand alone; in order to be made available, it must be supported by characters taken from other organs. (Among the *Tipulidæ with short palpi* there are some, like *Pedicia Amalopis*, *Arrhenica*, etc., having the last joint of the palpi much longer than the preceding, and showing in this way an approach to the tribe with long palpi.)

Not pretending to write a monograph, I do not define more accurately the group which forms the subject of the present paper; I took it, as defined by former authors, and I could do so the more readily as I have not met with any form of doubtful position.

Without entering into a detailed historical account of the generic and other subdivisions established and subsequently given up by different authors within the group in question, I will advert only to Macquart's attempt to subdivide the genus *Limnobia Meig.*, as it is the most important for my purpose.

Macquart separated from *Limnobia Meig.*, all species *with a petiolate areolet*, and formed of them the genus *Limnophila*. Now, a more natural subdivision, as will be shown below, is that founded, not on the presence or the absence of the petiolate areolet, but on the presence or absence of the *second radial area*. Nevertheless, Macquart's subdivision was *very near* the true one, because all *Limnobia* with *one radial area* are at the same time destitute of a petiolate areolet, and *most* of those with *two radial areas* possess this areolet. I say *most* of them, because there are a few species of *Limnobia* with *two radial areas* and *no petiolate areolet*, and these species were most unnaturally united by Macquart with the *Limnobia* with *one cubital area*. (The European *Limnobia sylvatica Meig.*, for instance, is one of them; in Macquart's *Histoire naturelle des diptères* it is to be found in the genus *Limnobia Macq.*, together with *L. modesta*, *morio*, etc.) This was the fault of his subdivision.

In a paper published by me in the *Stettiner entomologische Zeitung* in 1854, I have suggested that the presence of the *second radial area*, combined with characters taken from the structure of the genital organs, lead to a more natural subdivision. The classification, adopted in the present paper, is the development of this suggestion.

The bulk of the tribe *Tipulæ with short palpi*, may be divided in two sections, showing the contrast of characters expressed in the following two columns:—

* *Limnobia (Pedicia) albivitta* Wk., *L. (Pedicia) contermina* Wk., *L. cinctipes* Say, *tenuipes* Say, *rostrata* Say, *macrocera* Say, *argus* Say, *fascipennis* Say, *humeralis* Say, *gracilis* Wied., *carbonaria* Macq., *badia* Walk., *biterminata* Wk., *ignobilis* Wk., *simulans* Wk., *turpis* Wk., *prominens* Wk., (*Rhamphidia*?), *Symplecta cana* Walk., *Rhamphidia flavipes* Macquart, *Limnobiorynchus canadensis* Westwood, *Anisomera longicornis* Walk., *Erioptera caloptera* Say, and the European *E. fascipennis* Zett. I omit the species from the West Indies and Mexico; I omit also *Trichocera*, no species of this genus having been described by me here. The names printed in italics are those of species which have been identified by me; the others are as yet unknown or doubtful.

I.	II.
One radial area.	Two radial area.
Antennæ, 14-jointed.	Antennæ, 16-jointed.
No distinct pulvilli.	Pulvilli distinct.
Ungues, with distinct teeth on the under-side.	Ungues smooth on the under side.
No spurs at the tip of the tibiæ.	Tibiæ, with spurs.
<i>Limnobia nob.</i>	Tibiæ, without spurs.
	<i>Limnophila nob., etc.</i>
	<i>Erioptera Meig., etc.</i>

These characters do not exhaust the contrast: the structure of the mouth, and that of the male genital organs, is different in both groups.

The first column, and the two subdivisions of the second, contain thus the characters of the *three principal groups of the tribe*. Among the 87 species described on the following pages, 68, that is, nearly four-fifths of the whole number, belong to these three groups, each of them containing about the same number of species. I will call them *Tipulæ limnobiæformes* (with 24 species), *Tipulæ eriopteræformes* (with 25 species), and *Tipulæ limnophilæformes* (with 19 species), thus deriving the names from those of the typical genera.

A *fourth* group has all the characters of the second, as enumerated above, except that the structure of the antennæ is anomalous; they have 6, sometimes 10, distinct joints, and often reach extraordinary proportions, being in the ♂ of some species three or four times longer than the body. Some other characters, as the structure of the palpi, the presence of a tubercle on the front, etc., justify the separation of this group. A *fifth* group also answers to all the characters of the second; but has, besides, a *mediastinal cross-vein, which is far remote from the tip of the mediastinal vein, and anterior to the origin of the petiole; pubescent eyes; a distinct tubercle on the front, behind the antennæ, and the 4th joint of the palpi elongated*; I call them *Tipulæ pediciæformes*. The structure of the ♂ genitals and the neuration of the wings, (especially the form of the discal areolet) in this group, seem to indicate a transition towards the *Tipulæ with long palpi*. The genera *Amalopsis* and *Pedicia* are the types of the group; *Dicranota* is closely related to them, although it has 13-jointed antennæ and short palpi; *Ula* is only provisionally placed in this group on account of its pubescent eyes, the position of its mediastinal cross-vein, etc.

We have seen that the first group reproduces the characters enumerated above in the first column; that the second and third group answer to the characters of the second column; the fourth and fifth group, although somewhat anomalous, show a decided prevalence of the characters of the second column. But there are several genera which possess some of the characters of the *first* and some others of the *second* column at the same time, so that they have no more relation to the one than to the other. They have, for instance, *one radial area* and 16 (instead of 14) *joints of the antennæ*; the structure of their genital organs holds also the middle between the typical forms of the first and second group, with more apparent analogy to the second. But besides this anomalous combination of characters, each of these genera shows some peculiarity of structure, for the most part, so striking, that it appears at once very natural to isolate them from all other groups. I have gathered them all in a *sixth* group, which I have placed between the first and the second, under the name of *Tipulæ anomalæ*. This group is entirely artificial, and, for this reason only provisional.*

* It will be seen below, that the four genera placed in the group alluded to, have all *one radial area* and *spurless tibiæ*. But, among the species of my collection, which remained undescribed on account of too small number of specimens, there is one which has *one radial area* and *distinct spurs at the tip of the tibiæ*, and thus combines again the characters of the two opposite columns.

In an appendix, I describe an interesting new genus *Protoplasa*, and a new species of *Ptychoptera Meig.* These two genera, as well as *Bittacomorpha Westw.*, are related to each other, and seem to form a distinct tribe, belonging neither to the *Tipulæ* with short, nor to those with long palpi. It deserves to be observed that such intermediate groups, combining the characters of two or more larger divisions, groups small in number of species, but singular and anomalous in structure, contain most of the forms which the living fauna has in common with the fossil one. Thus *Protoplasa* is closely related to the fossil genus *Macrochile Loew*; thus *Elephantomyia* (among my *Tipulæ anomalæ*) is closely allied to *Toxorhina Loew*, which has been found living, as well as fossil; thus *Rhamphidia* of the same group, occurs very frequently as fossil; and it is not at all improbable, that my genera *Antocha* and *Dicranoptycha* will be found fossil in the Prussian amber. Another circumstance worth noticing is, that so many of the fossil forms, now extinct in Europe, should be found living in the New World. This observation is not confined to the *Tipulidæ* only: Professor Loew mentions, in a recent letter to me, that he had repeated it in the *Dolichopodæ*. It is well known that similar facts have been recorded in other branches of Zoology, as well as in Botany.

Many new species and even new genera remain undescribed in my collection, either because I have not been able to procure a *sufficient number* of specimens, or because I had *no fresh specimens* for examination. It will be noticed that at the end of every description I have mentioned the number of specimens which I had for comparison. The importance of this datum scarcely needs an explanation: it is evident that the more specimens have been compared, the more perfect the description ought to be; and it is important for those who have to determine specimens from descriptions, to be enabled to know how far the describer had the means on hand to draw a good description. In a very few instances only I have ventured to describe a species from a single specimen; and that in such cases only where the characters of the species seemed striking enough to secure its recognition. Another important rule to observe, is the study of *fresh and even living* specimens. The structure of the ♂ genital organs can be studied on such specimens only; likewise, it is for the most part very difficult to count the number of joints of the antennæ, and to obtain a correct idea of the form and the relative length of the joints of the palpi, unless from living or recently killed specimens.

Besides the number of specimens which I had for comparison, I have mentioned at the end of every description, the names of the persons from whom I have obtained them. I am exceedingly obliged in this respect for the generous contributions of Mr. S. H. Scudder in Boston, Mr. A. S. Packard in Brunswick, Me., Mr. Edw. Norton in Farmington, Conn., but before all to Mr. Robert Kennicott from Illinois, who put at my disposal highly valuable collections of *Diptera*, made during his travels in the North Western parts of the Union. The localities where I collected myself are designated by the abbreviation (*nob.*)

Although nearly one hundred N. American species are known to me at present, nearly all which would have been placed formerly in the old genera *Limnobia Meig.* and *Erioptera Meig.*, the fauna in this respect is far from being exhausted. Even now, when this paper is completed, almost every ramble in the country procures me a new species, or, at least, some new fact, deserving to be mentioned in the context. And if I determine upon the publication of this paper, it is only because I am compelled by circumstances which leave me no other choice but to publish it as it is, or to give up its publication altogether.

Several European species have been found by me as occurring here and are re-described under their old names. Having had no European specimens for comparison, I have identified them partly from recollection, partly from existing descriptions. It may happen also that among my new American species, some

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will be identified afterwards with European ones. The question of the real or apparent identity of American species with European ones, especially among insects, is a very delicate one, and requires a special investigation. Until some general principles are adopted in this respect, entomologists will have to depend on approximation, and their decisions will always be more or less arbitrary. In any event there is very little harm done in describing under a new name a European species found on this continent. The important point is, to have it well described, and if such is the case, its affinity or identity with the European species will easily be found out afterwards.

The terminology of the neuration of the wing, as explained on the diagram, is for the most part that of Walker. I have introduced some changes, where I could not follow him, as well as additions, where my purpose required it (especially some new names of the cross-veins). My terminology is in many points perfectly arbitrary, but until a rational nomenclature of the neuration of the wings, applicable to all families of *Diptera*, is adopted, the monographer of every family will be compelled to invent his own. There is no great harm in this, if only the meaning of the terms is clearly explained.

The terminology of the other parts of the body required almost no changes; there was only the thoracic portion between the suture and the scutellum, which had no peculiar name in the former descriptions. I call it *scutum of the mesothorax*, or simply *scutum*, following in this the nomenclature expounded by Westwood in Griffith's *Animal Kingdom*, vol. xv. p. 722, tab. cxxii. According to the same authority, I call *præscutum of the mesothorax*, or simply *præscutum*, the upper thoracic portion between the collare and the suture.

Not having been able to give figures of the wings of the different species, I have supplied their place by frequent references to the plates in Meigen's, Schummel's* and Walker's works, as well as by descriptions of the neuration.

The circumstance that the genital organs of the male *Limnobiæ* can be drawn from living specimens only, prevented me from replacing my hand by that of a more skilful draughtsman. I appeal, therefore, to the indulgence of my colleagues in Dipterology.

My friend Dr. John L. Le Conte has kindly volunteered to correct the proofs of this paper, which will be published during my absence, and I tender him my most cordial thanks for this mark of friendship.

Explanation of the terminology of the wing, as used in this paper.

AREÆ AND AREOLETS.

- | | |
|-----------------------|---|
| 1. Subaxillary area. | 9. Second radial area. |
| 2. Axillary area. | 10. Cubital area. |
| 3. Anal area. | 11. Subapical area. |
| 4. Pobrachial area. | 12. First externomedial, or <i>petiolate</i> areolet. |
| 5. Præbrachial area. | 13. Second externomedial areolet. |
| 6. Mediastinal area. | 14. Third externomedial areolet. |
| 7. Subcostal area. | 15. Fourth externomedial areolet. |
| 8. First radial area. | 16. Discal externomedial areolet. |

The areolets from 9 to 15 have been sometimes called collectively *apical areolets*.

* *Beitrag zur Entomologie, besonders in Bezug auf Schlesien*, von T. E. Schummel and Herm. Stannius; 8vo. Breslau, 1832.

Among other papers, this collection contains a monograph of the Silesian *Limnobiæ*, by Schummel.

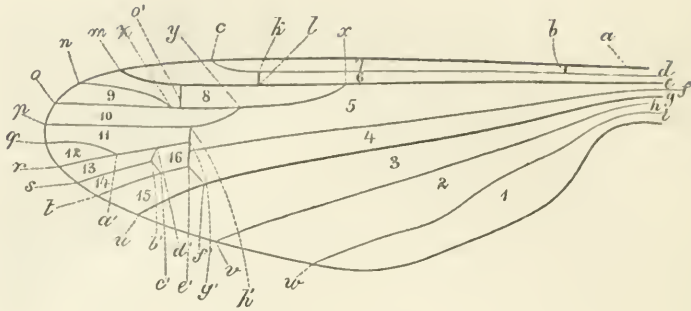


Diagram of a wing with two radial areas.

VEINS.

- am.* Costal vein or *costa*.
dc. Mediastinal vein.
cm. Subcostal vein.
fg'. Præbrachial vein.
gu. Pobrachial vein.
hv. Anal vein.
iw. Axillary vein.
xy. Petiole of the radial and cubital veins, or simply *petiole*.
yp. Cubital vein.
zn and *zo* radial vein, with its two branches, *zn* the upper, and *zo* the lower branch.
d'r. First externomedial vein.
b's. Second externomedial vein.
c't. Third externomedial vein.

CROSS-VEINS.

- b.* Humeral cross-vein.
kl. Mediastinal cross-vein.
o'. Stigmatal cross-vein.
g'h'. Central cross-vein.
g'e'. Upper discal cross-vein
d'b'. First lower discal cross-vein. } Discal cross-veins.
b'e'. Second lower discal cross-vein. }
e'f'. Great cross-vein.

The term *central cross-veins* has been also used collectively for the whole extent of the veins *x y h' g' e' f'*, or for a part of them, when they form a more or less straight line across the middle of the wing.

OTHER TERMS WHICH HAVE BEEN USED.

- x* is the origin of the *petiole*.
yh' is the portion of the cubital vein anterior to the central cross-vein; it has itself sometimes the appearance of a cross-vein, being in one line with the central cross-vein.
nzo is the *radial fork*.
oyp is the *cubital fork*, or simply *the fork* when it is the only one.

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Analytical Table for determining the genera.

- I. One radial area; antennæ 14-jointed; unguis armed with teeth on the under side; tibiæ without spurs at the tip; pulvilli indistinct or none; (natural group.) **Limnobia nob.**
- II. One radial area; antennæ 16-jointed; (*) (artificial group.)
- A. Mediastinal vein indistinct, being closely applied to the subcostal vein; no mediastinal cross-vein apparent; petiole, not arcuated at its origin, but forming an acute angle with the subcostal vein; anal angle of the wing square. **Antocha nob.**
- AA. Mediastinal vein distinct; petiole arcuated at its origin; anal angle rounded.
- B. No stigmatal cross-vein; proboscis elongated; palpi at its tip.
- C. Proboscis almost as long as the body. **Elephantomyia nob.**
- CC. Proboscis shorter than the body, but longer than the head. **Rhamphidia Meig.**
- BB. A distinct stigmatal cross-vein.
- D. A distinct fold, having almost the appearance of a supplementary vein, runs from about the middle of the anal vein, down the anal area, towards the posterior margin of the wing; *no distinct stigma?* proboscis short; wings elongated. **Dicranoptycha nob.**
- DD. No fold in the anal area; a distinct stigma; proboscis elongated, although shorter than the head; collare prolonged in a narrow, almost linear neck; wings broad, rather short, with a rounded posterior margin, very pure hyaline; the subcostal vein does not extend much beyond the central cross-veins. **Teucholabis nob.**
- III. Two radial areas.
- E. Tibiæ unarmed with spurs at the tip.
- F. Wings pubescent on the whole surface, or their veins clothed with long hairs. **Erioptera Meig.**
- FF. Wings naked, or only with a short pubescence along the veins.
- G. Axillary vein undulated; (see, Meig. i. tab. v. f. 7.) **Symplecta Meig.**
- GG. Axillary vein straight, or almost straight.
- H. The first radial area has the form of an almost equilateral triangle, the petiole being very oblique; ♂ and ♀ genital organs obtuse, without distinct horny appendages. **Cryptolabis nob.**
- HH. The first radial areas has its usual elongated form; the ♂ genitals have several distinct elongated, horny or coriaceous appendages; the ovipositor of the ♀ consists as usual of horny, pointed valves.
- J. The second radial area is very short, almost triangular; the upper branch of the radial fork takes an oblique, sometimes almost perpendicular direction to the lower branch, (like Meig, i. tab. vi. f. 7.) **Gonomyia Meig.**
- JJ. The second radial area has its usual elongated form, both branches of the fork being more or less parallel.
- K. No petiolate areolet; body black. **Gnophomyia nob.**
- KK. A petiolate areolet; body yellow. **Cladura nob.**
- EE. Tibiæ armed with spurs at the tip.
- L. Axillary vein very short, incurved to the anal angle; wings like Meig. i. tab. vii. f. 9; antennæ long, (as long as head and thorax together) setaceous, terminal joints indistinct. **Trichocera Meig.**
- LL. Axillary vein extending beyond the anal angle.
- M. Antennæ from 6 to 10-jointed.
- N. No discal areolet; wings like Meig. i. tab. vii. f. 8. **Anisomera Meig.**

*The antennæ are apparently 15-jointed in *Elephantomyia nob.*

NN. A discal areolet.

O. Antennæ of the ♂ much longer than the body; those of the ♀ short; second joint of the palpi longer than the third. *Arrhenica nob.*

OO. Antennæ ♂ of ♀ and of about the same length; both much shorter than the body; second and third joints of the palpi about the same length. *Eriocera Macq.*

MM. Antennæ 13 (sometimes apparently 12?) jointed; mediastinal cross-vein, far remote from the tip of the mediastinal vein, anterior to the origin of the petiole; wings like Walker, *Ins. Brit. Dipt. iii. tab. xxx. f. 7*, (having two cross-veins between the upper branch of the radial fork and the subcostal vein.) *Dicranota Zett.*

MMM. Antennæ 16 (or 17) jointed.

Q. Mediastinal cross-vein far remote from the tip of the mediastinal vein, anterior to the origin of the petiole.

R. Wings pubescent.

Ula Halid.

RR. Wings glabrous.

{ *Amalopsis Halid.*
{ *Pedicia Latr.*

QQ. Mediastinal cross-vein close by the tip of the mediastinal vein, or not far remote from it, and always posterior to the origin of the petiole. *Limnophila nob.*

LIMNOBIA nob.

(*Limnobia Meig.*, ex parte, inclusive of *Rhipidia Meig.*, *Geranomyia Hal.*, and *Dicranomyia Steph.*)

One radial area. Antennæ 14-jointed, (sometimes apparently 15-jointed, the cylindrical prolongation of the last joint appearing in some species as an independent joint). Ungues armed with teeth on the under side. Tibiæ without spurs at the tips. Pulvilli indistinct or none.

The proboscis is always elongated, cylindrical, although generally shorter than the head; in *Geranomyia* alone (1st Section) it reaches extraordinary proportions. The ♂ genitals vary in structure in the different sections of this genus; but all their forms have one character in common, and that is, the great development of the *anal style*, situated immediately under the forceps. (This organ is designated by the letter *e* on the figures 1, 3, 4, 5, 6, etc., of the plate.)

The group thus characterized, although very natural, comprises various forms on which new subdivisions may be established. But there is no reason to isolate some of them, leaving the others under the old generic denomination. The genus, as defined above, is so compact, that either it must remain in its integrity as a group of higher order, or the whole of it must be subdivided into subordinate groups. This rule has not been observed in former works.

The genus *Rhipidia* has been established on a European species with pectinated antennæ; the genus *Geranomyia* on several species with a long proboscis; but both *Rhipidia* and *Geranomyia* have more affinity to some species which remained in the genus *Limnobia* (especially to those which form my 3d Section, *Dicranomyia Steph.*,) than these species have to their neighbors of the same genus, (to the *Limnobiæ* of my 5th Section.)

The pectinated or moniliform antennæ of *Rhipidia* are a character of altogether secondary importance; that is they do not indicate a corresponding modification in the rest of the organization. The inconstance of this character is alone sufficient to prove its secondary value: in *Rhipidia maculata* the antennæ are pectinated in the male and moniliform in the female; in *Rhipidia domestica n. sp.* they are moniliform in both sexes. Such a character may be used in the classification, but it must be subordinate to more important characters.

In *Geranomyia* likewise the length of the rostrum, although a very good generic character, has apparently but little influence on the rest of the organi-

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zation, and should also remain subordinate to more essential characters. (In the same manner the immense proboscis of *Limnobiobrychus* does not prevent it from having the closest affinity to some *Rhaphidiæ*, for instance to my *Rh. brevirostris* with a comparatively short proboscis)

Not being able, on account of the scarcity of my materials, to attempt a final partition of the group *Limnobia* in its present definition, I retain it in its totality as a group of higher order and subdivide it in sections, some of which, (as *Rhipidia*, *Geranomysia*, etc.,) are genera already previously established, and which will also be retained in future, and others are only temporary divisions, adopted for want of better ones. The 5th Section especially is not sufficiently defined.

Limnobia in its present definition almost corresponds to *Limnobia Macq.* But, besides that it now includes *Rhipidia* and *Geranomysia*, it has been freed from those species, which, like my *Limnophila quadrata* and *L. lenta* have *two radial areas and no petiolate areolet*, and which *Macquart*, very erroneously, separated from his genus *Limnophila*, where they belong, and included in his *Limnobia*, where they are strangers. (See more about it in the preface and in *Limnophila*.)

Analytical Table.

1. Proboscis prolonged in a haustellum, and both together longer than head and thorax. (Section 1st.) Gen. *Geranomysia Halid.*
 (There is a separate analytical table for this genus below.)
2. Proboscis shorter than the head, 2
2. Antennæ pectinated or moniliform. (Section 2d.) Gen. *Rhipidia Meig.*
 (There is a separate analytical table for this genus below.)
3. Antennæ setaceous, 3
3. A supplementary cross-vein between the anal and axillary veins; wings with brown, ocelliform spots; length $3\frac{1}{2}$ —4 lines. (Section 6th.)
L. *Argus Say.*
- No supplementary cross-vein, 4
4. Wings with brown or black spots, or with clouds along the central cross-veins or with brown dots on the anterior margin, 5
 Wings without spots, clouds, etc., only with a more or less distinct stigma, 12
5. Feet black or dark brown, with a whitish ring before the tip of the femora, 6
 Feet yellow or brownish yellow, with or without brown rings, 7
6. Wings with blackish spots, especially along the anterior margin, and numerous small round dots in the areæ: body blackish; feet black, a whitish ring at a distance from the tip of the femora about equal to its own width; length $3\frac{1}{2}$ to 4 lines. (Section 4th.) L. *defuncta nob.*
 Wings with a dark stigma and clouds along the central cross-veins; body tawny and brown; feet brown; a white ring close to the tip of the femora; length 3— $3\frac{1}{2}$ lin. (Section 3d. *Dicranomysia Hal.*)
- L. *humidicola nob.*
7. The stigmal cross-vein is at the tip of the subcostal vein, 8
 The stigmal cross-vein is separated from the tip of the subcostal vein by an interval equal at least to half the length of the stigma, 11
8. Latter part of femora with brown rings at some distance from the tip; wings spotted with brown, 9
 Femora yellow, brown at the tip only, and without pale rings; wings with three brown ocelli and nebulosities on the cross-veins; body yellow, with brown dots; length $3\frac{1}{2}$ —4 lin. (Section 5th.) L. *triocellata nob.*
9. Intermediate stripe of the thorax pale, margined with brown; length 4—5 lin. L. *solitaria nob.*
- Intermediate stripe brown or black, capillary, 10
10. Two pale rings on the femora; the lower branch of the fork formed by the mediastinal cross-vein with the tip of the mediastinal vein is longer than

the upper one; it is *arcuated*, before joining the subcostal vein, whereas the upper one (joining the costal vein,) is short, straight and perpendicular; length 4—5 lines. (Section 5th.)

L. immatura nob.

One pale ring on the femora; both branches of the fork, formed by the mediastinal cross-vein with the tip of the mediastinal vein, are of about the same length; length 5—6 lines. (Section 5th.)

L. cinctipes nob.

11. Thorax with three brown stripes, the intermediate one capillary; wings clouded with brown along the central cross-veins and some of the longitudinal veins; length 4 lines. (Section 5th.)

L. indigena nob.

Thorax with one brown stripe on its anterior part; wings yellowish, with four more or less distinct brown dots along the anterior margin; length 4—4½ lines. (Section 5th.)

L. tristigma nob.

12. Thorax black, shining, pleuræ with a silvery reflection; wings infuscated, stigma brown: length 3 lines. (Section 3d.)

L. morio Fab.

Thorax cinereous, with three brown stripes; wings hyaline, stigma infuscated along the cross-vein only, the rest of its surface being paler; length 2½—3½ lines. (Section 3d.)

L. liberta nob.

Thorax ochraceous or brown, with or without stripes, 13

13. Whole antennæ black or brown; body brown, with more or less ochraceous on the thorax, 14

Antennæ, or at least their basal joints, pale, 14

14. Discoidal areolet extant, 15

No discoidal areolet; mediastinal cross-vein removed from the tip of the mediastinal vein at a distance about equal to the length of the stigma, 17

15. Feet yellow, with two brown rings; tip of the mediastinal vein with a brown cloud, **L. tristigma nob.**

(See above, No. 11.)

Feet yellow, without brown rings; tip of the mediastinal vein without cloud, 16

16. Ochraceous; abdomen, stigma and knob of halteres infuscated; veins of the wings brown; mediastinal cross-vein at a distance from the tip of the mediastinal vein about equal to the length of the stigma; length 2—2½ lines. (Section 3d.)

L. diversa nob.

The whole body, including the veins of the wings, pale ochraceous; mediastinal cross-vein at some distance from the tip of the mediastinal vein, but nearer than the length of the stigma; length 3—3½ lines. (Section 3d.)

L. pudica nob.

17. Ochraceous; thorax with a brown stripe in the middle; feet tawny; length 2½—3 lines. (Section 3d.)

L. immodesta nob.

Brownish ochraceous; thorax with three brown stripes; feet brown; femora with a pale ring before the tip; length 2½—3 lines. (Section 3d.)

L. gladiator nob.

18. Mediastinal cross-vein near the tip of the mediastinal vein, (the interval between them is much shorter than the length of the stigma,) 19

Mediastinal cross-vein removed from the tip of the mediastinal vein at a distance about equal to the length of the stigma; length 2½—3 lines. (Section 3d.)

L. distans nob.

19. The mediastinal vein joins the costal at some distance beyond the origin of the petiole, (this distance being almost equal to the length of the stigma); tip of the wing finely pubescent; length 3—3½ lines. (Section 3d.)

L. pubipennis nob.

The mediastinal vein joins the costal nearly opposite the origin of the petiole; tip of the wing naked; length 2½—3 lines. (Section 3d.)

L. stulta nob.

1st Section.

GERANOMYIA Halid.

Proboscis slender, longer than the head, prolonged in a haustellum, which

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is longer than the antennæ; it consists of a linear, very long lingua, and an equally long labium, divided from the base in two branches; palpi very short, near the tip of the proboscis, but at a considerable distance from the tip of the haustellum.*

The other characters of the genus agree with those of the 3d section, (*Dicranomyia Steph.*) The forceps of the male has the same structure; the habits seem to be the same, both genera being found in damp situations.

This genus was formed by Haliday, in 1833, on a European species, the only, I think, at present known from that part of the world. The American continent seems to be more abundant in *Geranomyia*. Dr. Loew published six species from Brazil, Chili, and the West Indies, and Mr. Walker one from Brazil. I have found three species within the United States.

Macquart's genus *Aporosa*, (established in 1838), is identical with *Geranomyia Halid.*

Analytical Table.

- | | |
|--|-------------------------|
| 1. Wings spotted, | G. rostrata Say. |
| Wings not spotted, | 2 |
| 2. Thorax cinereous, with three black stripes; the mediastinal vein joins the costal nearly opposite the origin of the petiole. | G. diversa nob. |
| Thorax tawny, with brown stripes; the mediastinal vein joins the costal at about the middle of the distance between the origin of the petiole and the tip of the subcostal vein. | G. communis nob. |

G. rostrata. Alis fusco maculatis et nebulosis; long. lin. 3.

Say, Journ. Acad. Phil. iii. 22, 6.

Wiedem. Auss. Zw. i. 35, 20.

Front and vertex cinereous; proboscis and antennæ brown. Thorax gray with more or less distinct brown stripes; the intermediate one appears sometimes slightly capillary; humeri and pleuræ tawny with a hoary reflection; scutellum and metathorax brown, hoary; halteres pale yellow with a brown knob; feet tawny, tips of the tibiæ black, thickly clothed with very short black hairs, and appearing for this reason slightly clavate; tips of tarsi infuscated. Abdomen brown, venter paler. Wings with five nearly square brown spots along the anterior margin; cross-veins and tips of all the veins along the apex and the posterior margin clouded with pale brown.

Four ♂ ♀ specimens. Washington (nob.) Mass. (Harris' Catal. Ins. Mass.) I have caught the same species in Cuba.

G. communis. Pallide fusca, thorace fusco-vittato, alæ hyalinæ stigmatè ovali, obscuro; long. lin. $2\frac{1}{2}$ — $2\frac{3}{4}$.

Front and vertex cinereous, occiput tawny; antennæ brown, under side of the 1st joint tawny; palpi and proboscis brown, basis of the latter pale. Thorax tawny, with three more or less dark brown stripes; pleuræ yellowish tawny; metathorax brown with a hoary reflection; halteres blackish, with a pale base; feet tawny, tips of femora, tibiæ and tarsi brown. Abdomen brown, margins of segments pale; venter paler. Wings hyaline, slightly cinereous, with a pale brown oval stigma; the tip of the subcostal vein forms a curve joining the radial; the stigmatal cross-vein is a little before their junction; the mediastinal vein joins the costal at about one-third of the distance between the origin of the petiole and the tip of the subcostal vein.

Five ♂ and 3 ♀ specimens. Washington (nob.) Upper Wisconsin River, (Mr. Kennicott).

G. diversa. Thorace cinereo, vittis tribus nigris, alæ subhyalinæ, stigmatè pallide fusco; long. lin. $2\frac{1}{2}$ — $2\frac{3}{4}$.

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* I distinguish here the *proboscis* from the *haustellum*, according to the acceptation of this word laid down in Illiger's Terminology.

Proboscis, palpi and antennæ black; front and vertex cinereous. Thorax cinereous, with three distinct black stripes, the intermediate one extends over the collar; the lateral ones are abbreviated before; pleura, scutellum and metathorax honry; halteres pale at base, dusky at tip; coxæ and basis of femora pale; the rest of the feet more or less dark tawny. Abdomen brown; ♂ forceps paler. Wings slightly infuscated; stigma of an irregular oblong form, pale fuscous; a slight nebulosity at the origin of the petiole; the mediastinal vein joins the costal nearly opposite the origin of the petiole; the stigmatal cross-vein forms with the tip of the subcostal vein an obtuse angle (sometimes approaching a straight line); the cross-vein is situated near the posterior end of the stigma.

♂ and ♀ specimens from Trenton Falls, (nob.) The proboscis (including the haustellum) of this species, are shorter than those of *G. communis*.

2d Section.

RHIPIDIA Meig.

Antennæ bipectinated or moniliform in the ♂, moniliform in the ♀.

The other characters, as well as the neuration of the wings, and the form of the ♂ forceps (see the figures 8 and 9 of the plate) agree with my 3d section, (*Dicranomyia Steph.*)

I have altered the generic character of this genus as it was adopted by Meigen ("antennæ maris bipectinatæ"), in order to include in it two new species, which are closely allied to *R. maculata*, but have moniliform antennæ in both sexes.

Analytical Table.

- | | |
|--|--------------------------|
| 1. Antennæ bipectinated in the ♂, moniliform in the ♀; wings densely spotted with small pale brown spots. | <i>R. maculata</i> Meig. |
| Antennæ moniliform in ♂ and ♀, or only <i>subpectinated</i> in the ♂; wings with some brown spots along the anterior margin. | 2. |
| 2. Antennæ black. | <i>R. fidelis</i> nob. |
| Antennæ with the two penultimate joints yellow. | <i>R. domestica</i> nob. |

R. maculata. Cinerea-fusca, thorace vitta brunnea, alis fusco maculatis et nebulosis; long. lin. $2\frac{1}{2}$ -4.

Meig. Eur. Zweifl. i. p. 153.

Front and vertex dark cinereous; proboscis, palpi and antennæ black. Thorax yellowish cinereous with a broad brown stripe in the middle; lateral stripes short and indistinct on the præscutum, although extended over the scutum; scutellum and metathorax with brown lines in the middle; halteres pale; feet tawny; coxæ and base of femora pale; a brown ring before the tips of the latter; tip of tibiæ brown. Abdomen brownish. Wings cinereous, densely covered with pale greyish brown spots and small round dots; four larger and darker spots along the anterior margin; the 1st near the base, the 2d a little beyond it, the 3d near the origin of the petiole; the 4th at the tips of the subcostal vein; central and lower discal cross-veins clouded; a round spot at the lips of the axillary vein.

Two ♂ and ♀ five specimens. White mountains in September; Trenton Falls in June (nob.); Maine (Mr. Packard); Illinois (Mr. Kennicott).

One of the ♀ specimens is somewhat different from the others in the picture of the wings; the larger spots and the nebulosities on the cross-veins are very dark; the smaller dots, on the contrary, are not so dense as usual, leaving large hyaline intervals between them.

Although I have no European specimens of *Rhip. maculata* for comparison, I do not doubt of the specific identity of the American specimens.

R. domestica. Antennæ nigra, articulis reniformibus, subpectinatis;

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pænultimus et ante-pænultimus flavi; præscutum brunneopictum; alæ fusco-maculatæ; long. lin. 3-3½.

Front and vertex cinereous; proboscis and palpi brown; eyes almost contiguous, in living specimens dark green above and violet below; antennæ black; penultimate and ante-penultimate joints yellow; flagellum moniliform, its joints reniform. Thorax yellowish brown, sericeous when viewed in a certain light; the thoracic stripes, which are dark brown, become distinct on the posterior part of the præscutum only; the anterior part is occupied by several brown lines and spots; a brown stripe on the pleuræ, running from the collare backwards; another one runs along the coxæ; halteres tawny, with a dusky spot on the knob; feet tawny; coxæ and basis of femora pale; tips of femora, tibiæ and tarsi brown. Abdomen dark tawny; margins of segments brown; ♂ forceps like figs. 8 and 9. Wings slightly brownish, with five or six brown spots along the anterior margin; cross-veins and tips of longitudinal veins clouded; the intervals between the veins also slightly clouded.

Washington, in May and August (nob.) 6 ♂, ♀ specimens.

R. fidelis. Fusca, antennis fuscis, moniliformibus, subpectinatis, alis fusco-maculatis et nebulosis; length 3 lin.

Head, proboscis, palpi and antennæ fuscous; the latter moniliform, subpectinated. Thorax dull brown, slightly hoary on the pleuræ; stripes indistinct; halteres pale; femora pale yellow, brown at the tip; tibiæ and tarsi brown. Abdomen brown; ♂ genitals paler. Wings pale brownish, except the region round the stigma and a narrow margin at the tip, which are hyaline; stigma brown; brown clouds at the origin of the petiole, the mediastinal cross-vein and the origin of the fork; discal and great cross-veins also slightly clouded.

One ♂ specimen from Sharon Springs, N. Y.

3d Section.

DICRANOMYIA Steph.

Body slender; feet long and slender; wings narrow; joints of the antennæ except the basal ones, oval-oblong, with short or moderate verticils, inserted about the middle of the joint; the ♂ forceps (see the figures 3, 4 and 5 of the plate) consists of two soft, moveable, ellipsoidal or subreniform lobes, each being armed on the inside with a short, curved, horny appendage having more or less the shape of a bird's beak (I call it *rostriform* appendage); another horny, long, slender, arcuated appendage (*falciform* appendage), is closely applied to each lobe; a linear, slightly curved anal style below those lobes.

The neurulation of the wings in the different species of this section is very uniform (almost like Meig. i. tab. vi. fig. 5); some difference may be found only in the position of the mediastinal vein and its cross-vein, and in the presence or absence of the discal areolet. Its absence occurs very frequently; it is sometimes a good specific character, and sometimes only an occasional variety.

The habits of the species seem to be aquatic; the larvæ probably live in water or mud; the perfect insects are always found in damp situations.

This generic name appeared for the first time in J. F. Stephens's *Catalogue of British Insects* in 1829, and afterwards in *Curtis's Guide* in 1837. I am not aware of any definition of it having ever been published.

D. liberta. Cinerea, proboscide, palpis et antennis nigris, thorace vittis fuscis; alæ subhyalinæ, stigma pallidum, juxta venulam transversalem infuscatum; long. lin. 2½-3½.

Proboscis and palpi black; front and vertex cinereous; antennæ black, verticillate with hairs of moderate length. Thorax cinereous; intermediate stripe broad, fuscous, well defined, capillary (capillarity indistinct in some specimens;) lateral stripes abbreviated before and extended over the scutum behind; a short oblique brown line runs from the intermediate stripe towards a deep puncture near the humerus; scutellum slightly tawny on the margins;

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halteres pale, knobs dusky; feet dark tawny, pale at base, brown ring at the tip of femora often scarcely apparent; tips of tibiæ and those of tarsi brown. Abdomen cinereous; ♂ forceps pale tawny; its structure like fig. 4. Wings hyaline, faintly tinged with grey; veins brownish, pale at basis; costal and subcostal pale; stigma oblong, pale, distinctly clouded *at the cross-vein*; the mediastinal vein joins the costal nearly opposite the origin of the petiole; sometimes a little before or beyond it: the cross-vein is near its tip; the great cross-vein is generally a little before the discal areolet; sometimes it is in one line with the upper discal cross-vein.

Eleven ♂ and six ♀ specimens.

Common near Washington in summer. I have also specimens from Mobile, Ala., and Dalton, Ga., (nob.) and Wisconsin, (Mr. Kennicott).

In one of the specimens the discal areolet, on one wing only, is open.

In another specimen (a ♀) the second externomedial areolet takes an oblique direction and joins the first, forming by this a petiolate areolet. This is the case on both wings.

D. humidicola. Fusca, abdomine fasciis pallidis, pedibus fuscis, femorum apice pallido, alis subcinereis, cinereo nebulosis; stigmatibus subquadrato, fumato; long. lin. 3-3½.

Proboscis, palpi and antennæ black; joints of the flagellum subglobular, becoming more elongated towards the tip; verticils moderate; front and vertex dark cinereous. Thorax tawny; the stripes brown, moderately distinct, more or less confluent; humeri yellowish, with a faint yellow, sericeous reflection; scutum, scutellum and metathorax brown, the first two with more or less yellow spots; pleurae brown, with pale spots; halteres pale, knob infuscated; coxæ pale; feet tawny, a pale ring close at the tip of the femora. Abdomen tawny, with pale bands on the incisures; ♂ forceps like fig. 3; ovipositor of the ♀ ferruginous. Wings subcinereous, with darker shades of gray at the tip, in the middle of the præbrachial areolet, in the pabrachial, (along the pabrachial vein) and in the first externo-medial (along the same vein;) the central cross-vein, all the discal cross-veins and the great cross-vein, are clouded; there is a pale brown spot at the margin of the petiole; another, larger and nearly round spot at the junction of the radial and cubital veins; stigma brown, nearly parallellopipedal; the mediastinal vein joins the costal generally a little beyond, sometimes nearly opposite the origin of the petiole; the cross-vein is near its tip; the great veinlet is generally a little before the discal areolet; the color of the veins is brown.

Washington, Trenton Falls (nob.), Connecticut (Mr. Norton). Common in damp, shady situations, especially in hollows having a spring at the bottom. Compared twelve (♂, ♀) specimens. One of my specimens has a stump of a vein on the curve of the petiole.

A variety of this species (consisting, perhaps, of immature specimens?) has no clouds on the wings; the stigma is brown, as usual. I caught them in numbers at Sharon Springs, N. Y. Such specimens are easily recognized by the pale tip of the femora, which is a very characteristic mark of the species.

D. stulta. Fusca, humeris, pleurisque pallidis, alis subcinereis, stigmatibus pallide cinereo; long. lin. 2¼-3.

Proboscis and palpi black; antennæ black, hardly reaching much beyond the fore-coxæ; joints of flagellum oblong, with moderate verticils; front and vertex dark cinereous. Thorax yellowish tawny; stripes brown, more or less shining, almost confluent; intermediate one extending over the collare, and sometimes faintly capillary; the lateral ones are extended over the scutum; scutellum and metathorax brown; halteres infuscated, pale at base; feet brownish, pale at base. Abdomen brown; ♂ genitalia paler; the rostriform appendage is small, and has two erect bristles; ♀ ovipositor ferruginous. Wings subcinereous, stigma oblong, pale; veins pale brown; the tip of the

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mediastinal vein is opposite the petiole; the mediastinal cross-vein is very near its tip (the distance is slightly variable in different specimens;) the great veinlet varies its position (as in *D. liberta*;) the upper discal cross-vein is generally arcuated.

Twenty-three ♂ and ♀ specimens. Trenton Falls, N. Y.; Berkeley Springs, Va., and Quebec, Canada, (nob.)

D. distans. Very like *D. stulta*, but mediastinal cross-vein separated from the tip of the mediastinal vein by a distance about equal to the length of the first externomedial vein. The thorax is less shining, and appears slightly yellowish sericeous; length, lin. $2\frac{1}{4}$ -3.

I have 6 (♂ and ♀) specimens, all taken in Florida in March, 1858.

Besides these specimens I brought five others from the same locality, distinguished from the former by the *absence of the discal areolet*, which is open, and by the *shortness of the petiole*, which is not longer than the great cross-vein, and originates at some distance beyond the tip of the mediastinal vein; the position of the mediastinal cross-vein is like in *D. distans*. Among these five specimens there is a ♂ and a ♀ which I caught in copulation; and as they agree in the above mentioned characters, it would prove, perhaps, that these are not merely accidental, but specific differences.

D. pubipennis. Fusca, thoracis disco fusco-nigro, antennis palpisque nigris, stigmatate cinereo; areolis apicalibus sparse pubescentibus; long. lin. $3-3\frac{1}{4}$.

This species is also very like *D. stulta*, but it is easily distinguished: 1st, by its size, which is a little larger; 2d, by its color, which is darker, especially on the thorax; 3d, by some peculiarities in the neuration of the wings; the mediastinal vein reaches considerably beyond the origin of the petiole; the cross-vein is near its tip; the distance between the cross-vein and the origin of the petiole is about equal to the length of the discal areolet; the two cross-veins, which divide the stigma transversely, do not form an almost straight line, like in *D. stulta*; the lower cross-vein is arcuated, and advances a little towards the tip of the wing; the apical part of the wing is finely pubescent, which pubescence does not reach the central cross-veins.

Eleven male and 9 female specimens, caught in May, 1859, at Relay House, (near Baltimore.) Five of these specimens (3 ♂ and 2 ♀) *have the discal areolet open*; one of them has it imperfectly closed.

D. immodesta. Pallide silacea, thorace vitta fusca, abdominis tergo infuscato, alis hyalinis, stigmatate pallido, areola discoidali aperta; long. lin. $2\frac{1}{2}$ -3.

Proboscis pale, palpi infuscated, antennæ fuscous, pale at base, front infuscated. Thorax ochraceous, paler on the pleuræ; collare and præscutum with a brown stripe in the middle which does not reach the scutum; halteres pale, knob dusky; feet pale tawny, coxæ and basis of femora pale yellow; tips of tarsi darker. Tergum infuscated; ♂ forceps pale. Wings with a slight yellowish-cinereous tinge; stigma elliptical, pale; the mediastinal vein joins the costal nearly opposite, or a little before the origin of the petiole; mediastinal cross-vein separated from the tip of the mediastinal vein by an interval a little longer than the stigma; stigmatal cross-vein generally in a line with the tip of the subcostal vein; sometimes it recedes a little, and then the tip of the subcostal is arcuated towards the radial vein.

Washington, Trenton Falls (nob.); Maine, (Mr. Packard.)

Twenty-five ♂ ♀ specimens.

This species is not unlike the European *D. modesta*, which, however, generally has a discal areolet, its absence being an exception; on the contrary I have not found as yet a specimen of *D. immodesta* with this areolet closed.

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D. gladiator. Fusco-silacea, thorace vittis tribus fuscis, abdomine fusco; pedibus fuscis, femorum apice infuscato, alis hyalinis, stigmatibus infuscato, areola discoidali aperta; long. lin. 2½—3.

Proboscis pale ochraceous, palpi infuscated, antennæ brown, pale at base. Thorax brownish ochraceous, with three distinct brown stripes on the præscutum; the intermediate one extends over the collar; the lateral ones over the scutum; scutellum and metathorax brown in the middle; pleuræ with a large brown spot near the intermediate coxæ and several smaller, indistinct spots; halteres pale at base; knob brown; feet brown, coxæ and base of femora pale; tip of the latter brown, with a pale ring before it. Abdomen brown, posterior margins of segments and genitals paler; falciform appendages of the ♂ forceps very large; (fig. 5,) they are very striking in the living insect and when their points touch each other, they form a kind of arch or bridge over both lobes. (The name of the insect is derived from their sword-like appendages). Wings slightly subcinereous; stigma elliptical, more or less infuscated; neuration exactly like that of *D. immoesta*.

Fourteen ♂ ♀ specimens. Washington in June (nob.)

If it was not for the structure of the ♂ forceps and for the circumstance that large numbers of *D. gladiator* occur in localities where not a single specimen of *D. immoesta* is to be found, and vice versa, I would have taken the former species only for a darker variety of the latter.

D. diversa. Pallide silacea; antennarum flagello, halteribus, tarsorumque apicibus fuscescentibus; alis hyalinis, stigmatibus pallide infuscato; venis fuscis; long. lin. 2—2½.

The abdomen is slightly infuscated, the genitals are yellow. Otherwise this species is not unlike *D. immoesta* from which it is easily distinguished by its smaller size, the presence of a discal areolet, the absence of the brown stripe on the thorax, and the wings, which are purer hyaline. The mediastinal cross-vein is, like in *D. immoesta*, at a distance from the tip of the mediastinal vein, which is about equal to the length of the stigma.

Five ♂ and ♀ specimens.

Washington and Maryland in the Spring (nob.)

D. pudica. Pallide silacea tota; oculis nigris, tarsorum apicibus fuscis; alis pallide flavescens, venis pallidis; long. lin. 3—3½.

There is not much to add to this diagnosis; the stigma is scarcely apparent, being of the same pale yellowish color as the rest of the wing; the mediastinal vein joins the costal a little before the petiole: the cross-vein is not far from its tip (at a distance shorter than half the length of the stigma.)

Two ♂ and four ♀ specimens from Illinois, (Mr. Kennicott.)

D. morio. Thorace nigro, nitido, pleuris argenteo-micantibus; alis pallide infuscatis, stigmatibus fusco; long. lin. 3.

Tipula morio Fab. Ent. Syst. iv. 242, 40; Syst. Ant. 32, 42.

Limnobia leucocephala Meigen, Auss. Zw. i., 136, 37.

Limnobia morio Meig., ibid. vi. 274; Walker Ins. Brit. Dipt. iii. 296, 32.

Head black, front silvery; antennæ and palpi black; last joint of the former ending in a slender, cylindrical prolongation, which might be taken for a 15th joint. (For this reason Meigen, vol. vi. p. 274, counted 15 joints in this species.) Thorax black, shining on the præscutum, silvery on the pleura; halteres with a blackish knob; feet pale brown, coxæ pale. Abdomen brownish with pale margins of the segments. Wings pale brownish, stigma darker brown.

Eight ♂ ♀ specimens from Trenton Falls (nob.)

Although not having European specimens of this species for comparison, I hardly doubt of their specific identity.

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4th Section.

Ungues with several notches on the underside, (and not with long teeth as in the other sections of the genus.) Forceps of the ♂ belonging to the same typical form with that of *Dicranomyia*, but with more elongated, slender lobes. (Fig. 1 and 2.)

L. defuncta. Fusco-cinerea, thorax vittis tribus nigro-fuscis, intermedia capillari; pedes nigro-fusci, femora versus apicem annulo albido; alae fusco maculatæ; long. lin. 3½-4.

Head cinereous; front and vertex almost black in the middle; proboscis, palpi and antennæ fuscous; joints of the flagellum subglobular, with short verticils. Thorax cinereous with a yellowish reflection; three dark brown stripes on the præcutum, the intermediate one capillary; the lateral ones abbreviated before, and extended over the scutum behind; pleuræ variegated with brown; halteres pale with black knobs; coxæ cinereous, feet brown, base of the femora tawny; a very distinct whitish ring at a distance equal to its own width from the tip of the femora; unguis with several small notches on the underside. Abdomen blackish cinereous; posterior margins of the segments paler; genitals pale. Wings subcinereous, spotted with blackish brown; subcostal area infuscated at four intervals; several spots, forming a short band, along the central cross-veins; series of small, round dots along the middle of the areæ; a larger spot in the axillary area, at the tip of the axillary vein; stigma square.

Common near Washington, especially in May. It occurs near running water, and is often found on stones or rocks over which a thin sheet of water is running. I possess the same species from the Trenton Falls and Quebec, (nob.) and from Maine (Mr. Packard.)

Compared 8 males and 4 female specimens.

5th Section.

(*Limnobia veræ*.)

Collare long, well developed; joints of the antennæ (except the basal ones) elongated, subcylindrical, slightly incrassated at the base; verticils long, inserted on the incrassation and before the middle of the joint; ultimate joint sometimes twice as long as the penultimate, and apparently consisting of two joints; feet stout; unguis strong with a large tooth in the middle of the under side and smaller ones nearer to the base; wings long and broad; the ♂ forceps consists of two subcylindrical, coriaceous halves; to each is attached a pair of closely contiguous, curved moveable lamellæ; the outer lamella seems to be horny; the inner one is of a softer consistence; they vary in size and form in different species. (See the figures 6 and 7 of the plate.) The difference between their structure and that of the forceps of *Dicranomyia* seems to be more apparent than real, and to depend entirely on the great distension of the soft portion of the forceps in the latter genus; the solid, horny parts seem to have the same structure in both genera. Thus, in *L. solitaria* the soft parts, marked *ff* on the plate, might be the analogues of the large lobes of *Dicranomyia*, only in a rudimentary state.

The colors of this group are bright (generally ferruginous or yellow) with well marked brown stripes and spots. The habits are terrestrial; the larvæ live in decaying wood or fungi; the perfect insect is found in localities where these matters abound. (The larva of *L. annulus*, a European species of this group, is described by Van Roser, as being, in shape and color, like a common earthworm; it lives in decaying wood; that of *L. xanthoptera*, another European species, has been found by Stannius and Bremi in Agarius.)

The contrast between this section and the 3d (*Dicranomyia*) is great, 1859.]

and appears in the whole organization as well as in the habits of the species. Still this contrast is not equally marked in all the species of the present section. Its typical representatives are the European *L. annulus*, *quadrimaculata*, etc., and the American *L. cinetipes*, *solitaria*, *immatura*; next come the European *L. xanthoptera* and the American *L. indigena*, *triocellata*; finally the European *L. macrostigma*, *tripunctata*, etc., and the American *L. tristigma*. In these species, the striking habitual characters of the types are softened down, and the contrast with *Diceromyia* is weakened. The structure of the forceps of the ♂ undergoes modification in accordance with the rest of the body.

For this reason I consider the establishment of this section as only provisional, not having been able for the present to effect a better subdivision.

L. cinetipes. Thorax vittis quatuor, femora annulis duobus fuscis; alæ fusco maculatæ et nebulosæ; ad apicem venæ subcostalis macula ocellata; long. lin. 5-6.

Say, Journ. Acad. Phil. iii. 21, 4.

Wiedem. Auss. Zweifl. i. 32, 15.

Proboscis and palpi infuscated; antennæ fuscous, first three joints ferruginous; front cinereous; vertex with a brown spot; its sides, as well as the underside of the head, reddish yellow. Collare yellow with brown spots; præscutum with four black stripes; the intermediate ones approach the collare before and reach the scutum behind; the lateral ones are abbreviated before and extend behind over the scutum, the sides of the scutellum and the metathorax; there are some indistinct brown spots on the humeri and the pleuræ; the ground color of the thorax (that is the interval of the stripes, as well as the pleuræ,) has a pale yellowish sericeous reflection; the anterior part of the intermediate stripes has a reflection of the same color; halteres pale, with a brown ring a little below the middle of the stem, and a brown spot at the base of the knob; feet ferruginous yellow; femora with two brown rings; the one a little beyond, the other near the tip; tarsi infuscated. Abdomen ferruginous yellow; segments of the tergum with black stripes on their posterior margins; lateral edge of the abdomen also black; venter yellow; genitals of ♀ ferruginous. Wings yellowish with brown spots and clouds; four spots near the anterior margin; the first near the basis; second, at origin of the petiole; third, double spot, at the tip of the mediastinal vein and the origin of the fork; fourth, ocellated, at the tip of the subcostal vein; cross-veins infuscated; a pale grey band, beginning at the anterior margin, near the tip, crosses the apical areæ, sends a branch across the discal areolet and expands into a large diluted spot in the last externo-medial area; several diluted pale grey shades in the anal, axillary and subaxillary areæ, leaving some pellucid spots along the posterior margin.

Missouri (Say,) Illinois (Mr. Kennicott,) Mass. (Mr. Scudder.)

I have but two specimens in my possession, one of which seems immature, its thorax being yellowish; the description is drawn from the other (a ♀) which is darker in its coloring and shows the peculiar sericeous reflection mentioned above.

L. immatura. Thorax vittis quatuor, femora annulis tribus fuscis; alæ fusco-maculatæ et nebulosæ, macula ad apicem venæ subcostalis integra (nec ocellata); long. lin. 4-5.

Very like the preceding species, but showing the following differences: it is smaller in size; the femora, besides the two brown rings *beyond* the middle, have a third one *in* the middle; it is pale, although distinct, especially on the anterior pair; the lateral edges of the abdomen are black, but there are no black stripes on the posterior margins of the segments; there is a brown spot instead of an ocellus at the tip of the subcostal vein; the grey band at the

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tip of the wing and the diluted spots along the posterior margin are much darker.

Other differences, perhaps of less consequence, which I notice in my specimens are: that the brown marks on the humeri are more distinct; that the brown spots on the pleuræ are more numerous and darker; that the base and the tip of the halteres are pale, the whole intermediate portion being dusky.

Three specimens, (one ♂ and two ♀) Washington, in May, (nob.) Upper Wisc. river (Mr. Kennicott,) Maine (Mr. Packard.)

L. solitaria. Thorax vitta media pallida, fusco-marginata, alæ fusco-maculatæ et nebulosæ; in area pobrachiali serie punctorum fuscorum; long. lin. 4-5.

Proboscis and palpi infuscated; front yellowish cinereous; vertex infuscated; antennæ fuscous, first joint yellow; the two or three following yellowish at base, infuscated at tip. Thorax yellowish; a brown stripe on the collare; a pale yellowish stripe, limited on both sides, by brown lines, on the præscutum; two lateral brown stripes, abbreviated before and extended over the tum behind; scutellum and metathorax pale yellowish sericeous both with lateral brown spots; pleuræ pale yellowish; halteres with brown knobs; coxæ pale; femora tawny; a pale ring beyond the middle, followed by a brown one near the tip; tibiæ and tarsi tawny, infuscated at their tips. Abdomen yellowish ferruginous; an indistinct brown band, formed by a series of spots in the middle of the tergum; genitals pale; their structure like fig. 6. Wings yellowish with brown spots and clouds; an oblique spot extends from the posterior end of the stigma to the origin of the fork; the margin of the stigma is more or less infuscated; a small brown ring is formed by this margin on one side, and the clouded cross-veins at the tip of the subcostal vein on the other; origin of the petiole infuscated; a series of more or less numerous brown dots runs along the disc of the præbrachial area, the most conspicuous among them being generally those opposite the origin of the petiole: anterior part of the pobrachial vein clouded; discal cross-veins and great cross-veins slightly clouded; a pale brown band across the apical arææ; posterior margin clouded, especially at the tip of the pobrachial and anal veins, and in the subaxillary area.

Two ♂ specimens; Trenton Falls (nob.)

A ♂ specimen from Maine seems to belong to the same species; but it differs by having a spot and not a ring at the tip of the subcostal vein; the spot at the origin of the petiole is larger and confluent with the corresponding dot in the præbrachial area; there are but two dots, instead of a series of dots, in this area, near the base; the last three segments of the abdomen are infuscated; the pale ring on the femora is less distinct.

N. B. Besides the differences mentioned in the descriptions of *L. cinctipes*, *imatura* and *solitaria*, each of these species seems to have a constant distinguishing character in the structure of the fork, formed by the mediastinal cross-vein with the tip of the mediastinal vein. In *L. imatura* the lower branch of this fork, (joining the subcostal vein,) is longer than the upper one, and arcuated; the upper one (joining the costal vein), is short, straight, and perpendicular.

The contrary is the case in *L. solitaria*; here the upper branch is longer and arcuated; the lower being short, straight, and perpendicular. In *L. cinctipes* both branches are about of the same length. The specimen of *L. solitaria* from Maine agrees in this respect with the typical specimens.

L. indigena. Flava, brunneo-vittata et marginata; femora annulis duobus fuscis; alæ fusco nebulosæ; long. lin. 4.

Head black; front with a silvery reflection; antennæ and palpi black.

1859.]

Thorax honey-yellow, shining, with three dark brown stripes; the intermediate one is capillary and does not reach the scutum; the lateral ones are abbreviated before and extended over the scutum behind; scutellum dark brown with a yellow line in the middle; metathorax brown; pleuræ with a brown stripe running from the base of the wing to the intermediate coxæ; a large brown spot anterior to the base of the halteres; the latter pale yellow, faintly infuscated in the middle of the stem; feet yellowish-tawny with two brown rings on the femora, but a little beyond the middle; the other near the tip; tip of tibiæ and tarsi infuscated. Abdomen brown; base of the second and the following segments broad yellow; ♂ forceps like fig. 7. Wings yellowish; stigma fuscous; central cross-veins clouded with fuscous; the tip of the p-brachial vein, the externo-medial veins and the lower discal cross-veins likewise margined with fuscous; fuscous spots about the middle of the præbrachial, p-brachial and anal areolets, forming an interrupted band across the wing; in some specimens they are indistinct.

Maine (Mr. Packard,) Upper Wisc. River (Mr. Kennicott,) Washington, in the Spring, (nob.)

Eight ♂ ♀ specimens.

L. triocellata. Ferruginea, thorace lineis et punctis nigris; alæ flavescens, ocellis tribus parvis fuscis; long. lin. $3\frac{1}{2}$ —4.

Proboscis and palpi brown; antennæ pale ferruginous; front slightly hoary; vertex pale ferruginous. Thorax ferruginous; collare long, with a longitudinal brown stripe in the middle; præscutum shining; two short, brown lines near the collare and four brown spots before the suture; a brown spot on the humerus pleuræ pale ferruginous, slightly hoary, with two or three brown dots between the anterior coxæ and the root of the wing; two lines in the middle and a spot on each side of the scutum; metathorax with brown marks in the four corners; halteres pale, with brown knobs; feet ferruginous, hairy; tips of the femora and last joint of tarsi brown. Wings tinged with yellow; space between costal and subcostal veins more saturate yellow; a small brown spot near the basis, between the subcostal and præbrachial veins; a brown ring at the origin of the petiole; another smaller one at the origin of the fork; a third sometimes indistinct one at the posterior end of the stigma; its anterior end is marked with a brown spot; a brown shade on the margin of the wing, between the stigma and the apex; tips of the longitudinal veins clouded.

Washington, Trenton Falls, in July and August (nob.); Upper Wisconsin River (Mr. Kennicott.)

L. tristigma. Pallide ferruginea, thoracis vitta fusca, alis flavescens, punctis quatuor marginalibus pallide fuscis, femoribus annulis duobus fuscis; long. lin. 4— $5\frac{1}{2}$.

Head, proboscis and palpi black; front slightly hoary; the first joint of the antennæ black at the root, yellow towards the tip; the following four or five joints pale yellow, the rest of the antennæ brown. Thorax pale ferruginous, a broad, brown stripe on its anterior part; it is linear on the collare and cuneiform on the præscutum, the point not reaching the suture; halteres yellow, slightly brownish at the tip; feet yellowish, tawny; femora with two brown rings, one beyond the middle, the other near the tip. Abdomen yellow. Wings yellowish, the interval between the costal and subcostal veins more saturate yellow; stigma pale; four pale brown dots along the anterior margin; the first at the origin of the petiole; the second at the mediastinal cross-vein; the third at the anterior, and the fourth at the posterior end of the stigma; the second is generally the most distinctly marked, the others being sometimes almost obsolete; the mediastinal cross-vein is at the tip of the mediastinal vein; the stigmatal cross-vein is in the middle of the stigma.

Five ♂ and six ♀ specimens from Northern Illinois (nob.)

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This species is very much like the European *L. tripunctata* Meig. Still, judging from the description of the latter it seems to be different.

6th Section.

A supplementary cross-vein between the anal and axillary veins. Forceps of ♂ holding the middle between those of *Dicranomyia* and of the 6th section (*Limnobia vera*.) See my figure of the forceps of the European *L. annulata* L., (*imperialis* Lw.) in the Stett. Entom. Zeit. 1854, tab. i. f. 1, 2.

The only species of this section is closely allied to some species of the 5th section.

L. argus Say, Long's Exped. App. p. 358; *Wiedem. Auss. Zw. i. 33, 17.*

I hardly doubt of the identity of this species with the European *L. annulata* Lin. (*L. imperialis* Loew; see the figure of the wing as given by Prof. Loew in Lin. Entom. v. tab. ii. f. 15.)

North Western Territory (Say), Nova Scotia (British Museum), Mass. (Mr. Scudder), Me. (Mr. Packard). I caught several specimens at Trenton Falls in June, 1858.

DICRANOPTYCHA nob.

Antennæ 16-jointed, reaching the base of the wing in the ♂, and but little shorter in the ♀; first joint cylindrical, elongated; second stout, obconical, the four or five next oval, the following elongated; verticils moderately long. Eyes naked, almost contiguous below. Proboscis short. Palpi short; second joint short, stout, third a little longer, fourth not much longer than third. Feet long, rather stout, pilose; *tibiæ* without spurs at tip; *ungues* smooth beneath; *pulvilli* distinct. Wings elongated, moderately broad, with one radial area; neuration somewhat like Meig. l. tab. iv. f. 17; a discal and no petiolate areolet; stig-matical cross-vein apparent; mediastinal vein distinct, with the cross-vein near its tip; axillary vein short, with a distinct fold, having almost the appearance of a supplementary vein, which runs from about the middle of the anal vein, down the anal area, towards the posterior margin of the wing, but disappears just before reaching it.

♂ forceps consists of two subcylindrical basal pieces, ending in two falciform or unguiform horny appendages; (fig. 12a shows the forceps of *D. nigripes*; fig. 13 one-half of that of *D. sobrina*.)

This genus is distinguished from *Limnobia nob.* by the 16-jointed antennæ, the smooth ungues, the presence of distinct pulvilli and the structure of the ♂ forceps, which approaches that of *Limnophila nob.* But it is separated from the latter genus by having but one radial area.

The peculiar fold in the anal area, mentioned among the generic characters, exists in some other genera also; but it is by far not so distinct and more straight. Here, on the contrary, it is characteristic enough to have induced me to derive from its presence the name of the genus.

Dicranoptycha has one character in common with *Antocha*: it is the peculiar iridescence of the wing, which, in both genera, seems to be due to the great density and minuteness of the microscopic pubescence of the surface. This iridescence is particularly apparent in *D. germana*, and less in the two other species.

D. germana. Fusco-fulva, alis fulvis, iridescentibus; long. lin. 4—4½.

Head yellowish cinereous; palpi brown; antennæ tawny toward the base, darker towards the tip. Thorax brownish fulvous, posterior part of the præscutum, the scutum, scutellum and metathorax with a cinereous tinge; a line of the same tinge along the middle of the anterior part of the præscutum. (This tinge is generally more distinct in ♀ than in ♂ specimens); lower part of the pleuræ with a hoary reflection; halteres ochraceous; feet ferruginous-tawny, 1859.]

clothed with black hairs; infuscated at the tips of femora, tibiæ and tarsi. Abdomen fulvous, more or less infuscated; in ♂ specimens the last segment is generally the darkest, the forceps being ochraceous; in the ♀ the whole abdomen is brown, the genitals being pale ferruginous. The wings are of a saturated fulvous tinge, with a peculiar bluish, opalizing reflection; the veins are fulvous and distinctly pubescent; if looked at obliquely, the veins appear yellow on a bluish ground. The neuration is described among the characters of the genus. No distinct stigma. The stigmatal cross-vein is very near the tip of the subcostal vein; the mediastinal vein reaches a little beyond the origin of the cubital area; the latter is longer than the subapical area by about half the length of the discal areolet; the great cross-vein is a little before the middle of the latter; the upper discal cross-vein is generally straight, but in a couple of specimens it is oblique and arcuated. In one specimen the petiole has a short stump of a vein near its origin.

Eight male and nine female specimens, caught near Trenton Falls, where this species was very common in July, 1858.

N. B.—The description is drawn from dry specimens. Among the notes which I took on living ones, I find the following character mentioned: "abdomen yellow, with five brown spots along the lateral margins at the incisures."

D. sobrina. Cinerea, alis subcinereis; long. lin. 4—4½.

Head subcinereous; proboscis tawny; palpi and antennæ black (in some specimens the antennæ are paler at the base); verticils of the latter long. Thorax cinereous; præscutum with three indistinct, infuscated stripes; pleuræ hoary; halteres pale; knob slightly infuscated; feet tawny, densely clothed with a moderately long black pubescence; coxæ pale; tips of the femora a little darker; those of tarsi brown. Abdomen cinereous; venter paler; genitals pale ferruginous; ♂ forceps like fig. 13. (See its description appended to the plate.) Wings subcinereous, iridescent, neuration similar to that of the preceding species; veins clothed with moderately long hairs; the anterior margin of the wing with a fringe of dense, short hairs.

Seven male and five female specimens; caught near Washington, D. C., in June, 1859.

D. nigripes. Fusco-flava, pleuris cano-micantibus; pedibus dense nigro-pubescentibus; femoribus anticis annulo flavo; ventre nigro-maculato; length 4 lines.

Head cinereous; antennæ black; two basal joints ferruginous-yellow; proboscis brownish, palpi black. Thorax brownish yellow; pleuræ, scutum, scutellum and metathorax with a hoary reflection; the latter blackish at the basis; halteres pale; coxæ and base of femora yellowish-ferruginous, the rest of the feet clothed with a dense black pubescence, which almost entirely conceals the tawny color of the ground; tip of femora black, with a yellow ring before it, which is especially distinct on the anterior pair. Abdomen brownish yellow; the segments of the venter, from the third to the seventh, have transverse black spots in the middle; ♂ forceps represented in figure 12a, and described in the explanation of the plates. Wings tinged with brownish yellow, which color appears more saturated and almost ferruginous along the costal margin; there is a fringe of black hairs along the apical margin, between the tip of the subcostal vein and the externo-medial veins; the surface of the wing itself is slightly infuscated along this fringe. Neuration almost like the preceding species; veins finely pubescent.

One ♂ specimen from Dalton, Ga. (nob.); the description was drawn from it when it was yet fresh.

D. sororella. Thorace pallide cervino, vittis obsoletis; pedibus pallidis; alis pallide fusco-cinerascentibus; length 3½—4 lines.

Head pale brownish yellow with a light grey tinge; palpi brown; antennæ

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brownish; two or three basal joints yellow. Thorax pale brownish yellow, with light vestiges of an intermediate capillary and two lateral stripes; pleuræ with a hoary reflection: halteres pale yellow; feet pale yellow, pubescent, and slightly infuscated at the tips of femora, tibiæ and tarsi. Abdomen yellowish tawny; male forceps somewhat different from that of the preceding species, the interior falciform appendage forming a *simple* and not a *double curve*, as in *D. nigripes*; it is short and has some bristles at the tip. The wings have a brownish-cinereous tinge, more yellowish along the anterior margin; the neuration is almost like that of the preceding species; veins finely pubescent.

Single ♂ and ♀ specimens from Dalton, Ga. (July, 1859.)

A female specimen from the same locality is more brownish grey on head and thorax. I am not sure if it ought to be considered as a distinct species.

ANTOCHA nob.

Mediastinal vein indistinct, being closely applied to the subcostal vein. No mediastinal cross-vein apparent. Petiole not arcuated near its origin, but straight, and forming an acute angle with the subcostal vein. Anal angle of the wing almost square, and, in consequence of this, the subaxillary area is nearly triangular. Excepting these peculiarities, the neuration is like that of Dicranomyia Steph.; that is, there is one radial area, a discal, and no petiolate areolet. Antennæ 16-jointed, short (longer than the head, but not reaching the base of the wing); joints of the flagellum subglobular; last joint elongated; all joints beset with short hairs, the ♂ antennæ being more thickly clothed with them; verticils short. Proboscis short. Palpi shorter than the head, first joint elongated, second and third shorter, the fourth elongated. Tibiæ without spurs at tip and without distinct pulvilli. Ungues with two small teeth near the base. Forceps of the ♂ like fig. 11, showing more analogy to the type of Limnophila nob. than to that of Limnobia nob.*

The general appearance of the insects of this genus is very like that of *Dicranomyia*. *Antocha* is related to all *Limnobiæ* with one radial area, by the analogous neuration of its wings and the structure of the feet, (*no spurs, no pulvilli and toothed unguis*). But it is distinct from them and approaches the *Limnobiæ* with two radial areas (*Limnophilæ*, etc.) by the number of joints of the antennæ, and, apparently, by the structure of the ♂ forceps.

The wings of both species described below have a peculiar milky-whitish tinge; they are distinctly iridescent, when held obliquely towards the light. Besides, they show another peculiarity: it requires a magnifying power of 150 to discover the microscopic pubescence on their surface; so magnified, they appear covered with black dots, emitting very short hairs. (Much less power is required to show the pubescence on the wing of most of the other *Limnobiæ*.)

The name of the genus is derived from its principal character, the proximity of the mediastinal and subcostal veins.

A. saxicola. Cinerea, antennis, pedibusque fuscis; coxis, femorum, alarumque basi pallide flavis; long. lin. $2\frac{1}{2}$ —3.

Head cinereous; proboscis yellow; palpi and antennæ black. Thorax cinereous, with several tawny, more or less distinct spots on the collare, the humeri and the pleuræ; præscutum yellowish cinereous, with three fuscous, almost

*In order to ascertain this peculiarity of the neuration with more precision, I compressed a wing of *A. saxicola* between two glass plates. This straightens the fold usually existing in the *Limnobia* between the costal and subcostal veins and shows the course of the mediastinal vein with greater distinctness; in this case this vein appeared separated from the subcostal by a narrow interval for about one-third of its length only; beyond that both veins ran close along side of each other, till costal, subcostal and mediastinal converged in a stout and elongated anastomose. Under such circumstances there was evidently no room for a mediastinal cross-vein.

confluent stripes; the intermediate one broad; the lateral ones abbreviated before and extended over the section behind. (In some specimens scutum and scutellum have a yellowish tinge); halteres pale with a dusky knob; feet black; coxæ pale yellowish-tawny, tinged with cinereous; base of femora also pale. Abdomen cinereous; ♂ forceps tawny, (fig. 11); ♀ ovipositor ferruginous. Wings with a whitish, slightly milky tinge; veins black; stigma indistinct; stigmatal cross-vein almost obsolete; base of the wing, as well as the veins in that quarter, pale yellow.

Numerous male and female specimens caught near Washington on the 19th of May, 1859, on mossy stones in a creek. I found most of them performing a singular, sideways walk, close to the water's edge; some of them were in copulation.

A. opalizans. Thorax silaceo, vittis infuscatis, pedibus pallide fuscis; alis lacteis, opalizantibus, basi pallida; long. lin. $2\frac{1}{4}$ — $2\frac{1}{2}$.

Head cinereous; proboscis yellow; antennæ (except the base) and palpi fuscous. Thorax ochraceous, with three pale brown stripes, the lateral ones sometimes indistinct; halteres pale, knob slightly dusky; feet tawny, slightly infuscated at the tip of the femora; coxæ and base of femora pale. Abdomen brownish; genitals paler. Wings like those of *A. saxicola*; they have a still more milky, opalizing tinge; their base is likewise pale, etc.; the color of the veins, especially near the costa, is more yellowish.

Six ♂ and four ♀ specimens. Trenton Falls, N. Y., Dalton, Geo., and Montreal, Canada. June, July, (nob.)

The specimen from Montreal has black veins on the wings and fuscous feet, the base only of the femora being pale. The specimen from Dalton has altogether pale feet.

ELEPHANTOMYIA nob.

Proboscis almost as long as the body, very slender, filiform arcuated; palpi inserted at the tip of the proboscis; first joint very short and almost coalescent with the second; both together are much longer than the third, the fourth a little shorter, (conf. Prof. Loew's figures of the palpi of Toxorhina in Lin. Ent. v. tab. ii.) Antennæ apparently 15-jointed, longer than the head, but hardly reaching the base of the wings; first joint cylindrical, short; second stout; third oval, stout, the following joints subcylindrical, and more elongated towards the tip of the antennæ; joints of the flagellum clothed with long verticils. Eyes large, naked; front narrow. Collare prolonged in a narrow, almost linear, although moderately long neck. Feet long, slender, without spurs at the tips of the tibiæ. Pulvilli indistinct or none. Ungues without teeth on their under side, broad at the base. Wings (somewhat like Meig. i. tab. vi, fig. 6,) with one radial area, a discal and no petiolated arcole; mediastinal vein and cross-vein distinct; no stigmatal cross-vein; anal and axillary veins united by a little cross-vein near the root of the wing. Forceps of the male consisting of a basal piece and two falciform horny appendages, (fig. 12 represents one-half of the forceps.) Ovipositor of the ♀ long, slender and pointed.*

The only species of this genus is the *Limnobia rhynchus canadensis* described by Mr. Westwood in the *Annales de la Société Entomologique de France*, 1835, p. 683. I have to explain the reasons which induced me to form a new genus of this species.

Mr. Westwood has described two species of *Limnobia rhynchus*: the ♂ and ♀ of *L. brasiliensis* and the ♂ only of *L. canadensis*. When, therefore, he mentioned among the generic characters of *Limnobia rhynchus* that the wings of the female differ from those of the male by having the radial and cubital areas coalescent in consequence of the obliteration of the radial vein, he

* The incrassated third joint of the antennæ seems to derive its size from the coalescence of two joints, so that in reality the antennæ are 16-jointed.

takes this character from the ♀ of *L. brasiliensis* the only specimen he had. The wing of the ♀ of *L. canadensis* is exactly similar to that of the ♂.

Prof. Loew's genus *Toxorhina* (Loew, Bernstein and Bernsteinfauna, Schulprogr. Berlin, 1850, p. 37, and Linn. Entom. v. p. 400, Berlin, 1851, tab. ii. f. 16—23,) comprising several fossil and one living species (from Jamaica) agrees in its characters with *Limnobiorynchus*: it shows the same remarkable obliteration of the radial vein in the ♀; their identity has been already suspected by Mr. Loew himself. He seems to have had only ♀ specimens in his possession; although not expressly mentioned in his descriptions, this fact can be inferred from them. It is highly probable therefore that the ♂ *Toxorhina* has, like the ♂ *Limnobiorynchus*, a complete radial vein, or, in other words, that these two genera are synonymous. Mr. Westwood's name, as the oldest, has the priority.

It remains to be considered now, whether the species *canadensis* Westw. really belongs to *Limnobiorynchus* (= *Toxorhina*) as defined by Mr. Westwood and Prof. Loew. The specimens of said species, which I have before me, do not agree with the definitions of these authors in the following points: 1st. The neuration of the wings is the same in both sexes. 2d. The antennæ of *Limnobiorynchus* (*Toxorhina*), are distinctly stated by both authors to have long verticils on the terminal joints only, forming a kind of pencil at the tip; the verticils on the other joints are said to be much shorter. This is not the case with *E. canadensis*: the verticils are of equal length on all the joints of the flagellum. 3d. The front of *Toxorhina* is mentioned by Prof. Loew as broad. ("The eyes, at least in the ♀, says he, are separated on the upper side by a considerably broad interval.) On the contrary the front is remarkably narrow in my specimens. 4th. "The thorax," says Prof. Loew, "is distinguished by the horizontal prolongation of the metathorax." Nothing of the kind is the case with my specimens. 5th. The anal vein in *Toxorhina* *Lw.* runs into the pobrachial at a considerable distance from the base of the wing; the little cross-vein which seems peculiar to this genus, unites the axillary vein with the pobrachial. In my specimens the anal vein takes its usual direction towards the base of the wing and the little cross-vein is situated between it and the axillary vein.

Under such circumstances I thought that the establishment, at least provisionally, of a new genus, with *L. canadensis* for its type, would be the most warrantable course to pursue in order to prevent further confusion.

E. canadensis. Pallide silacea; thorace vitta infusca, femorum apice fusco; segmentis abdominis fusco marginatis; alis subcinereis, stigmatibus oblongo, fusco; long. lin. 3—3½.

Limnobiorynchus canadensis Westw., Ann. Soc. Ent. de France, 1835, p. 683.

Head yellow; proboscis covered with a fine pubescence; antennæ yellow; verticils black; basal joints, especially the second, more or less infuscated. Thorax yellow; a more or less distinct brown stripe runs along its middle and down the collare, (in some specimens this stripe is altogether obsolete); halteres pale; feet yellow; femora brown at the tip. Abdomen yellow; posterior margins of the segments brown; a more or less distinct brown stripe runs along the middle of the tergum; the last joint is brown in the ♂; the forceps are tawny; ♀ ovipositor is ferruginous. Wings pale cinereous; a slight nebulosity along the apical margin; stigma oblong, blackish brown; no vestige of stigmatal cross-vein; the mediastinal vein, as well as its cross-vein, are in the middle of the distance between the stigma and the origin of the petiole; the latter is very short; discal areolet nearly square, the great cross-vein inserted a little before its middle.

In great numbers near Trenton Falls, N. Y., in July, 1859, (nob.) Canada, (Westw.)

1859.]

RHAMPHIDIA Meig.

Proboscis elongated, but shorter than the thorax. Palpi inserted at the tip of the proboscis, of moderate length, last joint elongated; front narrow; antennæ 10-jointed, not reaching the base of the wings; first joint cylindrical, elongated; second cyathiform, short; the following joints subcylindrical short, becoming more elongated towards the tip of the antennæ; verticils moderately long. Wings with a distinct mediastinal vein and a cross-vein near its tip; one radial area, a discal and no petiolated areolet; no stigmatal cross-vein. (The neuration is like Meig. vol. i. tab. vi. f. 6, or Schummel, tab. i. f. 1.) Feet long, slender; without spurs at the tip of the tibiæ; unguis smooth beneath; tarsi without distinct pulvilli. Forceps of the male somewhat similar to that of *Elephantomyia*.

I refer to this genus a male specimen from Wisconsin, which agrees with the characters of *Rhamphidia* as given by Meigen and Walker (Ins. Brit. Dipt. iii. p. 308.) Only Mr. Walker describes the tibiæ as armed with very short spurs. A careful examination convinced me that they are unarmed, although there are some bristles at their tip which might be mistaken for spurs. The absence of the stigmatal cross-vein, expressly mentioned by Schummel in his description of *R. longirostris* (Schum. Linnaea, p. 103,) is sufficient in my opinion to settle the question of the generic identity.

The close relation between this genus and *Elephantomyia* is evident. The comparatively short proboscis, the structure of the palpi and of the second joint of the antennæ, seem to be the only differences. The neuration of the wings, including the absence of the stigmatal cross-veins, is exactly the same; the little cross-vein between the pobrahial and anal veins, apparent on the wing of *Elephantomyia*, is concealed by a fold in my specimen of *Rhamphidia*; still it can be distinctly seen by holding the wing in a certain direction. *R. brevisrostris* bears, besides, a most striking resemblance to *Eleph. canadensis* in the coloring of the body and the wings; the wing of the former is only a little more hyaline, and for this reason the dusky spot at the tip is more apparent; the stigma is less oblong, more square, and the tibiæ are black at the tip, whereas those of *E. canadensis* are not even infuscated.

The proboscis of *R. brevisrostris* seems to be much shorter than that of the European *R. longirostris*, (judging from the descriptions of the latter.)

R. brevisrostris. Silacea, præscuto et abdomine infuscatis; alis hyalinis, apice infuscato, stigmatate fusco; pedibus pallidis; apicibus femorum, tibiærumque nigris; long. lin. 2 $\frac{3}{4}$.

Head cinereous; proboscis but little longer than the head, fuscous; palpi fuscous; antennæ fuscous at the base; flagellum paler. Thorax ochraceous-yellow; præscutum infuscated; the usual stripes but indistinctly marked; halteres pale; feet pale yellow; tips of the femora and tibiæ black; tips of tarsi also darker. Abdomen yellow; the anterior part of the segments infuscated; last segments and genitals fuscous. Wings hyaline, infuscated at tip; stigma brown, nearly square; the anterior part of the pobrahial vein also infuscated; veins brown; costal and subcostal veins yellow.

Single ♂ specimen, brought from Wisconsin by Mr. Ulke.

This species might possibly be *R. prominens* Walk., (Dipt. Saund. v. p. 435) although the description disagrees in several points. *Rhamphidia flavipes* Macq., (Dipt. Exot. Suppl. v, p. 17,) is described as having thorax and abdomen brownish ("fusca"); in other respects Macquart's description agrees well with my *R. brevisrostris*.

TEUCHOLABIS nob.

Wings broad and rather short; posterior margin rounded; mediastinal vein [Aug.

not reaching beyond the middle of the wing; the mediastinal cross-vein at a moderate distance from the tip of the mediastinal vein; the subcostal vein not much extended beyond the central cross-veins; one radial area and no petiolated areolet: the microscopic pubescence of the wing is distinctly seen under a moderate magnifying power; it is rather sparse, the wing appearing for this reason pure hyaline and transparent. Antennæ 16-jointed, nearly reaching the base of the wing; first joint cylindrical, elongated, second short; flagellum, submoniliform, with oblong joints and long verticils. Proboscis cylindrical, slender, elongated, although shorter than the head; palpi at the tip of proboscis short, last joint very short; eyes naked, moderately remote above, approximated below. Collare prolonged in a narrow, almost linear neck, which is half as long as the head. Feet of moderate length, rather stout, hairy; no spurs at the tip of the tibiæ; pulvilli small. The forceps of the male consists of two oblong lobes, somewhat like those of *Dicranomyia*: large horny appendages on their under side; anal style distinct, (fig. 10 represents the forceps of *T. complexa* from above; fig. 10 a, one-half of it from below.) Valves of the ♀ ovipositor of moderate length, slender, arcuated.

Is easily distinguishable by its broad, clear wings, the shortness of the mediastinal and subcostal veins; the short, hairy feet, the stout, short thorax, rising abruptly above the abdomen, etc. The 16-jointed antennæ, the structure of the ungues, and the presence of the pulvilli are as many points of analogy with *Limnophila nob.*, the neuration of the wings (which have but one radial area,) and the absence of spurs at the tip of the tibiæ remind on the contrary of *Limnobia nob.* Hence the location of *Teucholabis* in the present intermediate group. *Rhamphidia scapularis Macq.* Dipt. Exot. i. 1, pl. 10, f. 1, shows some analogy with *T. complexa*, especially in the neuration of the wings.

T. complexa. Brunneo-flava, thorace vittis tribus brunneis; alis hyalinis; stigmatibus subrotundo, fusco; long. lin. $2\frac{1}{2}$ – $2\frac{3}{4}$.

Head blackish cinereous, antennæ and palpi black. Thorax yellow with three brown stripes; the intermediate one begins at the collare; the lateral ones are abbreviated before and extended over the scutum behind; scutellum yellow; metathorax more or less brown in the middle, yellow at the sides; pleuræ yellow with more or less distinct brown stripes, running from the collare to the abdomen; halteres pale; feet pale yellowish, hairy; tips of femora and tibiæ brown; last joints of the tarsi brown. Tergum brown, posterior margins of the segments a little paler; ♂ forceps tawny (fig. 10, and 10 a.) Wings hyaline, veins brown; costal and subcostal tawny; anterior margin distinctly pilose; stigma distinct, brown, rounded, near the tip of the subcostal vein; the stigmatal cross-vein crosses it; petiole arcuated, but little shorter than the radial vein which appears as its prolongation in a nearly straight line. (For the description of the neuration compare also the generic characters.)

Three ♂ and one ♀ specimens. Washington and Trenton Falls, N. Y., in June, (nob.) Illinois (Mr. Kennicott.)

There is a slight difference in the form of the discal areolet of these four specimens; in one of the males the second lower discal cross-vein is nearer to the upper discal cross-vein than in the others; the areolet in this case appears more square.

ΓΝΟΡΗΜΥΙΑ nob.

Antennæ 16-jointed, setaceous; first joint elongated, cylindrical, second cyathiform; the following joints oblong or subglobular, with moderate verticils. Proboscis short. Palpi of moderate length; last joint longer than the preceding. Front convex, eyes glabrous. Feet of moderate length, stout, 1859.]

covered with a short pubescence; femora slightly incrassated at tip. Tibiæ without spurs at tip. Tarsi with distinct pulvilli. Wings of moderate length, with two radial area and without petiolated areolet; (almost like Meig. i. tab. v, f. 4 or f. 6.) Mediastinal cross-vein at a moderate distance from the tip of of mediastinal vein. Forceps of the ♂ (fig. 18) consisting of comparatively short basal pieces, of the usual horny appendages, one pair are very long, slender, linear and slightly arcuated; the other is short and stout; ♀ ovipositor elongated, slender, slightly arcuated; the lower pair of valves is very short and do not reach much beyond the origin of the upper pair, (fig. 18 a.)

This genus is very much like *Erioptera* in its general appearance; the body is rather short and stout; the intermediate pair of feet is like in *Erioptera*, a little shorter than the other two. But it differs from the latter genus by its glabrous wings and the structure of the genital organs in the ♂ and ♀. The structure of the ♀ ovipositor is somewhat analogous to that of *Symplecta*. The dark, lugubrious coloring of *Gnophomyia* seems to be also characteristic. The name of the genus alludes to it.

G. luctuosa. Atræ, halteribus atris; alis obscura infumatis; long. lin. $3\frac{1}{4}$.

The whole body, including the halteres, is of a deep velvet black. Wings smoky, nearly black; subcostal area still darker; stigma hardly distinct; a short almost microscopic pubescence in the centre of the apical areolet; the stigmatal cross-vein is at the origin of the second radial area.

Single ♂ specimen caught in Florida, in Mareh, 1858, (nob.)

G. tristissima. Nigra, pedibus piceis, halterium capitulis flavis; alæ pallide infumate, stigmatæ oblongo, obscuro; long. lin. $2\frac{1}{2}$ – $3\frac{1}{4}$.

The whole body is black, moderately shining; thorax gibbose; a slight hoary reflection on the lower part of the pleuræ and sometimes on the front; feet piceous, base of femora dark tawny; halteres brown with yellow knobs; wings dusky with a blackish, elongated stigma, divided longitudinally in two by the subcostal vein; veins black, paler at base; fig. 18 represents the ♂ forceps of this species; fig. 18 a, the ♀ ovipositor.

Washington, New York, Virginia mountains in the Spring and in Summer, common. Upper Wisconsin River (Mr. Kennicott.)

Compared eleven ♂ ♀ specimens.

CRYPTOLABIS nob.

Antennæ 16-jointed, joints of the flagellum oval, hairy. Proboscis short; palpi with subcylindrical joints of nearly equal length. Feet moderately long, tibiæ without spurs at the tip. Tarsi with small pulvilli. Wings of moderate length and breadth; petiole very short and oblique, so that the first radial area has the form of an almost equilateral triangle; two radial area and no petiolated areolet; the central cross-veins at the base of the second radial, the cubital, the subapical and the first externo-medial area, form one line, being connected at their ends; the stigmatal cross-vein (or at least the vein replacing it) is the continuation of the same line; the second externo-medial area is shorter than the first; the great cross-vein is a little nearer to the tip of the wing than the other central cross-veins; the mediastinal cross-vein is a little anterior to the origin of petiole and very indistinct. Forceps of the ♂ somewhat like that of *Antocha*, but the falciform appendages are small and, in the state of repose, so closely applied to the under side of the basal pieces as to be indistinct. Ovipositor of the ♀ obtuse, soft, without any apparent horny lamellæ. (Fig. 14, 14 a and 15, 15 a male and female genitals of *C. paradoxa*.)

This genus is sufficiently distinguished from all others by the neuration of the wings and the structure of the genitals. The absence of the horny lamellæ

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in the ovipositor and the smallness of the ♂ forceps render the recognition of the sexes very difficult.

C. paradoxa. Thorax livido, nigro-vittato; antennis nigris, pedibus, basi pallidis; alis immaculatis. Length lin. 1-1 $\frac{1}{4}$.

Head blackish; palpi and antennæ black. The color of the thorax is livid; but it is scarcely apparent between the black stripes; intermediate stripes broad, capillary; lateral ones extended over the scutum; scutellum pale, metathorax dark; pleuræ blackish; halteres pale; feet clothed with hairs; coxæ and base of the femora pale; their tips brown; tibiæ brownish-tawny, infuscated at tip; tarsi likewise. Abdomen blackish (often greenish in living specimens, the color depends on the food.) Wings hyaline, without apparent stigma; veins brown, costal and subcostal pale yellow; neuration as described among the generic characters; apical areolets slightly pubescent in the middle.

Twenty-one specimens taken at the White Sulphur Spings in Va., on the 30th of June, 1859.

ERIOPTERA Meig.

Wings pubescent on the whole surface, or on the veins only; two radial areæ; mediastinal cross-veins at a considerable distance from the tip of mediastinal vein, although *posterior* to the origin of petiole, the latter nearer than usual to the origin of the wing. Antennæ with 16 joints. Proboscis and palpi short. Tibiæ without spurs at the tip. Pulvilli distinct. Ungues smooth.

The pubescence of the wings is the most striking character of *Erioptera*; still it is not sufficient for defining the genus, because *Ula* and several *Limnophila*, have also wings which are pubescent along the veins, or on the whole surface. The characters enumerated above, especially the spurless tibiæ, complete the definition.

Erioptera, thus defined, is far from being homogeneous, and exhibits among a comparatively small number of species more variety in the neuration of the wings or the structure of the ♂ genital organs than either *Limnobia* or *Limnophila*, although these genera are much richer in species. It has been observed already by Mr. Curtis, (*Brit. Entom.* 557,) that in some *Erioptera* the antennæ of the ♂ are much longer than those of the female, and that such species show at the same time some peculiarities in the neuration of the wings, and might therefore, with good ground, be separated from the rest of the genus.

My *E. hirtipennis* and *pubipennis* belong to the group thus defined by Curtis. My *E. chlorophylla*, *vespertina*, *septemtrionis*, *villosa*, *chrysocoma*, etc., seem to form another natural group; my *E. Meigenii* and *nubila* a third one; *E. caloptera* *Say*, and *parva nob.* a fourth, etc.

The ♂ forceps shows a great variety of structure; several pieces are figured on the plate; fig. 19, *E. vespertina* (one half); fig. 20, *R. armata*, upper side; fig. 21, the same, side view; fig. 22, *E. caliptera*; fig. 23, *E. venusta*, upper side; fig. 13 *a* under side.

Analytical Table.

- | | |
|--|----|
| 1. Second radial area shorter than the cubital; petiole ending in the cubital, 2 | |
| Second radial longer than the cubital; petiole ending in the second radial; | |
| first and third externomedial areolets longer than the subapical, the great | |
| cross-vein being much nearer to the base of the wing than the other central | |
| cross-veins, | 14 |
| 2. No discal areolet, | 3 |
| A discal areolet, | 11 |
| 3. Second externomedial areolet petiolated; wings like Meig i. tab. iv. f. 9, | 4 |
| First externomedial areolet petiolated, | 9 |

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4. Surface of the wing naked, the veins alone being hairy, 5
The whole surface of the wing hairy; its color is pale brown; *lower fork shorter than the upper one*; the upper branch of lower fork forms a curve near its origin; the lower branch is straight; body dark cinereous; stripes on thorax obsolete; halteres and base of femora pale; ovipositor ferruginous. Length $2\frac{1}{4}$ lin. Washington, two ♀ spec. (nob.) **E. holotricha.**
5. Body pale green; antennæ, halteres, veins, genital organs, etc., also pale greenish; eyes black. Long. lin. $2-2\frac{1}{2}$. Common ♂ ♀ Washington, Dalton, Ga. (nob.) **E. chlorophylla.** 6
Body yellow or brown,
6. *Knob of halteres brown*; body ochraceous; front whitish, infuscated in the middle; præscutum with more or less distinct, confluent brown stripes, the intermediate one is dark brown on the collare, and the anterior part of the præscutum; tergum infuscated, antennæ, except the base, and palpi brown; wings hyaline, slightly cinereous, immaculate, veins dusky; *hairs much shorter than in the other species of the genus*; feet pale yellow; length $2-2\frac{1}{2}$ lin. Sharon Springs, N. Y. (nob.) Maine, (Mr. Packard.) Six ♂ and ♀ specimens. **E. septemtrionis.** 7
Knob of halteres pale,
7. Body brown; a sulphureous spot on the shoulder extended into a pale stripe towards the basis of the wing; base of femora pale; tip of halteres with a fine, silky, golden yellow pubescence; horny appendages of the ♂ forceps pale, with brown tips; wings dusky; hairs long; long. lin. $2\frac{1}{2}$. Middle States (nob.) Single ♂ specimen. **E. villosa.** 8
Body yellow,
8. Wings immaculate, slightly yellowish cinereous; veins pale, hairs of moderate length; palpi and antennæ brown; the first 3 or 4 joints of the flagellum pale; (the two basal joints of the antenna are generally infuscated, especially the tip of the second;) thorax of a saturate reddish yellow on the back, paler, almost sulphureous on the shoulders; pleuræ pale, slightly hoary; tips of the tarsi and of the horny parts of the ♂ forceps brown; lin. $2\frac{1}{4}-2\frac{1}{2}$ long, common; Washington D. C. Florida, (nob.) Wisconsin, (Mr. Kennicott.) **E. vespertina.**
Wings yellowish, with two brown dots on the anterior margin; (one across the stigmatal cross-vein; the other at the tip of the subcostal vein;) veins pale yellow, infuscated at all their tips and anastomoses, cross-veins infuscated; great cross-vein nearer to the base of the wing, than the other central cross-vein; *a fringe of golden yellow hairs at the tip of the wing*, feet brown, clothed with brown hairs; base of femora yellow, which color extends nearly to the tip of the posterior femora; antennæ of the ♂ clothed with a dense pubescence, besides the verticils; length lin. $2-2\frac{1}{4}$. Washington, D. C. three ♂ spec. (nob.) **E. chrysocoma.**
9. Surface of the wing naked, the veins alone being hairy. 10
Whole surface of the wing pubescent; *a brown spot in the region of the stigma*; indistinct nebulosities on the central cross-veins; upper branch of the lower fork straight; lower branch arcuated, almost angular near its origin; great cross-veins a little nearer to the base of the wing than the other central cross-veins; body cinereous; antennæ brown; those of the ♂ densely pubescent besides the verticils; stem of the halteres dusky; the latter part of the knob pale yellow; feet blackish tawny, pale at base, knees pale. length lin. $2-2\frac{1}{2}$. Middle States, eight specimens ♂ ♀, (nob.) **E. Melgenii.**
10. Wings fuscous, with numerous round, white spots on the surface, and six large square spots of the same color along the anterior margin; thorax with two fuscous lines above and one on each side, before the wings; femora

with two blackish rings; length $1\frac{1}{4}$ – $2\frac{1}{4}$ lines. Common in the United States; occurs also in Cuba.—Say, Journ. Acad. Philada. iii. 17.

E. callptera Say.

Wings hyaline, slightly cinereous; about ten brown spots along the margins of the wing, at the tips of the longitudinal veins; the spots along the anterior margin are larger; cross-veins infuscated; thorax yellow, with two brown stripes; similar stripes on the pleuræ; feet pale, with a brown ring before the tip of the femora; abdomen brown; length 1 – $1\frac{1}{2}$ lines. Washington, D. C., Savannah, Ga. Ten ♂ ♀ specimens (nob.)

E. parva.

11. Surface of the wing naked, the veins alone being hairy.

Whole surface of the wing hairy; body cinereous; a brown stripe over the thorax; antennæ fuscous, paler at the base of flagellum; verticils short; palpi black; halteres pale, slightly infuscated at the base of the knob the tip of which is clothed with a short, golden yellow pubescence; feet dark tawny, paler at base of femora, brown at tip of tarsi; brown ring before the tip of femora; knees whitish; wings greyish-white, with grey nebulosities; they form two more or less marked bands across the apical areolets; a third band passes over the cross-veins; there is one nebula in the centre of the præbrachial area; another in the axillary, and some nebulosities in the subaxillary area; length $2\frac{1}{4}$ – $2\frac{3}{4}$ lin. Washington, D. C., common in April; on the 15th of this month I caught several pairs in copulâ.

E. nubila.

12. Wings with numerous brown spots.

Wings pale yellowish with two brown bands; the first begins at the origin of the petiole, is broadest in the middle, and reaches the posterior margin at the tip of the axillary vein; the other is parallel, runs from the anterior to the posterior margin, and includes at each end a small transparent spot; sometimes the spot at the anterior margin is connected with the yellow of the apical part of the wing; in this case a brown spot at the tip of the subcostal vein is isolated from the band; second lower discal cross-vein slightly colored; small brown dots at the tips of the upper branch of the radial fork and of both branches of the lower fork; body brown; thorax yellow; pleuræ brown; feet and halteres pale; femora with brown rings; length, lin. $2\frac{1}{4}$ – $2\frac{1}{2}$. Trenton Falls, N. Y., and Virginia Springs (nob.); Connecticut (Mr. Norton); 12 ♂ ♀ specimens.

E. venusta.

13. Feet pale; thorax cinereous, without stripes; abdomen fuscous; posterior margins of segments pale; five or six brown spots at the anterior margin of the wing; the second spot from the base does not touch this margin; tips of all the veins along the posterior margin clouded with brown; there is a nebulosity in the subaxillary area; cross-veins clouded; great cross-vein nearer to the base of the wing than the other central cross-veins; the second externomedial vein is prolonged in the shape of a stump, inside of the discal areolet; sometimes this stump reaches the opposite side of the areolet, and thus divides it in two; length, lin. $2\frac{1}{4}$ – $2\frac{1}{2}$. Washington in the Spring (nob.); Wisconsin (Mr. Ulke); 16 ♂ and ♀ specimens.

E. armata.

Feet variegated with brown, which forms two broad rings on the anterior femora, occupying the whole surface; posterior femora brown, with a pale ring before the tip; tips of tibiæ and tarsi brown; thorax yellowish cinereous, a brown, capillary often indistinct stripe on the præcutum; a broad, dark brown stripe reaches from the humeri to the metathorax, passing inside of the base of the wing; a similar stripe on the pleuræ; abdomen brown; halteres pale; antennæ brown, with pale base; (those of the ♂ densely clothed with a short pubescence); palpi brown; tips of the longitudinal veins, cross-veins, etc., clouded; costal vein infuscated at six intervals, especially opposite the petiole, where a spot occurs, one branch of which nearly reaches the præbrachial vein; pabrachial vein infuscated and clouded twice before the great cross-vein, which is arcuated and nearer to the base of the wing than the other central nervures; some

indistinct nebulosities in the axillary and subaxillary area; veins yellow; except where the clouds and spots occur; length lin. $2\frac{1}{2}$ – $2\frac{3}{4}$. Washington, D. C. Common. **E. graphica.**

14. The forked externomedial vein originates from the great cross-vein (see the figure in Curtis' Brit. Ins. tab. 557). 15
 The forked externomedial vein originates *beyond the great crossvein*, that is, from the præbrachial vein; greyish black, the body, the veins and the posterior margin of the wings covered with long, black hairs, which appear golden in a certain light; halteres, antennæ and feet black; the second radial area is square at its base, the basal cross-vein being in a line with the stigmatal cross-vein; the cubital and subcubital areas are likewise square at their base, of equal length and but little shorter than the second radial; (the veins can be seen only when the pubescence is rubbed off; length lin. $\frac{3}{4}$. Washington, D. C., and Relay House, near Baltimore (nob.), 10 ♂ specimens; forms clouds in the Spring in the vicinity of running waters; perhaps synonymous with the European *E. murina* Meig? **E. ursina.**
15. Body brown; wings dusky; veins very hirsute with brown hairs; pale spots at humeri; halteres infuscated; feet fuscous; coxæ and base of femora pale; antennæ brown; length lin. 2– $2\frac{1}{2}$. Three ♀ from Maryland (nob.). **E. hirtipennis.**
 Body yellow; front and margin round the thorax sulphur yellow; the latter, if viewed in a certain light has a hoary reflection; palpi brown; antennæ pale, brown at tip; halteres sulphur yellow; anterior feet tawny, clothed with brown hairs; the two other pairs yellow, with brown tarsi and tips of tibiæ; wings and their veins pale yellowish; veins thickly hairy; a fringe of golden hairs along the anterior margin and round the tip; long 2 lin. Washington, D. C., eight ♀ specimens. **E. pubtipennis.**

SYMPLECTA Meig.

The distinguishing character of this genus is the *undulating axillary vein*. The *absence of spurs* at the tip of the tibiæ seems to indicate a relationship to *Erioptera*; at the same time it is a ground for separation from *Limnophila*, *Anisomera*, etc.

The ♂ forceps consists of two subcylindrical, coriaceous pieces with two stout horny appendages attached to each of them (fig. 29, forceps of *S. punctipennis*; the ♀ ovipositor shows some analogy to that of *Gnophomyia* in the shortness of the lower valves; besides the ovipositor is armed on the upper side at the base with two small teeth. This character, first noticed by Schummel in *S. punctipennis*, &c., belongs also to several ♀ *Erioptera*.

For details about this genus, I refer to Meigen, Walker, Zetterstedt, etc.

Judging from the description of the European *S. punctipennis* Meig. it would seem that the specimens which I caught in America belong to the same species. I describe them, therefore, under the same name.

S. punctipennis. Cinerea, thorace vittis tribus fuscis; alis albicantibus, venulis transversis infuscatis.

Limnobia punctipennis Meig. Eur. Zw. Ins. i. p. 147, tab. v. f. 7.

Symplecta punctipennis l. c. vol. vi. p. 283.

Head cinereous; antennæ and palpi black. Thorax cinereous; hoary on the pleuræ; præscutum with three distinct brown stripes; knob of the halteres infuscated; feet brown, paler at the base. Tergum blackish; venter cinereous; ♀ genitals pale. Wings whitish cinereous; cross-veins, base of petiole, etc., clouded; neuration exactly like Meig. i. tab. v. f. 7.

Common in the spring and autumn; occurs even frequently in winter. Washington, D. C. Mobile, Ala., (nob.) Illinois, (Mr. Kenicott.)

Compared 12 ♂ specimens. The supplementary cross-vein in the second radial area is sometimes wanting; the same is the case with the first lower discal-cross-vein.

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CLADURA nob.

Proboscis and palpi short; last joint of the latter very stout. Front and vertex convex. Eyes almost contiguous on the under side of the head. Antennæ 16-jointed, of moderate length (reaching the base of the wings); first joint cylindrical, second turbinate, the following joints subcylindrical, elongated, slightly incrassated at the base, with moderate verticils. Feet long, moderately stout, tibiæ without spurs at the tip. Ungues small, smooth. Pulvilli distinct. Wings long, neuration like *Limnophila*, with two radial areæ and one petiolate areolet. Veins with a short, but distinct, pubescence on the apical portion of the wing. Genitals of the ♂ large, stouter than the abdomen; the upper side of the last abdominal segment is horny, convex, having a notch between two projecting points on the posterior margin; the forceps, which are inserted below, are large, with a long, cylindrical basal joint. (See fig. 34; this sketch is drawn from a dry specimen, and might not perhaps be altogether correct.) Ovipositor of the ♀ of the usual structure; the upper valves are flattened, lamelliform towards the tip.

In general appearance this genus is very like *Limnophila*, but it may be distinguished at once by the absence of spurs on the tibiæ. It has this character, as well as the slight pubescence on the veins of the wing, in common with *Erioptera*; but its long feet and elongated wings give *Cladura* an altogether different appearance. By its eyes, contiguous below, it reminds of *Symplecta*. In the structure of the ♂ genitals it differs from all other genera of the group.

C. flavoferruginea. Flavo-ferruginea, præscuto nitido; pleuræ punctis, abdomen fasciis brunneis; alæ flavescentes, venulis transversalibus infuscatis; long. lin. 3—3½.

Proboscis, palpi and antennæ pale ferruginous; the two latter infuscated at the tip. Præscutum ferruginous, shining; a more or less apparent dark line in the middle; a brown spot on the humerus; pleuræ pale yellow, two brown spots between the humerus and the base of the wing; a third one lower, about the middle of the pleuræ; scutellum and metathorax ferruginous; a small black dot on each side, between the latter and the base of halteres; these are pale; feet hairy, yellowish ferruginous; tips of femora, tibiæ and tarsi brown. Tergum ferruginous; lateral margins of segments brown, united by a pale brown band running across the middle of each segment; venter yellow; genitals ferruginous, shining. Wings yellowish; costal, subcostal and pabrachial veins ferruginous; other veins brown; cross-veins and origin of petiole clouded with brown; stigma pale; a supplementary cross-vein about the middle of the cubital area.

Washington, D. C. October, November, (nob.)

Compared seven ♂ and ♀ specimens.

In one of my specimens, there is a second supplementary cross-vein in the second radial area on one wing, and in the subapical on the other.

Besides the seven specimens described above, I have three from Massachusetts (sent by Mr. Scudder), distinguished from the above described specimens by the absence of the supplementary cross-vein in the cubital area. These three specimens are smaller in size, and the cross-veins of the wing are scarcely clouded. I doubt whether they belong to a different species, but still it is very remarkable that all came from the same locality. In the mean time I have abstained on their account from mentioning that supplementary cross-vein among the characters of the genus as well as in the diagnosis of the species.

GONOMYIA Meig.

Proboscis and palpi short; the joints of the latter nearly equal length. Antennæ 16-jointed, of moderate length (not reaching the base of the wing.) Feet long, slender; tibiæ without spurs at tip; unguis small; pulvilli distinct. Wings 1859.]

(like Meig. i. tab. vii. f. 7,) of moderate length; naked, with two radial and no petiolate areæ. *The second radial area is very short, taking its origin about the middle of the cubital; the upper branch of the radial fork runs obliquely towards the anterior margin; mediastinal vein short, joining the costal nearly opposite the origin of the petiole; discal areolet extant or wanting; stigmatal cross-vein wanting.* Forceps of the ♂ (fig. 16 and 17, *G. blanda* and *G. cognatella*,) consists of two moveable basal pieces, with four elongated appendages attached to each of them; these appendages are clothed with hairs or bristles, and armed with spines. Ovipositor of the ♀ moderately long, consisting, as usual of two pairs of valves; the upper pair long, arcuated.

The peculiarities of this genus consist, chiefly, in the neuration of the wing, the structure of the ♂ forceps and *the coloring, in which the sulphur-yellow prevails.*

It is not easy to find for *Gonomyia* an appropriate location in the system; it stands as an isolated, sharply defined group, bearing no apparent affinity to any other group of the family. The number of joints of its antennæ, the smooth ungues, the distinct pulvilli, and the presence of the second, although almost rudimental, radial area, determined me to locate it, provisionally, in the same group with *Erioptera*.

The European *Limnobia tenella* Meig. belongs to this genus. It was sent to Meigen by Megerle under the name of *Gonomyia tenella* (conf. Meigen, vol. I. p. 146). Mr. Stephens, in his Catalogue of British Insects, (1829), and Mr. Curtis, in his "Guide," (1837), have again applied this generic name to this species, but without defining the genus.

Analytical Table.

- | | |
|---|------------------------|
| 1. Wings spotted, | <i>G. blanda.</i> |
| Wings not spotted, | 2 |
| 2. Femora with a distinct brown ring at the tip; knob of halteres lemon-yellow, | <i>G. sulphurella.</i> |
| Femora without brown rings at the tip, | 3 |
| 3. Antennæ orange at the base, | <i>G. cognatella.</i> |
| Antennæ entirely black, | <i>G. subcinerea.</i> |

G. sulphurella. Sulphureo-flava, fusco-maculata; *antennis basi aurantiacis, in ♂ verticillis longis; femoribus annulo fusco; areola discoidali (in speciminibus typicis) clausa; long. lin. 2—2½.*

Front and vertex sulphur-yellow, infuscated in the middle; proboscis, palpi and antennæ brown; basal joints of the latter bright orange; flagellum of the ♂ incrassated at the base and slender beyond it, with long, feathery verticils; that of the ♀ filiform with short verticils. Collare sulphur, yellow; præscutum and scutum light brown, yellow on the margins; scutellum yellow with a brown line in the middle; metathorax yellowish, infuscated in the middle; pleuræ yellow along the margins of the præscutum; a yellow stripe, margined with brown, runs from the fore coxæ backwards; halteres yellow; knob lemon-yellow; coxæ pale yellow, with a brown ring at the tip; femora slightly incrassated at the tip, with a yellow ring beyond the middle and a brown ring near the tip, which is yellow; anterior pair of femora darker, their tip brown; tibiæ tawny, infuscated at tip; tarsi fuscous. Abdomen of the ♂ lemon-yellow; base of the segments brown, genitals yellow; abdomen of the ♀ brownish; posterior margins of the segments of the tergum yellow; genitals ferruginous. Wings slightly gray, pale at the base, stigma pale; oblique vein very short, almost perpendicular. (Conf. Schummel, l. c. tab. ii. f. 2.) The discal areolet is closed in the normal specimens; among 15 ♂ and ♀ specimens which I have before me, it is open in a single one only.

Washington, Trenton Falls, etc. Spring and Summer (nob.)

G. cognatella. Sulphureo-flava, fusco maculata, *antennis basi auranti-*
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tiacis, in ♂ *dense pubescentibus*, verticillis brevibus; *pedibus unicoloribus*; areola discoidali aperta; long. lin. 2—2½.

Very like the preceding, but easily distinguished by the following characters: 1st. The antennæ of the ♂ are covered on every joint with a short, dense pubescence, which, being interrupted at the articulations, makes the antennæ appear moniliform; 2d. The halteres (both stem and knob) are infuscated; 3d. The pluræ are yellow, with a brown stripe; 4th. The feet are uniformly pale tawny; only the tips of the tarsi darker; 5th. The upper branch of the radial fork is more oblique and therefore longer; 6th. The discal areolet is open (at least in the normal specimens;) 7th. The forceps of the ♂ has a different structure.

Five ♂ and two ♀ specimens; Washington (nob.)

G. subcinerea. Sulphureo-flava, thoracis disco cinereo-fusco, *antennis nigris*; *pedibus unicoloribus*; long. lin. 2¼—2½.

Very like *G. cognatella*, but easily recognizable by the following characters: the pleuræ are yellow; the brown parts of the thorax have a peculiar greyish tinge; the antennæ are uniformly black; those of the ♂ have moderately long verticils, the pubescence is not so distinct; the discal areolet (in the normal specimens) is closed; the halteres are very slightly infuscated.

Twelve ♂ and ♀ specimens; the discal areolet of one of them is open. Washington, Trenton Falls, etc. (nob.)

This species seems to resemble *Limnobia shistacea* Schum. (l. c. p. 146), but the upper branch of its radial fork is more oblique and arcuated than that of the latter species, judging from Schummel's figure.

G. blanda. Flavo-variegata; *alæ stigmatæ et marginis anterioris parte apicali fuscis*; *venulis transversis infuscatis*; long. lin. 2¼—2½.

Proboscis cinereous, margined with yellow on the upper side; front and vertex cinereous, margined with yellow along the eyes; antennæ brown; two basal joints yellow. Præscutum pale cinereous, with two approximated brownish stripes in the middle; lateral stripes hardly distinct; scutum, scutellum and metathorax yellowish cinereous, marked with brownish spots; pluræ pale yellow, slightly hoary; halteres dusky, with dark knobs; feet pale, tips of femora, tibiæ and tarsi infuscated. Tergum brownish cinereous; lateral and posterior margins of the segments yellow; venter sulphur yellow; ♂ forceps yellow with black appendages; ♀ ovipositor ferruginous. Wings with clouded cross-veins and black dots at the anastomoses of the veins; the stigma and the portion of the anterior margin between the stigma and the tip are blackish; in some specimens there is a short stump of a vein near the origin of the petiole.

Four ♂ and ♀ specimens; Washington, Trenton Falls (nob.)

LIMNOPHILA nob.

Two radial aræ; mediastinal cross-vein near the tip of the mediastinal vein, and always posterior to the origin of petiole; petiolated areolet in most cases extant; sometimes wanting; (in the first case the neuration is more or less like Meig. i. tab. iv. f. 20, or tab. vi. f. 2; in the second like Meig. v. f. 4.); antennæ 16-jointed;* palpi much shorter than the head; joints nearly of the same length; (except in *L. macrocera* Say, the palpi of which are nearly as long as the head, the last joint being elongated); proboscis short; labrum transverse; tibiæ armed with spurs at the tip; pulvilli distinct; ungues smooth; forceps of the ♂ consisting of two cylindrical or subcylindrical basal pieces, with two coriaceous or horny, generally falciform appendages attached to them. (Fig. 24, 25, 26, 27, 28.)

*Except in the 12th section, which has been temporarily located in this genus, and in which the antennæ are apparently 17-jointed.

The various forms, contained in the group thus characterized, may be arranged into several natural groups of lower order, most of which will be erected at some time into new genera. Those among them offering characters which require an immediate separation, have been supplied with generic names; but as long as the whole group is not subdivided into genera of an equal systematic value, it is preferable to leave all its subdivisions under a common generic appellation.

Limnophila in its present definition comprises all the species which Macquart would have located in his genus *Limnophila*; but it contains besides those, species with *two radial areæ, but without petiolate areolet* which, in Macquart's distribution, belonged to his genus *Limnobia*; (compare what has been said about it in the introduction.)

Analytical table.

1. A supplementary cross-vein in the subcostal area, about the *middle of the anterior margin*. (Sect. 7. Subgenus *Epiphragma nob.*) 2
 A supplementary cross-vein at the tip of the second radial area. (Sect. 10. *Dicranophragma.*)
 Antennæ pale at base, thorax cinereous, with brown spots, feet pale, wings spotted with brown; $2\frac{1}{4}$ —3 lin. long. **L. fuscovaria nob.**
 A supplementary cross-vein in the pobrachial areolet, 3
 No supplementary cross-veins, 4
2. Wings variegated with brown and tawny bands and spots, but without ocelliform spots; body pale brown; thorax pale sericeous behind the wings; feet tawny; femora with a brown ring before the tip; lin. long $4\frac{1}{2}$. **L. solatrix nob.**
 Wings variegated with brown ocelliform spots; long. lin. $4\frac{1}{2}$,
L. pavonina nob.
3. Antennæ of the ♂ longer than head and thorax together; ♀ with rudimentary wings. (Sect. 2; subgenus *Idioptera Macq.*) Wings with two brown bands and several brown spots; head and thorax cinereous; abdomen yellow, with brown margins; long. lin. 3, **L. fasciata Lin.**
 Antennæ of the ♂ hardly reaching the base of the wings; joints of the flagellum subglobular; cinereous, with brown feet; wings with 7 or 8 brown spots along the anterior margin; lin. $2\frac{1}{2}$. (Sect. 3.)
L. aprilina nob.
4. Petiolate areolet extant (that is, *four* externomedial areolets,) 5
 Petiolate areolet wanting (that is *three* externomedial areolets,) 15
5. Wings with large brown spots along the anterior margin and the central cross-veins, 6
 Wings altogether without spots or with a brown stigma and nebulosities on the cross-veins only, 7
6. Body black, shining; antennæ of the ♂ as long as the body, or a little longer, slender, filiform; clothed with soft, erect hairs; those of the ♀ setaceous, not reaching beyond the base of the wing; feet brown, femora ferruginous with brown tip; long. lin. 3—4. (Sect. 1. Subg. *Lasio-mastix nob.*) **L. macrocera Say.**
 Body cinereous; antennæ of ♂ and ♀ short; thorax with four brown stripes; feet dark tawny, with brown tips; long. lin. $3\frac{1}{4}$ —4. (Section 9th. Subg. *Dactylolabis nob.*) **L. montana nob.**
7. Cubital area considerably longer than the subapical, its base being so much nearer to the base of the wing; wings infuscated, cross-veins clouded; thorax cinereous, abdomen dark tawny; long. lin. 3— $3\frac{1}{2}$. (Section 5th.) **L. luteipennis nob.**
 Cubital area of equal length with the subapical, or not much longer, the base of both being nearly equidistant from the base of the wing, 8
8. Thorax cinereous,

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- Thorax ochraceous, yellow or brown, 11
9. Thorax with four distinct brown stripes, the intermediate ones approximated; antennæ and feet fuscous; wings hyaline, stigma pale; the third, fourth, fifth and sixth joints of the antennæ almost coalescent; long. lin. $2\frac{3}{4}$ — $3\frac{1}{4}$. (Section 6th,) **L. ultima nob.**
Stripes of the thorax indistinct, 10
10. Petiolate areolet unusually short, almost rudimental; wings hyaline, slightly subcinereous; stigma pale; body brown, thorax subcinereous; long. lin. $2\frac{3}{4}$, (Section 5th,) **L. brevifurca nob.**
Petiolate areolet longer or not much shorter than the petiole; body dark cinereous; wings yellowish or infuscated; stigma fuscous; base of femora ferruginous; long. lin. 4—5. (Section 8th. *Prionolabis nob.*)
L. rufibasis nob.
11. Mediastinal cross-vein close by the tip of the mediastinal vein; the discal areolet has the usual proportions, 12
Mediastinal cross-vein removed from the tip of the mediastinal veins at a distance about equal to the length of the great cross-vein; discal areolet elongated, about twice as long as in the other species of the genus; body pale yellow; wings hyaline, stigma pale; long. lin. $2\frac{3}{4}$ — $3\frac{1}{4}$, (Section 5th,) **L. areolata nob.**
12. Thorax shining, 13
Thorax not shining, body brownish yellow; wings hyaline, with a pale stigma, 14
13. Body and feet yellowish ferruginous; wings slightly infuscated at tip; stigma pale fuscous; stigmatal cross-vein beyond the origin of the radial fork; long. lin. $3\frac{1}{2}$ —4, (Section 5th,) **L. adusta nob.**
Body brown, pleuræ yellow; wings infuscated; stigmatal cross-vein close by the origin of the radial fork; antennæ of the ♂ longer than head and thorax together; long. lin. 3—4, (Section 4th,) **L. tenuipes Say.**
14. The petiole forms an almost straight line with the *radial vein*; long. lin. $3\frac{1}{4}$ —4, (Section 5th,) **L. imbecilla nob.**
The petiole forms an almost straight line with the *cubital vein*; radial vein conspicuously arcuated before its forking; long. lin. 3— $3\frac{1}{2}$, (Section 5th,) **L. toxoneura nob.**
15. Wings pubescent on the whole surface; body brown; long. lin. $3\frac{1}{2}$, (Section 12th,) **L. pilosella nob.**
Wings not pubescent, 16
16. Cinereous, with pale ferruginous feet and brown tips of femora, tibiæ and tarsi; long. lin. $2\frac{3}{4}$ — $3\frac{1}{4}$, (Section 11th,) **L. quadrata nob.**
Pale yellow, stigma pale; long. lin. $2\frac{3}{4}$ — $3\frac{1}{4}$. (Section 11th,) **L. lenta nob.**

1st Section.

(Subgenus *Lasiomastix nob.*)

Antennæ of the ♂ as long or a little longer than the body, slender, *filiform*; two basal joints short, the following elongated, cylindrical, of nearly equal length, clothed with soft, erect hairs; the third and fourth joints have a small spine on the under side, at the tip; antennæ of the ♀ *setaceous*, not reaching much beyond the base of the wing; joints cylindrical, clothed with sparse hairs.* Palpi a little longer than the head; *last joint longer than the preceding*. Wings somewhat like Meig. i. tab. vi. f. 3. Forceps of the male like the typical *Limnophilæ*; upper horny falciform appendage slender and jointed; lower one short, stout, with the point turned upwards.

* It is difficult to count the number of joints of the ♂ antennæ, even in fresh specimens, although in judging from analogy, it is extremely probable that there are 16. One of the ♀ has apparently but 15 joints.

L. macrocera. Nigra, nitida; femoribus flavo ferrugineis, apice fusco; alis fusco-maculatis; long. lin. 3-4.

Limnobia macrocera Say, Jour. Acad. Phil. iii. p. 20, 2.

Antennæ black, except the basal joints, which are tawny; proboscis and palpi black; front above the antennæ and lower part of the head yellowish-ferruginous; vertex black, shining. Thorax black, shining; pleuræ slightly hoary; halteres pale yellow, (the ♀ specimen have a brown knob); feet dark tawny; coxæ and base of femora paler; tips of femora, tibiæ and tarsi brown. Abdomen black; three or four intermediate segments with pale ferruginous spots at the base (more distinct in living specimens); genitals ferruginous-yellow. Wings hyaline, spotted with brown; one spot near the base, in the angle between the subcostal and pabrachial veins; another square one, near the origin of the petiole, between the same veins; a third one between the costa and the discal areolet; the tip of the wing, as well as the discal cross-veins, are clouded. In some specimens (for instance in my ♂ from Florida,) a nebulosity extends along the pabrachial, anal and axillary veins; it occupies the whole extent of the areæ between these veins; the nebulosity at the tip of the wing has, in such cases, also a greater extension. The neuration is like Meig. i. tab. vi. f. 3, only the second radial and cubital areæ are nearly of the same length, the radial vein forking immediately beyond its origin.

I found ♂ specimens quite commonly on the 2d of July, 1859, near the so-called *Salt-pond* in southern Virginia, (about 20 miles from the Montgomery White Sulphur Springs.) Another ♂ specimen I caught in Florida, in March, 1858. Of my three ♀ specimens I found two near Washington, and received one from Dr. Asa Fitch, of Salem, N. Y. There is a very strong probability that these ♀ belong to the same species; but having never found both sexes in the same locality, I cannot affirm it positively.

N. B. Say commits a mistake when he compares the neuration to Meig. i. tab. v. f. 7. Wiedemann quotes correctly Meig. i. tab. vi. f. 3.

2d Section.

(Subgenus *Idioptera* Macquart.)

Wings like Meigen i. tab. iv. f. 16, or Schumm. tab. iv. f. 4. *Pabrachial areolet divided in two sections by a supplementary cross-vein in its middle.* Antennæ of the ♂ longer than head and thorax together, with elongated subcylindrical, densely pubescent joints; two basal joints short.

The ♀ of the European *L. fasciata* has rudimental wings and cannot fly. (Figured in Schum. tab. v, f. 2.)

A ♂ specimen from Massachusetts, for which I am indebted to Mr. Scudder, in Boston, corresponds pretty closely to Schummel's description of *L. fasciata*.

L. fasciata. Capite thoraceque cinerascens, abdomino silaceo, fusco-marginato et fasciato, alis hyalinis, fasciis duabus, maculisque pluribus fuscis; length 3 lin.

Limnobia fasciata (Linn.?) Schummel, Limnob. p. 183.

Head brownish cinereous: palpi and antennæ black. Thorax cinereous, pleuræ and metathorax hoary; scutellum pale; halteres tawny, with brown knob; feet brown; coxæ and base of femora pale ochreous. Abdomen ochraceous, lateral and posterior margins of the segments brown; ♂ forceps tawny. Wings hyaline, with two bands formed of brown spots; a spot at the tip and several small dots between it and the second band.

3d Section.

Neuration of the wing like 2d Section, (Meig. i. tab. iv. f. 16,) *a supplementary cross-vein dividing the pabrachial areolet in two sections.* Antennæ hardly reaching beyond the origin of the wing; joints of the flagellum subglobular.

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L. aprilina. Cinerea, pedibus subfuscis, basi pallidis; alis ad costam 6 vel 7 maculatis; venis transversis, nebulosis; long. lin. $2\frac{1}{2}$.

Head cinereous; palpi black; antennæ clothed (in the ♂) with a dense pubescence, dark tawny; two basal joints brown. Thorax cinereous; præscutum yellowish, with indistinct stripes, the intermediate one capillary; halteres pale; feet dark tawny, coxæ and base of femora pale. Abdomen cinereous; the horny appendages of the ♂ forceps short, stout and obtuse; one of them with a deep notch at the tip, (fig. 25 and 25a.) Wings with seven brown spots along the anterior margin; the first near the base; the third is sometimes connected with a nebulosity on the supplementary cross-vein and with a large round spot at the tip of the axillary vein; the fourth is sometimes connected with a nebulosity along the central cross-veins; the fifth situated at the tip of the subcostal vein is the largest of all, and nearly square; the sixth and seventh are at the tips of both branches of the radial vein; the other veins have likewise small spots at their tips; the great cross-vein is clouded, as well as the other cross-veins; base of the wing, subcostal and pobrahial veins, yellow.

Two ♂ specimens. Washington, in April, (nob.)

4th Section.

Wings like Meig. i. tab. vi. f. 2, elongated, narrow. *Antennæ* of the ♂ much longer than head and thorax together, filiform; joints subcylindrical, elongated, clothed with a short, dense pubescence, and with moderately long verticils; antennæ of the ♀ a little shorter than those of the ♂; pubescence indistinct, but verticils long.

This section is allied to Section 2d (*Idioptera*) by the structure of the ♂ antennæ, and to Section 5th by the neuration of the wings and the whole *habitus* of the body.

L. tenuipes. Brunnea, humeris, pleurisque silaceis; alis infuscatis; long. lin. 3—4.

Limnobia tenuipes Say, Jour. Acad., Phil. iii. p. 21, 3.

L. humeralis Wied., Auss. Zw. i. p. 38, (not *L. humeralis* Say.)

Proboscis ochraceous; palpi black; antennæ black, base paler, front black, with a cinereous reflection. Thorax ochraceous, præscutum shining, more or less brown in the middle; scutum, scutellum and metathorax also brown in the middle; halteres infuscated at tip; feet dark tawny, pale at base; coxæ ochraceous. Tergum brownish, venter paler. Wings with a brownish tinge, stigma elongated, brown, sometimes very pale; neuration exactly like Meig. i. tab. vi. f. 2.

Twelve ♂ and ♀ specimens from Washington, in June, and Savannah, Ga., in April, (nob.)

N. B.—Say's descriptions of *L. tenuipes* and *L. humeralis* are so much alike that the choice between them was somewhat difficult in identifying the present species. Still the words in the description of *L. tenuipes* "antennæ long," and "wings dusky" determined my choice. Wiedemann took both for synonyms; but Say denies this synonymy in a manuscript note, which still exists in a copy of Wiedemann's work, which he had used.

5th Section.

(Typical *Limnophilæ*.)

Neuration of the wings like Meig. i. tab. iv. f. 20, and tab. vi. f. 2 or 3; no supplementary cross-veins; antennæ hardly reaching or not reaching much beyond the base of the wings; basal joint cylindrical, elongated; the second short; joints of the flagellum subcylindrical or elliptical, with moderate, sometimes long, verticils. Feet long, moderately slender.

L. adusta. Ferrugineo-flava, fronte cinerea, thorace nitido, alis flavescensibus, ad apicem infuscatis, stigmatibus fusco; long. lin. $3\frac{1}{2}$ —4.

1859.]

Head yellow, palpi infuscated, antennæ yellow, infuscated at tip, front cinereous. Thorax yellowish ferruginous, shining; a narrow brown line in the middle of the præscutum; halteres yellow, knob infuscated; feet ferruginous yellow, tips of tarsi brown. Abdomen yellow. Wings yellowish, infuscated at the tip (especially between the stigma and the subapical areolet); origin of the petiole and central cross-veins slightly clouded; subcostal and mediastinal areæ tinged with yellow; stigma oblong, fuscous; the costal, subcostal, mediastinal, præscutum and pabrachial veins yellow; the veins and cross-veins on the apical portion of the wing brown; the stigmal cross-vein is near the tip of the subcostal vein, at some distance beyond the origin of the radial fork; cubital area considerably longer than the second radial one and a little longer than the subapical.

Three ♂ and two ♀ specimens. Trenton Falls and Northern Illinois, (nob.) Upper Wisconsin River, (Mr. Ulke), Maine, (Mr. Packard). The specimen from Maine, although undoubtedly belonging to the same species, is distinguished by a darker coloring of the wing; the veins are brown; the fuscous tinge at the tip is more intense and extends much farther along the posterior margin; the pabrachial vein is infuscated; the nebule at the central cross-veins and at the origin of the petiole are darker. In some specimens the stigma as well as the infuscated tip of the wing are very pale brown.

L. luteipennis. Antennis fuscis, thorace cinereo, linea media fusca; pleuris canescentibus; abdomine pallide fusco; alis infuscatis, venis transversis nebulosis; long. lin. 3—3½.

Front and vertex cinereous; proboscis and palpi brown; antennæ brown; upper side of first joint cinereous; base of third pale. Præscutum brownish cinereous; intermediate stripe double, but more or less obsolete; a longitudinal brown line in its middle always distinct; indications of the lateral stripes near the suture and on the scutum; the latter and metathorax brownish cinereous; scutellum reddish, with a brown line in the middle; pleuræ bluish hoary; halteres pale, with dusky knob; feet tawny; tip of femora and of tibiæ and tarsi more or less infuscated. Tergum tawny; venter paler; male forceps having one of the falciform appendages ciliated. (Fig. 24.) Wings infuscated; all cross-veins, origin of petiole, base of petiolated areolet and tips of anal and axillary veins, clouded; subcostal vein ferruginous; other veins dark brown. Cubital area a little longer than the subapical. The proportion between the length of the petiolated areolet and its petiole is not constant; generally, the areolet is a little longer, although sometimes it is shorter than the petiole. In one of my specimens the areolet is more than twice shorter than its petiole on one wing, and it is altogether wanting in the other. A stump of a vein near the origin of the petiole.

Common at Washington from the earliest Spring through the greatest part of the Summer. I observed them swarming and copulating on the 19th of April, 1859, just before sunset, and caught them also in July. Florida, (in March, 1858.) Massachusetts, (Mr. Scudder.)

Compared eight ♂ and seven ♀ specimens.

L. toxoneura. Fusco silacea, antennis fuscis; alis subhyalinis, stigmatate pallido; *vena radialis* (ante furcam), *conspicue arcuata*; long. lin. 3—3½.

Front cinereous; palpi infuscated; proboscis yellow; antennæ brown; base of third joint pale. Thorax brownish yellow, with two pale brown stripes, which are very distinct on, and before, the scutum, and paler near the collare, where they communicate with a brown spot near the humerus; pleuræ pale, sometimes with a pale brown stripe; halteres pale, slightly infuscated; feet pale tawny, tips slightly infuscated. Abdomen tawny, lateral margins brown. Wings pale cinereous; stigma pale; *the petiole forms a line nearly straight with the cubital vein*, (and not with the *radial vein*, as is frequently the case in other species); the portion of the cubital vein anterior to the central cross-vein is

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short and but slightly oblique; *radial vein conspicuously arcuated* before its forking, (hence the name of the species.)

One ♂ and five ♀. Trenton Falls, (nob.)

L. imbecilla. Fusco-silacea, thorace unicolore, antennis fuscis, basi flagelli pallida, verticillis longis; *petiolus longus, venæ radialis longitudine æquus*; long. lin. $3\frac{1}{4}$ —4.

Front cinereous, palpi infuscated, antennæ brownish, pale at the base of the flagellum, with long verticils. Thorax brownish yellow; pleuræ and metathorax slightly hoary; halteres pale, slightly infuscated; feet pale tawny; tips of tarsi brown. Abdomen tawny; tip pale; ♀ ovipositor long. Wings pale cinereous, stigma more or less pale fuscous; petiole about as long as the radial vein, forming a straight line with the portion of this vein which is anterior to the fork; the stigmatal cross-vein is beyond the middle of the stigma, very near the origin of the radial fork and about the middle of the distance between the tip of the costal vein and the anterior end of the stigma; the central cross-vein forms a straight line with the cross-vein, separating the cubital area from the præbrachial, (which cross-vein is, in fact, the anterior portion of the cubital vein.)

Four ♂ and seven ♀ specimens. Trenton Falls, N. Y., Virginia and Georgia, (nob.) Illinois, (Mr. Kennicott.)

This species is very like *L. toxoneura* in its coloring, but is easily distinguished by the different neuration of the wing.

The thorax of the normal specimens is *not shining*; the front is slightly cinereous; but among the specimens which I collected in Georgia there are two or three with a shining thorax and a brownish yellow front. They agree in all other characters, and I hardly think that they form a distinct species.

L. brevifurca. Fusca, thorace cinerascete, alis subcinereis, areola petiolata brevissima; long. lin. $2\frac{3}{4}$.

Head cinereous; antennæ and palpi fuscous. Thorax cinereous, slightly yellowish on the præscutum; an obsolete, pale brown, double stripe along its middle; halteres pale at base; knob slightly infuscated; feet moderately hairy, dark tawny, slightly infuscated at the tips of the femora and tarsi; coxæ and base of femora pale. Abdomen brownish; ♂ forceps pale. Wings subcinereous, stigma slightly infuscated; petiolated areolet from four to six times shorter than its petiole; the radial vein, before its forking, forms a straight line with the petiole; the portion of the cubital vein anterior to the central cross-vein is very short, perpendicular to the radial vein, and in one line with the central and upper discal cross-veins; the mediastinal vein joins the costal very near the stigma; the mediastinal cross-vein is at a short distance from their junction.

Washington, in April, (nob.) Eight ♂ specimens.

L. areolata. Pallide silacea, alis ad basin pallide flavescentibus, tarso-rum apice infuscato, area discoidali elongata; long. lin. $2\frac{3}{4}$ — $3\frac{1}{4}$.

Pale ochraceous yellow, antennæ, except the basal joint, slightly infuscated, with moderately long verticils; halteres pale, very slightly dusky; tarsi infuscated, especially at the tip. Wings with a very slight cinereous tinge, yellow at the root; costal, mediastinal and subcostal veins yellow; the other veins brown, with a short pubescence; stigma pale, sometimes very slightly infuscated; the mediastinal cross-vein is removed from the tip of the mediastinal vein at a distance a little longer than the great cross-vein; stigmatal cross-vein in the middle of the stigma and also in the middle between the tip of the subcostal vein and the origin of the radial fork; discal areolet about equal in length to the second externomedial areolet, and about twice as long as in most of the other species of *Limnophila*.

Thirteen ♂ and ♀ specimens. Trenton Falls in June, and Maryland in May, (nob.)

1859.]

Some specimens have a short stump of a vein near the origin of the radial fork.

6th Section.

Antennæ short, hardly reaching the basis of the wings; the four basal joints of the flagellum are short and almost coalescent, forming an elongated, subcylindrical body, which is stouter than the remaining part of the antennæ; the following joints are subcylindrical, with short verticils. Wings narrow in the ♂, a little broader in the ♀; neuration somewhat like Meig. i. tab. vi. f. 2. Feet slender.

L. nltima. Cinerea, antennis fuscis, thorace vittis quatuor fuscis, intermediis approximatis, pedibus infuscatis, alis pallide cinerascensibus, stigmate pallido; long. $2\frac{3}{4}$ - $3\frac{1}{4}$ lin.

Cinereous, antennæ and palpi brown, first four joints of the flagellum as described above; thorax with four brown stripes, the intermediate approximated, the lateral ones abbreviated before; halteres slightly infuscated at tip, feet fuscous; coxæ cinereous; trochanter and base of femora pale; ♂ forceps of the same brownish cinereous color as the body; basal joint of forceps long, cylindrical; horny parts elongated, hooked at the tip, (fig. 26.) Ovipositors moderately long, very slightly curved.

Washington, in October, (nob.) Maine, (Mr. Packard.) Six specimens, ♂ and ♀.

7th Section.

(Subg. *Epiphragma* nob.)

Wings broad, variegated with brown bands, spots, ocelli, etc.; neuration somewhat like Meig. vol. i. tab. iv. f. 20, but with a supplementary cross-vein in the subcostal area, about the middle of the anterior margin, (as in Schum. tab. iv. f. 3.) Antennæ not reaching much beyond the base of the wing; 1st. joint cylindrical; 2d short, cyathiform; 3d and 4th coalescent, stout; the 5th and the following slender, elongated, slightly incrassated at their base, with moderately long verticils on the incrassation.

The European *L. picta* belongs to this section.

L. solatrix. Brunnea, articulo antennarum tertio flavo, thorace pone alas pallide sericeo, alæ fusco et testaceo-pictæ. Long. lin. $4\frac{1}{2}$.

Proboscis and palpi brown; basal joints of the antennæ dark cinereous; the second dark brown; the third yellow; the following dusky, darker towards the tip; front and vertex brown, sericeous with yellowish; margins of the eyes paler. Collare brown; præscutum reddish brown, two brown stripes in the middle; lateral stripes abbreviated and indistinct; dark brown spots on the humeri; the posterior margin of the præscutum, as well as the scutum, scutellum and metathorax are yellowish white, sericeous; anterior part of the pleuræ dark brown with some pale and sericeous lines; posterior part sericeous; halteres pale, tip of the knob brown; feet pale tawny clothed with short hairs; coxæ sericeous, with brown in the middle; a brown ring before the tip of the femora. Abdomen pale brown, clothed with short hairs; anterior margin of the segments darker, posterior margin whitish-sericeous; ♀ ovipositor ferruginous. Wings variegated with brown and tawny; the subcostal area contains two angular brown marks, besides the two infuscated cross-veins (humeral and supplementary); a large spot is situated at the base of the wing, between the subcostal vein and the posterior margin; its anterior part is tawny, the rest brown; a brown band begins at the posterior margin, before the tip of the axillary vein; it extends to the præbrachial vein, where it assumes a tawny color and emits two branches; one branch joins a tawny spot in the præbrachial area (between the two angular marks of the subcostal area); the other branch joins a large brown spot which occupies the greater part of

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the first radial area; it emits a tawny branch, which follows the central and great cross-veins; the apical portion of the wing is variegated with several tawny and brown spots, lines and bands.

Washington. in August, (nob.) Compared two ♀ specimens.

L. pavonina. Thoracis disco pallide cervino, basi antennarum fusca; alæ annulis maculisque fuscis. Long. lin. 4½.

Proboscis and palpi brown; front and vertex yellowish-sericeous; antennæ yellow, first joint brown. Præscutum whitish-yellow with a reddish brown margin; brown spots near the humeri; pleuræ yellowish-sericeous with an indistinct pale brown band; metathorax brownish yellow; halteres pale; base of the knob infuscated; feet yellowish tawny; tips of femora and tarsi brown. Abdomen tawny, infuscated at tip. Wings with yellowish-brown spots and ocelli, the margins of which are darker brown; one incomplete ocellus near the base, between the costal and pobrachial veins; another complete one has the origin of the petiole for its centre, and is connected by an ocelliform spot with several brown spots on the posterior margin; next comes a brown band formed by several imperfect and confluent ocelli and running from the anterior to the posterior margin; this band encloses several pellucid spots, especially in and around the discal areolets; the tip of the wing is occupied by one circular brown spot at the base of the petiolated areolet; another, oblong spot, between it and the anterior margin, and several (five or six) irregular, contiguous spots at the tips of the veins, between the radial and pobrachial; all cross-veins, especially the supplementary cross-vein of the costal area, are infuscated.

Single ♂ specimen from Illinois (Mr. Kennicott.)

8th Section.

(Subgenus *Prionolabis* nob.)

Body and feet stouter than in the preceding section; the latter hairy. Wings of moderate length and breadth. Neuration somewhat like Meig. vol. i. tab. iv. fig. 20; or Schum. tab. iii. f. 7. Antennæ not reaching the base of the wing; basal joint cylindrical, long; the second short; the following subglobular, elongated towards the tip of the antennæ; pubescent with short, sparse hairs; no verticils are apparent. ♂ forceps with a pair of large, flat, horny appendages, which are serrated on the inside (fig. 27.) ♀ ovipositor with long, slender, straight valves, which are very slightly arcuated towards the tip.

L. rufibasis. Cinerea, halteribus pallidis, alis pallide fusco-flavescentibus; stigmatibus obscure fusco; venulis centralibus et vena pobrachiali fusco-nerbulosis; pedibus fuscis, femorum basi pallide ferruginea; long. lin. 4-4¾.

Head cinereous; palpi and antennæ brown; third joint of the latter faintly rufescent. Thorax cinereous; stripes obsolete, pleuræ hoary; halteres pale yellow; feet brown; coxæ cinereous, base of femora pale ferruginous. Abdomen blackish cinereous; horny parts of the genitals ferruginous and brown (♀ forceps fig. 37.) Wings yellowish, slightly infuscated; subcostal and mediastinal areas with a yellow tinge, as well as the veins enclosing them; the other veins brown; stigma dark brown, oblong, central cross-veins, pobrachial vein and origin of petiole clouded; the portion of the radial vein preceding the fork, and that of the cubital vein preceding the central cross-vein, are of about the same length with the latter; two stigmatal cross-veins is not far from the tip of the subcostal vein, and about the middle of the upper branch of the radial fork.

Six specimens (four ♂ and two ♀.) Washington (nob.) in April; New York (Dr. Fitch); Mass. (Mr. Scudder.)

The cinereous color of the thorax seems to be due to a microscopic pubescence on a black ground.

1859.]

9th Section.

(Subgenus *Daotylolabis* nob.)

Body moderately stout, feet long, slender; proboscis a little elongated, although much shorter than the head; palpi elongated. Antennæ not reaching much beyond the base of the wing; first joint long, cylindrical; second short; the following elliptical, clothed in the ♂ with a dense microscopic pubescence, besides the short, bristle-like verticils. ♂ forceps with elongated, soft, digitiform appendages, which do not overlap in repose. (Fig. 23, forceps of *L. montana* in repose; fig. 23a the same; from the side.) ♀ ovipositor with short, lamelliform, slightly curved valves.

L. montana. Thorace cinereo; vittis quatuor fuscis; alarum margine anteriore maculis quinque fuscis, media in fasciam, usque ad venam pobrachiale, extensa; long. lin. 3 $\frac{1}{4}$ -4.

Head cinereous; proboscis, palpi and antennæ brown; four basal joints of the latter cinereous. Præscutum cinereous with four brown stripes; the intermediate ones nearly reach the collare; the lateral ones extend over the scutum; pleuræ hoary; scutellum and metathorax hoary-brown; poisers pale; feet dark tawny; tips of femora and tibiæ darker; tarsi brown. Abdomen brownish; margins of segments paler; ♀ ovipositor ferruginous (see above, for details about the ♂ and ♀ genitals.) Wings with five brown spots on the anterior margin; the third one is prolonged in a band across the central cross-veins, as far as the pobrachial vein; the fifth nearest to the tip of the wing, is very small; the lower discal cross-veins and origin of the petiolated areolet are also spotted; veins brown, naked; subcostal pale.

Common in Washington in April and May, in dry, rocky localities. Mass. (Mr. Scudder.) Illinois (Mr. Kennicott.)

Compared 19 ♂ ♀ specimens.

In some specimens the spots on the wings are much larger than in others; the stripes on the thorax are also more or less distinct.

10th Section.

(Subgenus *Dicranophragma* nob.)

Wings broad, posterior margin rounded; a supplementary cross-vein unites both branches of the radial fork near their tip. Antennæ hardly reaching the base of the wings; basal joint long, cylindrical: the second stout, rounded; the following joints short, subglobular, becoming more elongated and slender towards the tip of the antennæ; verticils moderately long; the fourth and fifth basal joints of the flagellum are densely pubescent on the under side of the ♂.

L. fuscovaria. Antennis basi pallidis; thorace cinereo, fusco-variegato; pedibus pallidis; alis fusco-variegatis; long. lin. 2 $\frac{1}{4}$ -3.

Head cinereous, proboscis and palpi brown; antennæ pale at base, darker towards the tip, with moderate verticils. Thorax cinereous with three narrow brown stripes; the intermediate one, which is paler, ends in two black dots near the collare; pleuræ with two brown stripes; one begins at the collare; the other at the fore coxæ; both running backwards; brown spots near and on the coxæ; scutellum cinereous with two, sometimes indistinct, brown spots; metathorax cinereous, its latter half brown; halteres pale, with the tip slightly dusky; feet pale, clothed with hair; tip of the tarsi a little darker. Abdomen brown, paler at the incisures; lateral margins darker; ♂ forceps pale; ♂ ovipositor ferruginous, long, slender, nearly straight. Wings variegated with numerous little round, brown dots; five larger, nearly square spots along the anterior margin; the first a little beyond the humeral veinlet; the second at the origin of the petiole; the third on the central cross-veins, descending nearly to the discal areolet; the fourth at the tip of the subcostal

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vein; the fifth at the tip of the upper branch of the radial vein. The first three longitudinal veins and the base of the others are pale.

Compared 13 specimens (♂ and ♀.)

Virginia, Trenton Falls, etc., (nob.) June, July.

This species is very easy to recognize by the cross-vein which divides the second radial area in two sections.

11th Section.

Wings without petiolated areolet, somewhat like Meig. i. tab. v. f. 4.

This group is purely artificial and comprises two species which have the above character in common.

L. quadrata. Cinerea, antennis palpisque fuscis, pedibus pallide ferrugineis, femorum, tibiarum tarsorumque apicibus fuscis, alis subhyalinis; long. lin. $2\frac{3}{4}$ - $3\frac{1}{4}$.

Front and vertex greenish cinereous; palpi and antennæ brown; basal joints of the flagellum a little paler; verticils long. Thorax cinereous; præscutum yellowish cinereous without distinct stripes; pleuræ slightly hoary; halteres pale; feet yellowish ferruginous; coxæ and base of femora pale yellow; tips of femora, tibiæ and tarsi brown. Abdomen brownish; genitals yellow. Wings slightly infuscated, pale at the root; stigma pale; veins brown; subcostal and mediastinal veins pale yellow; the mediastinal cross-vein is near the tip of the mediastinal vein; the stigmatal cross-vein is immediately beyond the origin of the radial fork; the central cross-veins form a nearly straight line.

Ten ♂ ♀ specimens. Virginia, Maryland, in May and June (nob.)

L. lenta. Pallide silacea, antennarum flagello palpisque infuscatis, fronte canescente, alis hyalinis, stigmatate pallide infuscato; antennæ maris dense pubescentes; long. $2\frac{3}{4}$ - $3\frac{1}{4}$.

Pale ochraceous yellow; palpi and antennæ (excepting the basal joints) fuscous; antennæ of the ♂ thickly covered with a short pubescence; verticils in both sexes short; joints oval: last joint small, club-shaped; front hoary; vertex infuscated; tip of the tarsi infuscated. The falciform appendages of the ♂ forceps are more diverging in this species than in the others of the genus. Wings pale yellowish; costal, mediastinal, subcostal and pabrachial veins yellow; the others brown; stigma slightly infuscated round the cross-vein, which is situated near the origin of the radial fork (a little before or a little beyond it, its position differing sometimes on both wings of the same specimens); mediastinal cross-vein near the tip of the mediastinal vein.

The general appearance of this species is very much like that of *L. areolata*, but it is easy to distinguish the former by the absence of the petiolated areolet, the shorter discal areolet, etc.

Compared ten ♂ ♀ specimens. Virginia, Maryland, D. C., May, June (nob.) Illinois (Mr. Kennicott.)

12th Section.

Wings covered with a fine pubescence on the whole surface; no petiolated areolet; neuration like Meig. vol. i. tab. v. f. 4, but second radial area nearly as long as the lower one; antennæ with apparently 17-joints; palpi short.

The location of this group within the present genus is only temporary; the pubescence of the wings and the number of joints of the antennæ would seem to justify its separation; but having only a single specimen in my possession, I have not been able to come to any definite conclusion as to its position in the system.

L. pilosella. Pallide fusca; antennis, palpis et fronte fuscis; tergo et 1850.] 18

halterum capitulo infuscatis; alis pallide fusciscentibus, pilosis. Long lin. 3½.

Proboscis and palpi fuscous; front and vertex infuscated in the middle, cinereous near the eyes; antennæ fuscous, with long verticils, and apparently 17-jointed. Thorax tawny, a little darker on the præscutum, pleuræ paler; metathorax pale brown; halteres pale at base; knob infuscated; feet tawny, slightly hairy, infuscated at the tip of femora and tarsi. Tergum brown, venter paler; valves of ♀ ovipositor long, narrow, sharp, and but slightly curved. Wings infuscated, covered with a short, sparse, almost microscopic pubescence, which is evenly spread over the whole surface; it is not woolly, like in *Erioptera* and does not affect much the transparency of the wing. The stigma is indistinct; the second radial area is nearly equal in length to the cubital; the three central cross-veins form almost a straight line; the mediastinal cross-vein is near the tip of the mediastinal vein.

A single ♀ specimen. Trenton Falls (nob.)

This species has a striking resemblance with *Ula pilosa*: the latter, however, is easily distinguished by the position of the mediastinal cross-vein, which is remote from the tip of the mediastinal vein; by the hairy eyes, the longer palpi, and the valves of the ♀ ovipositor, which are much shorter, broader and more curved.

TRICHCERA Meig.

This genus is mentioned here with the purpose only of showing its affinities.

It is allied to genus *Limnophila nob.*, by the neuration of the wings (two radial area, petiolate areolet, etc.,) its spurred tibiæ with smooth ungues and distinct pulvilli; although the joint of the antennæ are indistinct, as in *Limnophila*. (See his remark to plate xxvi. fig. 8, in Walker's *Ins. Brit. Dipt.* vol. iii.)

But *Trichocera* differs from *Limnophila nob.*, by the position of the mediastinal cross-vein, which is at a moderate distance from the tip of the mediastinal vein, *although not anterior to the origin of the petiole*, by the shortness and incurved direction of the axillary vein and by the length of the last joint of the palpi.

The American species in my collection appear to be identical with the European species of this genus; I would not venture to describe them, therefore, before having carefully compared them with specimens from the other continent.

ANISOMERA Meig.

The characters of the only North American species in my possession agree with those of this genus as defined by Meigen, Zetterstedt and Walker. The wings are exactly like Meig. i. tab. vii. f. 8. I perceive but six joints in the antennæ of the ♀ and not *ten* as Mr. Westwood does (see Walk. *Dipt. Brit.* iii. tab. xxvi. f. 9.)

Like *Arrhenica* and *Eriocera*, this genus is allied to *Limnophila nob.*, by its two radial area, the spurs at the tip of the tibiæ, the distinct pulvilli and the form of the ♂ genitalis.

A. megacera. Obscure cinerea, thorace vittis tribus fuscis; antennis ♂ corpore longioribus, nigris; pedibus nigris, femoribus basi pallide fuscis; alis subcinereis; long. lin. 2¾.

Head cinereous, brownish on the front; palpi and antennæ black; the latter, in the ♂, by the one-half longer than the body with a fine pubescence; their basal joints short, the tip of the third reach considerably beyond the base of the wing; the fourth, fifth, and sixth are about equal in length and a little shorter than the third; antennæ of the ♀ short, not reaching the base of the

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wings; the third joint is the longest; the sixth is very short, almost rudimental. Thorax cinereous, with a brownish, cuneiform, axillary intermediate stripe, and two lateral stripes, which are abbreviated before and extended over the scutum behind; metathorax cinereous; halteres pale at the base; knob blackish; feet black, base of femora tawny. Abdomen blackish; ♂ genitals black; ♀ ovipositor very short, brownish. Wings subcinereous, veins black; subcostal area tawny; neuration like Meig. i. tab. vii. f. 8.

Two ♂ specimens from Washington, D. C., and one ♀ from Maryland; early in the Spring.

ERIOCERA Macq.

Front with a tubercle behind the antennæ. Antennæ rather short, nearly of the same length in ♂ and ♀, six (or seven) jointed; third joint twice as long as the fourth. Proboscis short; palpi nearly as long as the head; second and third joints of about the same length; the last joint about twice as long. Eyes remote, naked. Feet long, moderately stout, tibiæ with distinct spurs; tarsi with distinct pulvilli. Wings with two cubital areæ and no petiolate areolet (somewhat like Meig. i. tab. v. f. 4.) Forceps of the ♂ very much like that of *Arrhenica* (see fig. 31.) Ovipositor of the ♀ of moderate length.

Eriocera is closely allied to *Arrhenica*, but is distinguished by the antennæ, which are short in both sexes, and by the structure of the palpi.

Macquart founded this genus in 1838, on a Brazilian species. (*Diptères Exotiques* i. i. p. 74.)

E. fuliginosa. Nigro-fusca: basi antennarum et pedibus fulvo-ferrugineis; apice femorum, tibiæ et nigra; alis nigro-fuscis; length 4-5 lin.

Lower part of the head and proboscis tawny; palpi black; antennæ black; basal joints yellowish ferruginous. Thorax dull brown with a slight grey reflection; four brown more or less distinct stripes on this grey ground: halteres brown; feet ferruginous, tip of femora and tibiæ brown, tarsi brown. Abdomen brown, shining; male forceps tawny (see fig. 31); female ovipositor ferruginous tawny at the base. Wings brown, clouded along the veins; stigma darker brown.

Nine male and one female specimens from Berkely Springs (Va.) and Washington, D. C.

I possess two male specimens from Virginia, which are very different from the normal ones. The whole body is cinereous; the stripes on the thorax are more distinct; the wings are pale brownish. It is not impossible that they belong to a different species.

ARRHENICA nob.

Front with an abrupt tubercle behind the antennæ. Antennæ of ♂ 6-jointed, more than twice as long as the body, with a row of small, erect spines on the under side; those of the ♀ not longer than the thorax, 10-jointed, the last joint being then indistinct. Proboscis much shorter than the head. Palpi longer than the proboscis, sometimes longer than the head; the second and fourth joint are much longer than the third. Eyes remote, naked. Feet long, tibiæ with distinct spurs; tarsi with distinct, well developed pulvilli. Neuration of the wings like that of *Limnophila*; with two radial areæ and with or without petiolated areolet. Forceps of the ♂ somewhat similar to that of *Limnophila*, consisting of an elongated, subcylindrical basal piece with two falciform appendages (see fig. 30, and detailed description appended to it.) Ovipositor of the ♀ elongated in *A. spinosa*, short in *A. longicornis*.

The long antennæ of the ♂ *Arrhenica* remind us of the genus *Megistocera* Wied., but these genera differ: 1st, by the antennæ of the ♀ which are long in the species described by Wiedemann; according to him they are 10-1859.]

jointed; and further he does not make any mention of the spines on the under side of the joints, peculiar to the ♂ *Arrhenica*; 2d, *by the wings*, which, according to Wiedemann, are like those of *Tipula*, where, as in *Arrhenica* the neuriation is like that of *Limnophila*, and the position of the last externo-medial vein shows unmistakably that this neuriation belongs to the type of the *Tipulæ brevipalpes*; 3d, *by the palpi*, which, according to Wiedemann have joints of *almost equal length* in *Megistocera*; this is not the case in *Arrhenica*.

Besides Wiedemann, Macquart and Westwood have described species of *Megistocera* from different parts of the world. But there is disagreement between these authors as to the characters of the genus, a disagreement which makes one suspect that the species described by them might belong to different genera, only having the extraordinary length of the antennæ in common. Thus, disagreeing with Wiedemann, Westwood (in the *Ann. de la Soc. Ent. de France*, 1835, p. 682,) describes a *M. dimidiata* from New Holland, whose ♀ has short antennæ. The same is the case with Macquart's *M. limbipennis* ♀ (*Dipt. Exotiques*, Suppl. i. p. 17); moreover, according to him, these antennæ are 13-jointed, and those of the ♂ are described as *finely pubescent on the inside*; the last joint of the palpi of the same species is said to be *long and flexible*, in contradiction to Wiedemann's description of the palpi of *Megistocera*.

But these three authors seem to agree in one point, *the neuriation of the wings*, and in this point all the species described by them differ from the two species of *Arrhenica* described below. The wings of the former species are described and figured as being like those of *Tipula*; the wings of the latter are exactly like those of *Limnophila*.

Besides Wiedemann's above quoted words, Macquart's figures of *M. fusca* and *limbipennis* (in *Dipt. Exot. Suppl. i. tab. ii. iii. iv.*) show *the last externo-medial vein originating from the pobrachial areolet*, a distinctive character of the neuriation of the *Tipulæ longipalpes*. *Arrhenica* does not even show an approach to such a neuriation.

The name *Arrhenica* is given in allusion to the length of the antennæ of the ♂, and the *prevalence* in this respect of this sex over the other.

The two species described below may be easily distinguished thus:

A petiolate areolet	A. spinosa.
No petiolate areolet	A. longicornis Wk.

A. spinosa. *Alæ areolæ petiolatæ instructæ*, infuscata, stigmatæ oblongo, obscure fusco; thorax vittis quatuor distinctis, mediis approximatis; long. ♂ 4½-5; ♀ circa 9 lin.

♂ Head cinereous, tawny below and on the anterior side of the tubercle; labium and palpi black; antennæ more than twice as long as the body, black, two basal joints tawny; the first three joints reach a little beyond the base of the wing; the fourth is longer than the third, and each of the following joints is longer than the preceding one; the sixth is as long or longer than all the others together. Thorax cinereous, clothed with a soft cinereous down; præscutum with four blackish stripes; the intermediate pair approximated, parallel, limited behind by the suture; lateral stripes broader, abbreviated before and extended over the scutum behind; scutellum brownish cinereous; metathorax more or less dark brown; pleuræ with a hoary reflection on their lower part; halteres pale at the base, knob black; coxæ hoary, trochanters and base of femora yellowish tawny; femora and tibiæ tawny with brown tips; tarsi brown. Abdomen greyish black; lateral edges, especially beyond the third segment, yellowish; venter paler; forceps tawny; structure like fig. 30. Wings infuscated; subcostal area tawny; stigma oblong, brown, situated between the mediastinal and stigmatal cross-veins and divided in two by the subcostal vein; subapical area about equal in length to the second radial;

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cubital a little longer; petiolate areolet shorter than its petiole. ♀ differs from the ♂ by the brownish-ferruginous tinge of its body. The antennæ are not longer than the head and the thorax together; they have no spines but only sparse hairs; ten indistinct joints can be counted; ovipositor ferruginous.

I possess two specimens of the ♂: one caught by me near Trenton Falls, N. Y., the other by Mr. Scudder in Mass. My only female specimen I also brought from Trenton Falls, and do not doubt of its specific identity with the males.

A. longicornis. Cinerea, *alæ absque areola petiolata*; stigmata subquadrato, fusco; thorace vittis tribus obscuris; long. lin. 4-5.

? *Anisomera longicornis* Walker, List of Diptera of the Brit. Mus. i. p. 82..

Head cinereous, palpi black, antennæ black; two basal joints pale; those of the ♂ are three or four times longer than the body; the third joint reaches beyond the base of the wing; every following joint is longer than the preceding; the sixth joint as long as the fourth and fifth together; the spines on the lower surface of the antennæ become short and indistinct towards its end; besides the spines there is a microscopic pubescence on the same side of the antennæ; antennæ of the ♀ hardly reaching beyond the origin of the wing; no spines, but hairs; two basal joints and base of the third yellowish; third joint as long as the two first, taken together; the fourth more than twice shorter than the third; the fifth a little longer than the fourth; the following three joints are of about the same length; the ninth is a little longer and the tenth a little shorter than the preceding ones. Thorax cinereous; a long straight pubescence on the sides in the ♂; no such pubescence in the ♀; three blackish stripes on the præscutum; intermediate stripe cuneiform, with a distinct brown line in the middle; the lateral ones abbreviated before and extended over the scutum behind; the lower portion of the pleuræ hoary; scutellum and metathorax grey; halteres pale; feet black; coxæ cinereous, trochanters and femora tawny, except the tip of the latter, which is brown. Abdomen greyish black; genitals of the same color; ovipositor of the ♀ very short, (not longer than the segments of the abdomen). Wings whitish-cinereous, with brown veins; no petiolate areolet; subapical area longer than the second radial; cubital a little longer than both; stigma situated between the mediastinal and stigmatal cross-veins, and not much longer than broad.

Mr. Walker's description agrees quite well with my specimens, only he does not mention the spines on the antennæ, nor the presence of the discal areolet; the latter characters especially he ought to have mentioned, as the genus *Anisomera*, in which he locates this species, has no discal areolet in its typical form. The correctness of my identification is not therefore quite certain.

I have two ♂ specimens; from Maine, (Mr. Packard); from Trenton Falls (nob.), and one ♀ from Illinois, (Mr. Kennicott.)

AMALOPIS Halid.

Front with a tubercle behind the antennæ. Palpi nearly as long, or longer, than the head; last joint much longer than the preceding. Eyes hairy. Mediastinal cross-vein far removed from the tip of the mediastinal vein, and anterior to the origin of the petiole. Discal areolet (when extant) pentagonal, the second lower discal cross-vein being very oblique. Wings divaricate in repose. The ♂ genitals are totally different in their structure, both from Limnobia and Limnophila, and seem to approach those of Tipula; the forceps consist of a coriaceous substance, with a helmet-shaped lobe and several horny branches on the inside, (fig. 32, forceps of A. inconstans.) On account of this hard substance, these organs preserve pretty well in dry specimens.

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Such are the characters which separate from *Limnophila nob.*, and in general from the whole tribe of the *Tipulariæ* with *short palpi*, a distinct natural group, consisting of the three species described below, under the *temporary* generic denomination of *Analopsis Halid.* and of *Pedicia Latr.* This group has the following characters in common with *Limnophila nob.*

Two radial arææ; tibiæ armed with spurs at the tip; pulvilli distinct; antennæ 16-jointed, (17-jointed in A. inconstans nob.)

The venation of the wings is pretty much like that of *Pedicia*, (see Meig. i. tab. iv. f. 14); but is very inconstant. It varies not only in the different species of the group, but in different specimens of the same species, nay on both wings of the same specimen.

In *A. calcar*, as well as in *Pedicia*, it is the *cubital* vein which forks, instead of the *radial*. In *A. inconstans* it is sometimes the radial, sometimes the cubital vein which forks; the passage from one to the other form is very gradual, and shows the secondary value of this character in the present genus.

The discal aræolet is wanting in *A. occulta*; it is generally present, but sometimes wanting in *A. inconstans*; it is extant in the only specimen of *A. auripennis* which I possess; finally in *both* of my specimens of *A. calcar* it is *wanting* on one wing and *extant* on the other.

A constant and for this reason important character is the location of the mediastinal cross-vein *anterior* to the origin of the petiole.

Mr. Haliday was the first, I believe, who noticed (in Walker's Dipt. Brit. iii. p. xv., Addenda,) that *L. occulta* Meig. had *hairy eyes* and a *frontal tubercle*. On these two characters, and on the *absence of the discal aræolet* he established (l. c.) the genus *Amalopsis*. Although I do not know *A. occulta* Meig., I have no doubt, from its description and the figures of its wing in the authors, that it belongs to the *same group* with the three species described below, although the location of these species in the *same genus* may be only temporary. (I am certain, for instance, that *A. inconstans* with its 17-jointed antennæ will be formed into a new genus.) I prefer to retain in the mean time for all the species of this group the name given by Mr. Haliday to one of them.

Pedicia undoubtedly belongs to the same group. It possesses all the above mentioned generic characters, excepting, *perhaps*, the pubescent eyes. Although Mr. Walker (Dipt. Brit. iii. p. 314,) asserts that the eyes are minutely pubescent, I could not discover any traces of this pubescence in my specimens; it may have been rubbed off.

The natural group, consisting of the genera *Amalopsis* and *Pedicia*, seems to hold an intermediate position between the *Tipulariæ* with *short* and those with *long palpi*, (that is between *Limnobia* Meig. and *Tipula* Meig.) Although closely allied to the former, they approach *Tipula* by their *divaricated wings*, their *elongated palpi*, the *form of the discal aræolet* and the structure of the ♂ forelegs. The genus *Tricyphona* Zett., unknown to me, belongs, perhaps, to the same group. However, Zetterstedt describes the tibiæ as *unarmed*, and this would be an important difference. The genus *Evanoptera*, established by Guérin, on a species from Brazil, (*Voyage de la Coquille*, 1830.) seems also to belong hither. *Limnobia littoralis* Meig., judging from the venation of its wing, might be closely allied to my *A. inconstans*. *Limnobia unicolor* Schum., ought, perhaps, to be located here too.

The habits of *Amalopsis* are unknown, but they seem to be aquatic. The larva of *Pedicia rivosæ* has been found by Scheffer (see Rossi, Dipt. Austriaca,) in spring-water.

A. auripennis. Thorace cinereo, vittis tribus fuscis; alis infumate topazinis, nitidis, venulis centralibus infuscatis; long. lin. 5.

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Head cinereous, with a golden pubescence; palpi brown, pale at base; antennæ brown, three or four basal joints pale; first joint cylindrical; second cyathiform; third smaller, obconical; joints from fourth to tenth short, cylindrical, compressed, gradually attenuated, covered with short hairs; the last part of the antennæ is filiform, with long verticils; eyes distinctly pubescent. Collare pale, with a brown spot: thorax cinereous, with three brown stripes; intermediate one broad, splitting in two lobes before the scutum, which is brownish; scutellum and metathorax cinereous; pleuræ cinereous; halteres pale; coxæ pale; feet pale tawny, tips of the femora fuscous; those of the tibiæ and tarsi infuscated; spurs at the tip of the tibiæ moderately long, very distinct. Tergum brown, with a sparse golden pubescence; venter pale. Wings infumate topazine, their surface shining; subcostal area faintly yellowish; central cross-veins, stigmatal cross-vein, tip of mediastinal vein and origin of petiole clouded; the radial vein forks (as usual), but the petiole of its fork is so short, that the second radial is almost equal in length to the cubital; stigmatal cross-vein at the tip of subcostal vein; the first lower discal cross-vein is situated at about the middle of the distance, between the origin of the two forks, which it unites; stigma pale.

One ♂ specimen from Massachusetts, (Mr. Scudder.)

A. calcar. Ochracea, fronte cinerea; alis pallide cinerascentibus; area subcostali flavescente, stigmatate pallido; calcaribus tibiæ longioribus; long. lin. $4\frac{1}{2}$ —5.

Front and vertex cinereous, proboscis yellowish cinereous, palpi yellow at base, two last joints brown; antennæ yellowish ferruginous, infuscated at tip, reaching about half the distance between the head and the base of the wing; second joint obconical; the following joints subcylindrical, moderately verticillated and covered with a dense pubescence; eyes pubescent. Thorax ochraceous yellow, reddish on præscutum; stripes indistinct; pleuræ, scutum, scutellum and metathorax paler, halteres pale; feet yellowish tawny, infuscated towards the tip; coxæ and base of femora pale; spurs at the tip of the tibiæ longer than usual, slender, divaricated. Abdomen yellowish, (infuscated at the tip in the ♂.) Wings hyaline, slightly cinereous; subcostal area yellowish, stigma pale; second radial area longer than the cubital (the cubital and not the radial vein forming the fork), and of nearly the same length with the subapical area; radial vein arcuated before joining the petiole; stigmatal cross-vein near the tip of the subcostal vein.

In both specimens in my possession the discal areolet is wanting on one wing and extant on the other; what the normal neuriation is, I am unable therefore to state. On those wings where it is wanting, (which happens to be the left wing in the ♂ specimen and the right in the ♀,) the neuriation looks pretty much like Meig. i. tab. v. f. 8. The cross-vein closing the areolet on the other wing is in the middle of the distance, between the origins of the second and third fork.

A. inconstans. Ochracea, thoracis dorso ferrugineo, alarum margine anteriore et venis transversis infuscatis; long. lin. $4\frac{1}{2}$ — $5\frac{1}{2}$.

Coloring very inconstant; ochraceous, more or less mixed with brown on the thorax and the abdomen, sometimes altogether without brown. The following is the description of the specimens with fully developed dark coloring:

Proboscis and palpi fuscous; front cinereous, brownish towards the vertex; hind part of vertex and under side of the head yellowish; antennæ 17-jointed, pale, but little longer than the head; basal joint sometimes dusky; flagellum with moderate verticils. Collare ochraceous; a black ring near the head; a brown stripe along the middle; præscutum ferruginous, with a slight brown tinge along the middle; stripes indistinct; scutum infuscated on both sides; a brown mark in the shape of a V in the middle of the suture; scutellum and metathorax yellow, fuscous on both sides; pleuræ pale; halteres pale; feet

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yellow, femora and tibiæ faintly infuscated at the tip; tarsi tawny, fuscous at tip, spurs short. Tergum yellow; posterior margins of segments fuscous; first and second segments infuscated, the following with a fuscous stripe along the middle; the two last segments fuscous; genitals of the ♂ fuscous; of the ♀ ferruginous. Wings subcinereous; subcostal and mediastinal areæ brown; this color occupies the whole base of the wing and encroaches also on the præbrachial and both radial areæ; mediastinal, stigmatal and central cross-veins and origin of petiole clouded with brown.

This is the normal coloring; but among the eighteen specimens which I have before me only four show it in its full development. All the others are more or less pale about the collare, scutum, scutellum, metathorax and abdomen, sometimes with a slight indication of brown, sometimes without any.

The coloring of the wings is also variable, the fuscous tinge of the anterior margin and the clouds on the cross-veins being sometimes very pale. *The cinereous tinge of the front, the brown ring on the collare, near the head, the ferruginous, almost orange, color of the præscutum and the infuscated anterior margin of the wing may be considered as characteristic.*

The neurulation of the wings is likewise inconstant. The normal neurulation is exactly like Meig. i. tab. vi. f. 4, only the first lower discal cross-vein is a little nearer to the apex of the wing, (originating from the lower branch of the fork.) Among my eighteen specimens, ten (eight ♂ and two ♀) partake of this neurulation.

In three specimens, the first lower discal cross-vein is removed nearer towards the base of the wing, so that the first externomedial areolet is petiolate. In one of the specimens this is the case with one wing only, the same areolet on the other being sessile.

In three other specimens the discal areolet is wanting, (that is, open from want of a second lower discal cross-vein.)

In two specimens it is the cubital vein which forms the fork, and not the radial, the latter originating before the fork. But in both instances the position of this vein on one wing does not agree exactly with that on the other. In one case the radial vein issues from the same joint with the fork.

The great cross-vein varies in its position also. Sometimes it is opposite, sometimes below the upper discal cross-vein.

In one specimen there are three supplementary cross-veins in the cubital area.

One character which seems to be merely accidental in other species, is very constant in this: it is the presence of a stump of a vein near the origin of the petiole. This stump is long and distinct, and is wanting only on one wing of one of my eighteen specimens.

Fifteen ♂ and three ♀ specimens. Washington, common early in April and later; New York and Virginia Springs (nob.); Connecticut, (Mr. Norton.)

This species seems to be allied to the European *Limnobia littoralis* Meig.

PEDICIA Latr.

The characters of this genus have been mentioned in part in detailing those of *Malopsis*. For more details see Walker, Ins. Brit. Dipt. iii. p. 314. I would add only to Mr. Walker's characteristics of this genus, that all the tibiæ have two spurs at the tip and not the hind tibiæ alone.

P. albivitta. Walker, List of Dipt., etc., i. p. 37.

Head black, front hoary; antennæ pale brown. Thorax pale brown, with a strong silvery reflection; a brown stripe runs from the collare to the origin of the wing; præscutum with three brown stripes; the intermediate one is darker and capillary; halteres pale. Abdomen silvery, with a row of triangular brown

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spots along the tergum; they are dark brown in the middle and ferruginous on the margins. Wings with a brown stripe along the costa; another one along the pobrachial vein; a brown band unites both across the central cross-veins; the rest of the wing is hyaline.

Length from 13 to 15 lines.

I possess specimens from Trenton Falls, (nob.), Massachusetts (Mr. Scudder), and Connecticut, (Mr. Norton.)

DICRANOTA Zett.

Antennæ 13-jointed. (*) Eyes hairy. Wings with two aræ. Tibiæ with small, but distinct spurs at the tip. Pulvilli distinct. Mediastinal cross-vein far remote from the tip of mediastinal vein, anterior to the origin of the petiole, and situated about the middle of the anterior margin. Structure of the ♂ genitals analogous to that of *Amalopis* and *Pedicia*. Head small; proboscis and palpi very short; a distinct gibbosity on the head behind the antennæ; feet of moderate size and thickness.

The wing of my *D. rivularis* is exactly like Mr. Westwood's figure of that of *D. pavidata* in Walker's Ins. Brit. Dipt. iii. tab. xxx. f. 7, having no discal areolet, two cross-veins between the upper branch of the radial vein and the subcostal, and one fork behind the subapical areolet. The neuration varies in different species of the genus, but the position of the mediastinal cross-vein seems to be an essential character.

This genus was first established by Prof. Zetterstedt on his *D. Guerinii*; afterwards, Mr. Haliday, in Walker's Ins. Brit. Dipt. iii. p. 306, added to it *D. pavidata* Hal., *D. bimaculata* Schum., and *D. senilis* Hal. However, *D. bimaculata* Schum. is mentioned in Prof. Zetterstedt's work (Dipt. Scand. tom. x. p. 3897, No. 72,) among the *Limnobiæ*. How should have Zetterstedt misplaced a species belonging to a genus established by himself, unless he overlooked its having 13, and not 16, joints of the antennæ?

D. senilis Hal., as figured in Ins. Brit. Dipt. iii. tab. xxvii. f. 3, is quite distinct from the other species by the presence of a discal areolet, by its having one cross-vein, instead of two, between the subcosta and the upper branch of the radial fork; and above all, by the position of the mediastinal cross-vein, which is posterior to the origin of the petiole, and not far distant from the tip of the mediastinal vein. If the latter character is correctly figured on the plate, I would doubt whether this species belongs to *Dicranota*.

The affinities of this genus with *Amalopis* and *Pedicia* (hairy eyes, position of the mediastinal cross-vein structure of the ♂ genitals, etc.) are manifest; it is distinguished by the short palpi, the number of the joints of the antennæ, etc.

The only species described below, agrees in its characters with *D. Guerinii* Zett. on which, as mentioned above, the genus was first established. Only Prof. Zetterstedt does not make any mention of the hairy eyes, which he may have overlooked. (See also the remark about the antennæ, at the end of the description.)

D. rivularis. Cinerea, thorace vittis tribus fuscis, femorum basi pallida, alis subcinereis; long. lin. 3-4.

Head cinereous, front and vertex slightly infuscated; proboscis, palpi and antennæ black; the latter in both ♂ and ♀ short, not reaching the base of the wings, joints of the flagellum subglobular, (see the observation at the end of the description). Thorax cinereous with three distinct, blackish stripes, the intermediate one broad, and, in some specimens, distinctly capillary; lateral one abbreviated before, extended over the scutum behind; scutellum and metathorax cinereous, posterior half of the latter blackish; halteres

(*) As to the length of the antennæ, see *observation* at the end.

pale, very slightly dusky on the knob; coxæ cinereous, trochanters and base of femora pale; feet black. Abdomen blackish cinereous, indistinctly whitish along the lateral margins; male genitals cinereous; female ovipositor ferruginous. Wings tinged with cinereous; stigma pale, indistinct, situated between the stigmatal and supplementary cross-vein; neuration like tab. xxx. f. 7, of Walker's *Ins. Brit. Dipt.* vol. iii., only the petiole of the lower fork is shorter than the fork itself, and the pubescence of the veins is not so apparent as in the figure.

Seven ♂ and two ♀ specimens, taken near Washington, early in April. They were flying along the surface of a little stream in the woods and copulating.

One of the ♂ specimens has a *discal areolet* on both wings; it is formed by a cross-vein which connects the lowest fork, near its origin, with the next externo-medial vein.

Some of the specimens have a stump of a vein near the origin of the petiole.

Observation. Both ♂ and ♀ of *D. rivularis* have been described above as having short antennæ. At least I found such specimens in copulation. But besides the males with short antennæ, I found, on the same day and in the same locality, two males, having antennæ twice as long as head and thorax together, with 13 nearly cylindrical, elongated, densely pubescent joints; the joints of the flagellum are of nearly equal length, except the last one, which is shorter. The other characters of the body and the wings of these specimens agree entirely with *Dicranota rivularis*, except that the vertex, the knob of the halteres and the stigma are more distinctly infuscated. The specimens are probably the normal representatives of the male, the more so as *D. Guerinii* Zett., has also long antennæ. What the males with short antennæ, which I found in copulation, are, further investigation will show.

ULA Halid.

Antennæ 17-jointed. (*) Wings with two radial areæ, *finely pilose on their whole surface*. *Mediastinal cross-vein far removed from the tip of the mediastinal vein and anterior to the origin of the petiole*. Spurs at the tip of the tibiæ very short, but distinct. Pulvilli distinct. Ungues smooth. *Proboscis elongated, although shorter than the head*. *Palpi elongated*, especially the last joints. *Eyes pubescent*.

The characters of this genus, as given by Walker (*Ins. Brit. Dipt.* iii. 307), agree too well with the specimen in my collection, to admit of any doubt as to the generic identity. *The pubescence of the eyes* alone is not mentioned, but may have been overlooked. The neuration of the wing of my specimen agrees exactly with Mr. Westwood's figure of the wing of *Ula* in the above quoted work, (l. c. tab. xxvii. fig. 4). With the precision peculiar to him, Mr. Westwood has not even overlooked the position of the mediastinal cross-vein. Schummel's tab. ii. fig. 7, conveys also an idea of the neuration of this genus.

Ula shows some relation to *Pedicia* in the position of the mediastinal cross-vein, the pubescence of the eyes and the length of the palpi; but it differs in the length of the antennæ, the pilose wings and the position of the last externo-medial vein. The direction of the latter is like that in the majority of the *Limnobiæ*, and *not oblique*, as in *Amalopis* and *Pedicia*.

The larvæ of *Ula* have been found by Dr. Stannius in *Agaricus*, (Schumm. *Limnob.* p. 25.)

The only species I possess seems to be identical with the European *Ula pilosa*, judging, at least, from its descriptions; I redescribe it, therefore, under the same name.

(*) I copy this character from Walker, the tip of the antennæ of my single specimen being broken.

U. pilosa Schum. (?) Walker, Ins. Brit. Dipt. iii. p. 308, tab. xxviii. f. 4.
Limnobia pilosa Schum. Limnob. p. 150, tab. i. f. 7; Zetterstedt, Dipt. Scand. x. p. 3886, 62.

Long. lin. $3\frac{1}{4}$.

Front and vertex light cinereous; proboscis infuscated, palpi and antennæ black; two basal joints of the latter short, yellowish; the following joints elongated, subcylindrical, verticillated and covered, besides with a short pubescence. Thorax yellowish cinereous, paler on the pleuræ, a brownish stripe in the middle of the præscutum; lateral stripes almost obsolete; scutum infuscated; scutellum pale; halteres pale; the knob infuscated at the tip; feet tawny, infuscated at the tips of femora, tibiæ and tarsi; coxæ and basis of femora pale. Abdomen brownish, venter paler, ♀ ovipositor falciform, short, ferruginous. Wings brownish cinereous, finely, densely and uniformly pilose over the whole surface; veins brown; this pubescence is not woolly as in *Erioptera*, and affects but little the transparency of the wing; stigma elliptical, but little darker in color than the wing itself; a slight brown nebula on the central cross-vein; no petiolate areolet; stigmatal cross-vein near the tip of the subcostal vein, and a little beyond the middle of the upper branch of the radial fork. (Compare also the above quoted figures of Westwood and Schummel.)

A single ♀ specimen from Washington (nob.)

At first glance, this species has a striking resemblance to *Limnophila pilosa nob.*, especially on account of the pubescence of the wings. It is easily distinguished, however, by the position of the mediastinal cross-vein, the structure of the antennæ and that of the ♀ ovipositor, which is larger in *Limnophila pilosa*, etc.

PROTOPLASA nob.

Proboscis stout, ending in a thick labium; both together are as long, or a little longer than the head. Palpi longer than the head, joints elongated. Antennæ 15-jointed, shorter than head and proboscis together, setaceous, verticillated; first joint short, cylindrical; 2d, stout, subglobular; the following joints cylindrical, compressed, short; the five last joints more oval, elongated. Front broad. Thorax gibbose; *suture deeply sinuated*; scutellum large, projecting over the metathorax, which is short. Abdemen rather short, stout. Feet moderately long, slender; tibiæ armed at the tip with moderately long, strong, divaricated spurs; pulvilli indistinct; ungues smooth. Wings broad; *anal angle square*; the narrow portion long and nearly linear; neuration very like that of the genus *Macrochile* Loew, (see Linnæa Entomologica, vol. v. tab. ii. fig. 25); the only differences are, 1st, that *Protoplasa* has a cross-vein between the discal areolet and the next longitudinal vein (towards the posterior margin,) which cross-vein closes a second, smaller discal areolet. 2d, it has a stump of a vein at the angle, formed by the petiole, near its origin.

This remarkable genus is closely allied to the fossil genus *Macrochile* Loew (l. c. p. 402) found in the Prussian amber, but with the following differences: 1st, *Macrochile* has a much longer proboscis; 2d, its antennæ are 19-jointed, and more than twice as long as head and proboscis together; 3d, the anal angle of its wing (judging from the above mentioned figure) is *rounded* and not *square*; 4th, the neuration of the wing is somewhat different, (see above.)

The relation of *Protoplasa* with *Ptychoptera* and *Bittacomorpha* is evident: the structure of the mouth, that of the antennæ and feet, the deep sinuosity of the thoracic suture, as well as many analogies in the neuration of the wings, indicate it sufficiently. But *Protoplasa* seems different from both by the small size of the metathorax. (*)

(*) I am not able to make this statement positively, as the meso- and metathoracic region of both my specimens was injured by the pin.

The name *Protoplasa* alludes to the close relation of this genus to a fossil form.

P. Fitchii. Cinerascens, pedibus pallidis, alæ maculis ocellaribus brunneis, in fascias confluentibus, ornate; long. lin. 3-3½.

Head cinereous, proboscis and palpi fuscous, antennæ infuscated. Thorax cinereous, with three faint brown lines on the præscutum; scutellum pale, infuscated in the middle; halteres pale, knobs brown; feet yellowish; knees, tips of tibiæ, of the first joint of tarsi and of their last joints brown. Abdomen brown; posterior margins of segments paler. Wings whitish, with brown spots and bands; most of the spots have the form of a ring, with an infuscated vein in the centre; they are distributed in three groups: 1st, basal group, formed of an ocellus near the origin of petiole, a spot in the subcostal area and two rings at the basis of the wing, near the basal angle; 2d, central band, formed of four ocelli and a large brown spot near the posterior margin; 3d, apical band, formed of two large ocelli (at the tip of the discal areolet and at the origin of the radial fork); 6 or 7 smaller ocelli along the apical margin of the wing and a brown band, beginning between the two large ocelli, and running along one of the longitudinal veins towards the tip of the wing.

I am in doubt as to the sex of the two specimens of this insect, for which I am indebted to Dr. Asa Fitch.

BITTACOMORPHA Westw.

I take occasion to give the figure of the male genital organs of *B. clavipes* Fab. (fig. 33, from above; fig. 33a from below.) One pair of appendages (the outer ones), are coriaceous; the shorter, inner pair seems to be of a harder consistence.

This species seems to have a wide distribution over the North American continent. The British Museum has received it from Nova Scotia, (see Walker's List of Dipt. Brit. Mus. i. p. 81). I found it in Florida, and possess, besides, specimens from Upper Wisconsin River. It occurs early in the spring, and also in autumn, in woods, in the neighborhood of running water.

PTYCHOPTERA Fabr.

For the characters of this genus I refer to Meigen, Zetterstedt and Walker, and will only mention, as a character which is peculiar to *Ptychoptera*, *Bittacomorpha* and *Protoplasa*, and which seems to have been overlooked, that the *transverse thoracic suture is deeply sinuated*, so that the scutum is attenuated in the middle, its two lobes being connected by a narrow band only.

The only American species I possess is very like the European species of this genus in general appearance, without seeming to be identical with any.

P. rufocincta. Nigra, abdomine (♀) maculis lateralibus apiceque ferrugineis, pedibus ferrugineis, alis macula basali et fasciis tribus fuscis; long. lin. 3¾.

Head black, shining; proboscis and two basal joints of the black antennæ ferruginous; palpi pale. Thorax black, subopaque; pleura, with ferruginous spots and bands, and with a silvery reflection along the coxæ, and especially under the base of the wing; halteres pale; tip of the knob dusky; feet pale ferruginous; tips of the femora, of the tibiæ and tarsi, brown. Tergum black, shining; large ferruginous spots on the lateral margin of the 2d and the following segments; they occupy a large portion of the anterior part of the intermediate segments; tip of the abdomen and genitals (♀) ferruginous; venter tawny. Wings with a brown spot at the base; an abbreviated band about the middle of the præbrachial and pabrachial areas, between the subcostal and pabrachial veins; a second band along the central cross-veins, attenuated behind, and not reaching the posterior margin; a third is formed of two spots at the origin of both forks; a brown dot at the tip of the

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subcostal vein; subcostal area yellowish; petiole very short, included within the second band, (differing in this respect from the European *G. contaminata*, figured in Walker's *Ins. Brit. Dipt. iii. tab. xxviii. f. 7.*)

One ♀ from Pennsylvania, (the anterior feet and the posterior tarsi of this specimen are wanting.)

Synoptical Table of the Genera and Species.

First group (*Tipulæ limnobiæformes.*)

LIMNOBIA nob.

Subgen. *Geranomyia Halid.*

- rostrata Say, 207.
- communis n. sp., 207.
- diversa n. sp., 207.

Subgen. *Rhipidia Meig.*

- maculata Meig., 208.
- domestica n. sp., 208.
- fidelis n. sp., 209.

Subgen. *Dicranomyia Steph.*

- liberta n. sp., 209.
- humidicola n. sp., 210.
- stulta n. sp., 210.
- distans n. sp., 211.
- pubipennis n. sp., 211.
- immodesta n. sp., 211.
- diversa n. sp., 212.
- gladiator n. sp., 212.
- pudica n. sp., 212.
- morio Fabr., 212.

* * * *

- defuncta n. sp., 213.

Subg. *Limnobia* (sensu strictiori.)

- solitaria n. sp., 215.
- cinctipes Say, 214.
- immatura n. sp., 214.
- triocellata n. sp., 216.
- indigena, n. sp., 215.
- tristigma n. sp., 216.

* * * *

- argus Say, 217.

Second group (*Tipulæ anomalæ.*)

DICRANOPTYCHA nob.

- germana n. sp., 217.
- sobrina n. sp., 218.
- nigripes n. sp., 218.
- sororecula n. sp., 218.

ANTOCHA nob.

- saxicola n. sp., 219.
- opalisans n. sp., 220.

BLEPHANTOMYIA nob.

- canadensis Westw., 221.

RHAMPHIDIA Meig.

- brevirostris n. sp., 222.

TEUCHOLABIS nob.

- complexa n. sp., 223.

Third group. (*Tipulæ eriopteraformes.*)

GNOPHOMYIA nob.

- tristissima n. sp., 224.
- luctuosa n. sp., 224.

CRYPTOLABIS nob.

- paradoxa n. sp., 225.

ERIOPTERA nob.

- chlorophylla n. sp., 226.
- vespertina n. sp., 226.
- septemtrionis n. sp. 226.
- villosa n. sp., 226.
- chrysocoma n. sp., 226.
- venusta n. sp., 227.
- armata n. sp., 227.
- graphica n. sp., 228.
- holotricha n. sp., 226.
- Meigenii n. sp., 226.
- nubila n. sp., 227.
- caliptera Say, 227.
- parva n. sp., 227.
- hirtipennis n. sp., 228.
- pubipennis n. sp., 228.
- ursina n. sp., 228.

SYMPLECTA Meig.

- punctipennis Meig., 228.

CLADURA nob.

- flavoferruginea n. sp., 229.

GONOMYIA Meig.

- sulphurella n. sp., 230.
- cognatella n. sp., 230.
- subcinerea n. sp., 231.
- blanda n. sp., 231.

Fourth group. (*Tipulæ limnophilæformes.*)

LIMNOPHILA nob.

1st Section.

Subgen. *Lasiomastix nob.*

- macrocera Say, 234.

- 2d Section.
 Subgen. *Idioptera* Macq.
fasciata Lin. Schum., 234.
- 3d Section.
aprilina n. sp., 235.
- 4th Section.
tenuipes Say, 235.
- 5th Section.
 (*Limnophilæ* typicæ.)
adusta n. sp., 235.
luteipennis n. sp., 236.
toxoneura n. sp., 236.
imbecilla n. sp., 237.
brevifurca n. sp., 237.
areolata n. sp., 237.
- 6th Section.
ultima n. sp., 238.
- 7th Section.
 Subgen. *Epiphragma* nob.
solatrix n. sp., 238.
pavonina n. sp., 239.
- 8th Section.
rufibasis n. sp., 239.
- 9th Section.
 Subgen. *Dactylolabis* nob.
montana n. sp., 240.
- 10th Section.
 Subgen. *Dicranophragma* nob.
fuscovaria n. sp., 240.
- 11th Section.
quadrata n. sp., 241.
lenta n. sp., 241.
- 12th Section.
pilosella n. sp., 241.

- TRICHOCERA Meig., 242.
- Fifth group. (*Tipulæ anisomeræ* forms.)
 ANISOMERA Meig.
megacera n. sp., 242.
- ERIOCERA Macq.
fuliginosa n. sp., 243.
- ARRHENICA nob.
spinosa n. sp., 244.
longicornis Walk., 245.
- Sixth group. (*Tipulæ pediciæ* forms.)
 AMALOPIS Halid.
auripennis n. sp., 246.
calcar n. sp., 249.
inconstans n. sp., 247.
- PEDICIA Latr.
albivitta Walk., 248.
- DICRANOTA Zett.
rivularis n. sp., 249.
 * * * *
- ULA Halid.
pilosa Schum., 251.
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- APPENDIX.
- PROTOPLASA nob.
Fitchii n. sp., 252.
- BITTACOMORPHA Westw.
clavipes Fab., 252.
- PTYCHOPTERA Meig.
rufocincta n. sp., 252.

On the male genital organs of the Tipulidæ with short palpi, together with the explanation of Plates III. and IV.

The form of the external male genital organs of the *Tipulidæ with short palpi* is that of a *forceps*; they are not different in this respect from the majority of the insects of the other orders. This forceps serves to seize the tip of the abdomen of the female. In the cases of copulation which I have observed in the genera *Limnobia* and *Erioptera*, the abdomen of the ♀ was seized from below, a little before the ovipositor, so that this organ was stretched on the tergum of the ♂. But, besides the external forceps, there is, between its two halves, a *second internal forceps-like apparatus*. After having secured the female in the described manner, the male, with this second apparatus, seizes the orifice of the inner genital organs of the female and adjusts thereon for copulation. This second forceps seems to vary in structure in different species.

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I have been able to see it distinctly in *Arrhenica spinosa*: it is figured and described below.

My chief attention has been directed to the structure of the external forceps for the purpose of classification; everything remains to be done, as yet, in the study of the more complicated and delicate internal organs. In the description of the figures which follows, I simply relate what I have seen, without attempting any generalization.

Fig. 1, forceps of *L. defuncta* from below.

Fig. 2, the same, from above; *aa*, soft, fleshy lobes; *bb*, horny, falciform appendages, moveable with the lobes, and closely applied although not attached to them; they are fastened only by the base; *cc*, horny, projecting points of the internal organs.

Fig. 3, forceps of *Dicranomyia humidicola* from above; *aa* and *bb* as in fig. 2; *dd*, horny, square appendages, bearing each a pair of bristles; *e*, point of the anal style, visible between the two lobes.

Fig. 4, forceps of *Dicranomyia liberta* from above; *aa* and *bb*, like in fig. 2; *dd*, horny, rostriform appendages, with bristles; *e*, anal style.

Fig. 4a, anal style of *D. liberta*, seen from below.

Fig. 5, one-half of the forceps of *Dicranomyia gladiator* from above; *a* and *b*, as in fig. 2; *e*, anal style.

Fig. 6, forceps of *Limnobia solitaria* from above, half closed; *aa*, moveable, coriaceous halves, with appendages (*bb*); these appendages consist of two lamels, which are closely applied to each other and never divergent; the outside lamel is horny; the inside one seems to be coriaceous; *e*, is the anal style; *cc*, projecting internal organs; *ff*, are soft eminences, (perhaps rudiments of the large soft lobes of *Dicranomyia*?)

Fig. 7, represents the forceps of *Limnobia indigena* from above; the lamels *bb* are also double; in some species, as in *L. tristigma*, I could not distinguish whether the lamels were double.

Fig. 8, forceps of *Rhipidia domestica* from above, and open; *aa*, *bb*, *cc*, *dd* and *e*, as in the preceding figures.

Fig. 9, the same forceps, from below and closed; *e*, anal style.

Fig. 10, forceps of *Teucholabis complexa* from above; 10a, one-half of the same, from below; *aa* and *bb*, horny appendages.

Fig. 11, forceps of *Antocha saxicola* from above; *aa*, double appendages, consisting of a horny and a soft point, closely joined.

Fig. 12, half of the forceps of *Elephantomyia canadensis* from below; *aa*, horny appendages.

Fig. 12a, forceps of *Dicranoptycha nigripes* from above; *y*, are short, black bristles; *zz*, indistinct, horny appendages. In this species I had for the first time a glimpse of the structure of the slender, horny, hook-shaped organ, figured farther below (fig. 27b), but occurring in most species. When *D. nigripes* opens the forceps this hook comes into a sort of erection and spreads outside of the forceps in the shape of fig. 12, b; *aa*, are slender and horny; *bb*, is a small forceps, moving independently of *aa*, and opening or closing at the point c.

Fig. 13, one-half of the forceps of *D. sobrina*.

Fig. 14, forceps of *Cryptolabis paradoxa* from above; 14a, the same from below; *aa*, are horny appendages; they are small and indistinct, being closely applied to the fleshy part of the forceps; *b*, seems to be the rudiment of an anal style.

Fig. 15, tip of the abdomen of *Cryptolabis paradoxa*, female, from the side; fig. 15a, the same, from above; there are no visible horny lamels; the tips, *aa*, are beset with microscopic bristles.

Fig. 16, forceps of *Gonomyia blanda* from above and open.

Fig. 17, half of the forceps of *Gonomyia cognatella*, from above.

Fig. 18, forceps of *Gnophomyia tristissima*, from above, and half open; 18a, female ovipositor of the same species.

Fig. 19, half of the forceps of *Erioptera vespertina*, side view.

Fig. 20, forceps of *Erioptera armata* from above.

Fig. 21, the same, from the side. Its structure is somewhat complicated; besides the coriaceous parts *dd*, there are two pairs of horny appendages attached to them; they are invisible from above, except the tip of one of them, which projects at *f*. One of these appendages is seen at *h* in fig. 21; detached, it looks somewhat like fig. 21a, in which the portion *bbb* is closely applied to the inside of the lobe *d*, and the portion *c* branches off. The other pair of appendages (*ee* on fig. 21) is slender and curved; each of them is attached to one of the lobes *dd*.

Fig. 22, forceps of *Erioptera caloptera* Say, from below.

Fig. 23, forceps of *Erioptera venusta* from above.

Fig. 23a, the same from below; the horny appendages *aa*, seen from below, appear double, consisting of the horny part *bb*, and a membranaceous appendage *cc*; fig. 23b represents it detached; its margin *d* is horny, the rest is a thin membrane; these two appendages are not closely applied to each other, and have an interval between them, although they move simultaneously.

Fig. 24, forceps of *Limnophila luteipennis*, from above *aa*, two pairs of moveable falciform appendages; the outside ones are horny, the inside one seems to be of a softer consistence and are ciliated.

Fig. 25, forceps of *Limnophila aprilina* from above; structure almost like the preceding; the outside appendages have a longitudinal notch, (fig. 25b.)

Fig. 26, forceps of *Limnophila ultima* from below; outside, horny appendages are slightly hooked at the tip.

Fig. 27, forceps of *Limnophila rufibasis* from above, open; the appendages *aa* are large and strong, serrated inside; *bb* are also horny, and look like fig. 27a; the point *c* is directed upwards; 27b is a slender, horny organ, situated inside of the forceps, and concealed when it is closed; its structure is perhaps analogous to a similar organ in *Dicranoptycha* (fig. 12a); the same organ is more or less distinctly seen in almost all other species.

Fig. 28, forceps of *Limnophila montana* from above, closed; it is distinguished at once by the position of the appendages, which is peculiar to this species; *aa* are the tips of internal horny organs; they protrude, together with the soft part *f*, when the forceps are opened.

Fig. 28a, the same from the side; *a* is the same as in fig. 28.

Fig. 29, forceps of *Symplecta punctipennis* from above; *a* and *b* are horny.

Fig. 30, forceps of *Arrhenica spinosa* from above; *a* horny, *b* soft appendage; *cc* internal forceps, (fig. 30a represents it detached); at *d* is a joint, by means of which this forceps is opened or closed.

Fig. 31, forceps of *Eriocera fuliginosa* from above; *aa* are horny; *bb* soft; *c* is curved downwards, like fig. 27b.

Fig. 32, forceps of *Amalopis inconstans*, from above and half open. It is difficult to convey an idea of this organ by a drawing, the points *f*, *g* and *h* being all curved and directed upwards; *aa* are horny; *bb* soft; *cc* coriaceous, hollow inside; *h* is figured separately, (32b); the point *f* is bifid, (32a).

Fig. 33, forceps of *Bittacomorpha clavipes* from below.

Fig. 33a, the same, from above.

Fig. 34, forceps of *Cladura flavoferruginea*, from the side; *a* is convex and seems to be hollow inside; the concavity can be seen at *b*; *cc* is the forceps. This figure is a very rough sketch, drawn from a dry specimen and may not, for this reason, be quite accurate.

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