

## On the designation of generotypes<sup>1</sup> by Fabricius.

A response to McAtee.

By

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In the *Entomological News* XLVIII, Oct. 1937 Mr. W. L. McAtee declares that »the claims that have been made for Fabrician genotype designations, at least in Rhynchota, are false», and that a reference to an article in the *Proc. U. S. Nat. Mus.* 67 (1), pp. 129—131, 1925, is sufficient reply to my article »Fabricius as the first designator and original inventor of genotypes» in *Ent. News* for May 1937.

Before I make the response to Mr. McAtee I will clear up some facts about Fabricius and his designation of types for genera.

J. C. Fabricius (1742—1808) was the founder of a system for classification based exclusively on the mouthparts, or »Instrumenta Cibaria». His system first appeared in 1775, but it was improved upon in later works, and it was published in its final form in 1798<sup>2</sup>. The mouthparts were for Fabricius the most important parts of an insect and that which made it possible to place it in its proper systematical place. Therefore, it is quite natural that when, in his later works, he wanted to specially distinguish a certain species as the one, where the character of the genus was most clear, or in our words most typical, he improved the structural description of the genus and that of the species by adding to the latter a description also of the mouthparts. In the earlier »*Entomologia Systematica*», 1792—94, such a special description was given rarely and almost exclusively to his own new genera. In all parts of this »*Entomologia Systematica*», the special descriptions of the mouthparts that constitute the designations are printed in roman letters (Fig. 1—2), but in the later series of the different »*Systemas*» the designative descriptions have mostly the different mouthparts

<sup>1</sup> The word »genotype» is a commonly used term for the type of a genus, but is linguistically incorrect and should be altered to generotype. Genotype is correctly used in genetics.

<sup>2</sup> H. F. Wilson & M. H. Doner; *The historical development of Insect Classification*, 1937.

printed in italics (Fig. 3). For the rare occasions when this is omitted, the printer was probably to blame. Fabricius himself certainly looked upon the italicizing as a detail of minor importance, exclusively undertaken in order to facilitate for the reader the observance of the designations, but he did not consider it important

41

49. **CEBRIO**. *Palpi* quatuor filiformes.  
*Maxilla* membranacea, vix unidentata.  
*Labium* apice palpigerum.  
*Antennae* filiformes.

1. **C. villosus** fulvus elytris abdomine femoribusque *gigas*.  
teffaceis.

*Cebrio gigas* Oliv. Inf. 31. tab. 1. fig. 1.

*Cistela gigas* Mant. Inf. 1. 84. 1.

Roll. Fn. Etr. 1. 100. 256. tab. 7. fig. 9.

Habitat in Gallia australiori Dr. Broussonet.

Os maxillis palpisque. *Palpi* quatuor inaequales, filiformes, anteriores longiores, quadriarticulati: articulis subaequalibus, obconicis; ultimo obtuso adhaerentes maxillae dorso, posteriores paulo breviores, triarticulati: articulis obconicis; ultimo obtuso adnati labii apice. Mandibula elongata, tenuis, cornea, arcuata, edentula. Maxilla brevis, membranacea, apice rotundata vix unidentata. Labium breve, membranaceum, integrum, apice palpigerum. *Antennae* ferratae.

Thorax dente postico utrinque prominens.

Variat elytris teffaceis & fulcis.

2. **C. fulvus** elytris striatis.

Habitat ad Cap. Bon. spei Dom. de Paykull.

*Cebrio* corpus elongatum, immarginatum, pubescens, agile, capite ovato, exserto, oculis lateralibus, rotundatis, prominulis, antennis sub oculis insertis, thorace transverso, pollice lateri angulo utrinque porrecto, scuto, scutello parvo, rotundato, elytris rigidis, fornicatis, longitudinae abdominis, pedibus validis, femoribus crassifuscis, tarsis aeniceis quinque posticis quadriarticulatis, colore obscuro.

Fig. 1. The usual arrangement of the designative descriptions.

Fig. 1—2. Two designative descriptions from the »Entomologia Systematica», Tom. I, 1792.

The designation consists of a description of the mouthparts added to the specific description. The generic description is always given in breviter below a line on the first page at the beginning of each genus. In both these cases the first species in the genus has been designated as the type. (Fig. 1—3 reduced to half the actual size.)

enough to alter in the proof. In the books where the designations are in roman letters, the student must be careful not to mistake an ordinary structural description beginning with the head or body and containing a colour or structural description of some single mouthpart for a designative description. The real designative description enumerates all the mouthparts. During the entire entomological activity of Fabricius, such really designative descriptions

71

**Scarbaeus ovatus** Oliv. Inf. 1. 3. 175. 220.  
tab. 20. fig. 187.  
Jabl. Coleopt. 2. tab. 20. fig. 9.  
Herbt. Arch. tab. 19. fig. 18.  
Habitat in Europae flercore bovino.  
Sc. nuchicorni quadruplo minor.

3. **HEXODON**. *Maxilla* porrecta cornea apice tridentata: dentibus fisis.  
*Labium* late emarginatum.  
*Antennae* lamellatae.

1. **H. atrum** elytris reticulatis griseis.

*Hexadon reticulatum* Oliv. Inf. 1. 7. tab. 1. fig. 1.

Habitat in Madagafcar Muf. Regis Galliae.

Statura oblonga fere Melolonthae. *Antennae* clava ovata lamellis tribus confante: intermedia majori. Caput & thorax atra, immaculata.

Elytra reticulata, cinerea. Abdomen ferrugineum. Os maxillis palpisque. *Palpi* quatuor inaequales: anteriores subclavati, quadriarticulati: articulis tribus subaequalibus, ultimo ovato crassiori, obtuso adhaerentes maxillae dorso, posteriores filiformes, triarticulati: articulo ultimo obtuso adnati labii basi. Mandibula porrecta, cornea, crassa, arcuata, obtusa.

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of mouthparts were never given to more than one species at a time in each genus. These descriptions must have been based on most difficult and laborious dissections of the mouthparts, undertaken only with the help of the crude instruments of the time. As already stated, such designative descriptions were mostly given to genera erected by Fabricius. In later years he more and more frequently selected species from genera not erected by himself, and

## 316 PEMPHEGON. OXYBELUS.

- albibratis*. 8. P. ater glaber, abdomine fessili, clypeo argenteo, tibiis anticis supra flavescens.  
*Crabro albibratis*. Ent. fyft. 2. 302. 31. \*  
Habitat Halae Saxonum Dom. Hübner.
- minutus*. 9. P. glaber ater, mandibulis tibiisque testaceis.  
*Crabro minutus*. Ent. fyft. 2. 302. 32. \*  
*Sphex pallipes*. Panz. Fn. Germ. 52. tab. 22.  
Habitat Hafniae Mus. Dom. Lund.

60. OXYBELUS. *Os absque lingua.*  
*Palpi aequales: articulis cylindricis.*  
*Labium breve, corneum, roundatum.*  
*Antennae filiformes.*

- interruptus*. 1. O. ater nitidus, abdomine falcis tribus interruptis albis, pedibus rufis.  
*Melinus interruptus*. Ent. fyft. suppl. 266. 4. \*  
Habitat Halae Saxonum Dom. Hübner.  
Thorax sub scutello utrinque spinosus.
- uniglumis*. 2. O. scutello mucronato, abdominis segmentis tribus punctis duobus albis.  
*Crabro uniglumis*. Ent. fyft. 2. 300. 23. \*  
*Vespa*

Oxybeli corpus parvum, glabrum, ovatum, inmarginatum, agile, capite magno, transverso, exserto, thorace latiore, oculis oblongis, lateribus, antennis approximatiss, supra os insertis, thorace brevioribus, costis stemmatibus tribus, thorace brevi, gibbo, scutello acuminate, abdomine fessili, ovato, anodo recedente, alis subsaequalibus, hyalinis, pedibus validis, sceler nigro flavoque.

## OXYBELUS.

317

- Vespa uniglumis*. Linn. fyft. Nat. 2. 951. 18.  
Fn. Sv. 1681.  
*Oxybelus*. Latreille Inf. 3. 342.  
Panz. Fn. Germ. 64. tab. 14.  
Schaeff. Icon. tab. 20. fig. 1.  
Habitat in Europae floribus, inprimis umbellatis.

*Os* maxillis palpiisque absque lingua. *Palpi* quatuor aequales, filiformes: *anterioris* sex-articulati: articulis aequalibus; ultimo cylindrico, obtuso, adhaerentes maxillae dorso, *posterioris* quinquearticulati: articulo ultimo obtuso, adnati labii apice. *Mandibulae* cornes, arcuatae, acuta, edentulae. *Maxilla* brevis, basi cornes, apice membranacea, rotundata, bifida. *Labium* breve, corneum, planum, apice rotundatum, integerrimum. *Antennae* filiformes, articulo secundo longiore, crassiore, tertio brevi, distincto.

3. O. scutello mucronato bidentatoque niger, thorace flavo lineato, abdomineque falcato, pedibus rufis.  
*Crabro lineatus*. Ent. fyft. 2. 300. 24. \*  
*Nomada lineata*. Mantill. Inf. 1. 206. 3.  
Panz. Fn. Germ. 73. tab. 18.  
Habitat Halae Saxonum Dom. Hübner.
4. O. scutello submarginato spinaeque porrecta *hastatus*, incurva, ater abdomine segmento primo secundoque utrinque puncto albo, pedibus rufis.  
Habitat in Mogador Dom. Schousboe Mus. Dom. Lund.  
Praecedente paulo major. Antennae nigrae, articulo primo ferrugineo. Caput nigrum, sub

22-

Fig. 3. The usual type of designative descriptions in the different »Systemas».

In this case taken from the »Systema Piezatorum», 1804, the second species (*uniglumis*) out of seven in the genus *Oxybelus* has been designated as generotype. In order to make the designative description more easy to observe the mouthparts are printed in italics. In the entire course of his zoological activity Fabricius never designates more than one species at a time as type of a genus.

it is very probable that if he had lived longer, he should have designated a species in every genus known to him. From the aforesaid it is evident that Fabricius *de facto* if not *de jure* has designated types to genera.

Fabricius was not only the first zoologist to designate types, but he was also the first one to study types. This we know because in dealing with the sawfly genus *Tenthredo* in 1793, he placed *Tenthredo campestris* L. not according to the description given in the works of Linnæus among the species under the

ORDRE VI. LÉPIDOPTÈRES. *Lepidoptera*.SECTION I. DIURNES. *Diurna*.

- FAMILLE I. PAPILLONIDES.
- Papillon. *Papilio Machaon*, Fab — Ejud. *Zelima Pyralades*.
- Parussien. *Doritis Apollo*, Fab.
- Thais. *Thais rumina*, Fab.
- Pieride. *Pontia brassicæ*, Fab.
- Coliade. *Colias Rhamni*, Fab.
- Libythée. *Libythea Celtis*, F.
- Danaïde. *Pap.* : *Idea Plexippus*, Fab., entom. system.; gen. *idea*, *euploea*, ejusd., system. glossat.
- Héliconien. *Pap.* : *polymnia*, *horta*, Fab.; entom. system.; gen. : *mechanitis*, *acraea*, ejusd., system. glossat.
- Céthosie. *Cethosia Cydippe*, F.; ejusd. *pap. Juno*, Cram.
- Argynne. *Argynnis paphia*, Fab.; ejusd., *melitæa cinxia*.
- Vanesse. *Vanessa Atalanta*, Fab.
- Biblis. *Pap.* : *undularis*, *biblis*, Fab., entom. system.; ejusd. gen. : *melanitis*, *biblis*, (system. glossat).
- \*Nymphale. *Pap.* : *Dido*, *aceris*, *populi*, *Achilles*, Fab., entom. system.; ejusd. gen. : *apatura*, *neptis*, *linenitis*, *morpho*. (system. glossat).
- \*Satyre. *Pap.* : *Teucer*, *Phidippus*, *Sophoræ*, *Piera*, *Galathæa*, *Mæra*, Fab., entom. system.; ejusd. gen. : *anathusia*, *brassolis*, *hætera*, *hypparchia*, (system. glossat).
- Erycine. Les pap. de Cramer : *Lamis*, *Fatima*, *Melander*; etc.; les pap. *Lysippus*, *Melibæus*, etc. de Fab., entom. system.
- \*Polyommate. Les pap. : *betulæ*, *quercus*, *boeticus*, *Argus*, etc., de Fab., *ibid*.

## FAMILLE II. HESPÉRIDES.

- Uranie. *Urania Leilus*, Fab., system. glossat.
- Hespérie. *Hesperis* de Fab. : *Proteus*, *Malvæ Steropes*, etc., entom. system.

Fig. 4. Facsimile in actual size of the upper  $\frac{3}{4}$  of page 440 from Latreille; »Table des Genres avec l'indication de l'espèce qui leur sert de type», 1810.

This work has been accepted as the first designation of generotypes. The naming in several cases of more than one species to each genus indicates that Latreille meant these as examples, but the chance use by him of the magic word »type» in the heading induced the Commission on Zoological Nomenclature to accept these examples as designations. This acceptance has recently been subject to a severe critique by A. d'Orchymont.<sup>1</sup> (The abbreviation »Ejud.» stands for ejusdem = of the same (author).

heading »*Antennis filiformibus articulis 7—9*», but in the group with multijointed antennae in accordance with the single specimen in the collection of Linnæus in London. Without having looked at the substituted type specimen in this collection, he could never have transferred *T. campestris* L. to such a place. The explana-

<sup>1</sup> A. d'Orchymont; Changements de noms de genres. — Bull. Ann. Soc. Ent. Belg., Tome LXXVII, p. 423, 1937. En marge de l'Opinion 11; Des termes »binaire», »uninominal» et »binominal». — Ibidem, Tome LXXVIII, p. 37, 1938.

tion is that during one of his frequent journeys to London he studied the Linnean collection and made the same mistake as many later students have done when studying types, *i. e.*, he did not check the supposed type with the original description to see if they agreed with each others; certainly a fundamental procedure to be followed in order to ascertain that not a substitution has taken place.<sup>1</sup>

To return to McAtee, he gives first a historical background of the case, and states that Latreille in 1810<sup>2</sup> »is the only author who asserts his definite intention and who consistently names only a single species to a genus«. To show that this statement is somewhat exaggerated I have taken the liberty to make a facsimile of page 440 from this work of Latreille (Fig. 4). It is easy to see that Latreille enumerates several species as examples of, *e. g.* the genus *Polyommata*, *vis. betulae, quercus, boeticus, Argus*, etc. This example is by no means a single one, and, when monographing large groups of Lepidoptera in later works, Latreille never indicates any types.

McAtee says further: »Lamarck and Laporte frequently cite more than one species to a genus and are only credited with fixing types when they happen to name just one illustration of a genus.« . . . »Because of *ex post facto* considerations we credit them with so doing when they accidentally mention but one species for a genus, but essentially we are putting a false construction on their work.« These arguments of McAtee would be excellent against an acceptance of the types of Latreille, but he must excuse me, if I cannot see the logic in using them against Fabricius.

Further McAtee states that neither Stål nor Reuter were in the habit of designating types of genera, and that a thorough fixing of types has taken place only in quite recent catalogues.

The logics of McAtee is still a mystery to me. Whether two later entomologists designate types to genera or not, cannot in any way be a proof that Fabricius did not. That both Stål and Reuter had a clear conception of the type idea we know from Bergroth. If they took the risk of having their understanding of their own genera changed by subsequent designators, it is their own affair, and their neglect cannot have any influence on the past actions of the long since dead Fabricius. Nevertheless, McAtee exclaims: »In the light of these facts what probability is there that Fabricius

<sup>1</sup> R. Malaise & R. B. Benson; The Linnean types of sawflies (Hym. Symph.). — Arkiv f. Zool. 26 A, 20, 1934.

<sup>2</sup> P. A. Latreille; Tables des Genres avec l'indication de l'espèce qui leur sert de type. This heading stands for an appendix in brevier of his »Considération générales sur l'ordre naturel des animaux«, Paris 1810. The appendix begins with page 421.

in 1803 or earlier as in 1794 (as some authors claim) took action that we can consider as genotype fixation? The answer is there is no probability whatever that such was the case.»

McAtee continues to say that other authors are credited with type fixation only when they chance to name a single species as an illustration of a genus or in connection with the description of a new genus. »Fabricius has only one such instance in the *Systema Rhyngotorum* (1803), but in numerous cases he gave a preponderantly structural description of one of the species in a genus (not a repetition of the generic characters as has been stated) and, . . .» By these cited words McAtee means to say that in the »Syst. Rhyng.» only one new genus is monobasic, but he has given this statement such a form that the unsuspecting reader, not thoroughly familiar with the works of Fabricius, must get the impression that Fabricius in that same work designated several species in each genus (a thing we know Fabricius never did).

McAtee remarks also on the inconsistency of Fabricius to use italics in all but two designative descriptions, and for designating in the »Syst. Rhyng.» only 31 genera out of 47 (not 30 out of 45 as stated by McAtee). On going through the genera without designated types in the »Syst. Rhyng.» we find that only two of these are erected by Fabricius. All the rest are erected by other authors, and for these genera Fabricius meant, probably, that the different authors should consider their own procedure. One explanation of the remaining two genera may be that most species consisted of exotic insects belonging to different owners that wanted back at least one specimen of each species that had not been dissected; the removing of the mouthparts with the help of the instruments of these times certainly could not be done without spoiling the smaller insects.

McAtee lists then the four generotypes accepted by Kirkaldy from the earlier works of Fabricius (1794) with comments on their treatment in the later »*Systema Rhyngotorum*» of 1803. In two of the four species, the designative descriptions are not or hardly repeated in the later work. Why should Fabricius repeat it? Once he has designated a type for the genus in question he has no need to repeat it as long as he has not changed his mind in the meantime. He certainly never made any lasting microscopical slides of the dissected mouthparts, and it was a tedious work to prepare new ones. Most if not all of the earlier naturalists were intent upon making the descriptions as short as possible, and they considered a statement to be valid as long as they did not change it. To make such a change or to give one of their own species or genera a new and better name, it was for them quite a natural right. If they found a suitable name already used by another

author in quite another order, they promptly annexed that name and made their own use of it, *e.g.* the names *Cryptus*, *Bracon*, *Crabro*, etc. The law of priority was not even dreamt of, and it was enforced only around 100 years after the death of Fabricius. If Fabricius later thought *tenebrosus* to be a better type for the genus *Lygæus* than *valgus* he just made the change, and in the same way he simply transferred *lacustris* as type from *Gerris* to *Hydrometra*. What results these changes as well as his designations will have when seen in the light of our laws of priority and of taxonomy must in every case be dealt with by the specialists in the different orders. In most cases, when we cannot accept his designations, this is owing to the fact that his species was not originally included in the genus when this was first described.

At the end of the article, McAtee states that type fixation according to the law must be definite, and he thinks that this requirement has not been met by Fabricius. If the designation of acceptable generotypes must be expressed by a name which did not exist at that time, the requirement of the law would be ridiculous. The law certainly requires only that the intention of designating should be clearly marked. If we reject the designations of Fabricius for such a formal cause, but have accepted those of Latreille, we are indeed »putting a false construction on their works», as it is certainly only depending on a mere chance that Latreille used the word »type» instead of »example».

Ed. P. van Duzee (Catalogue of the Hemiptera of America north of Mexico, 1917) says on page XI that we have Fallén (1764—1830) for authority that Fabricius has stated his intention of naming types for the genera. McAtee says then: »We have examined the *Philosophia Entomologica*, 1778, and there is nothing in it to indicate that Fabricius had any conception of genotypes.» Isn't that a glorious idea, to look for explanation in a work issued years before the invention of the type designation was done? I presume McAtee himself is as consistent in his doings as he expects Fabricius to be, and if he should happen to need an explanation of, *e.g.* an aeroplane, he would look for this in a work issued before the end of the past century.

From the aforesaid and the facsimiles given, it is quite evident that Fabricius has clearly designated generotypes in the modern sense, and by far more unquestionable than those of Latreille. It is inexplicable how the International Commission on Zoological Nomenclature could overlook such a fact, known and recognized by different leading entomologists in the course of a whole century<sup>1</sup>.

<sup>1</sup> Another proof of this recognizance may be quoted from Dr. Wilhelm Schmidt; *Revision der Europäischen Oedemeriden*. — »*Linnaea Entomologica*», I. Stettin 1846. Schmidt says on page 47: »Obschon *Stephens* diese Gattung unter dem Namen

The present inconvenience caused by these designations is certainly greatly felt, but after a few years the changes made will seem quite natural. When the law of priority first appeared, it created an avalanche of protesting outcries. Nowadays we find this law quite indispensable. The authority of a law stands and falls with the conviction that its maintenance and enforcement is guided by a consideration of what is right and correct, and not by temporary whims. Temporary inconveniences must be endured with patience. For the immediate moment it may seem more convenient to preserve an incorrectness as a *nomen conservandum*, but the question of a change will again rise, until the fault is mended. Then finally truth and correctness, the lasting foundation of all science will be acknowledged.

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Oncomera aufführt, so habe ich doch die *Fabricius'sche* Benennung Dryops beibehalten zu müssen geglaubt, weil *Fabricius* in d. Ent. Syst. die *Dr. femorata* durch die genaue Beschreibung der Mundtheile als den eigentlichen Typus der Gattung hervorhebt.»