Case 3548

A proposal for the treatment of *Mémoires pour servir à l'histoire des insectes* by De Geer (1752–1778) and the additional volume by Retzius (1783)

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Abstract. We analysed the eight volumes of *Mémoires pour servir à l'histoire des insectes*, published between 1752 and 1778 by De Geer, and an additional volume published by Retzius in 1783. We found that none of these works was consistently binominal. A great number of names of taxa of many insect and other arthropod groups that were established in those works are currently widely accepted and used, and regarding them as unavailable would cause an unnecessary amount of confusion and taxonomical instability. De Geer (1752) is a pre-Linnaean publication and the two parts of volume 2 (1771a, b) did not contain any Latin names. We propose that the works published by De Geer (1773, 1774, 1775, 1776, 1778) and Retzius (1783) be ruled to be available as binominal works and 140 polynominal names mentioned therein be suppressed, mostly for being identified as polynominal. Among the polynominal names included in these volumes were the very commonly used names for human lice (*Pediculus humanus capitis* and *P. humanus corporis*) which De Geer regarded as different species, not as subspecies of *P. humanus*. We suggest that *P. h. capitis* be considered available and that *P. h. corporis* be suppressed (the latter being commonly regarded as a synonym of *P. h. humanus* Linnæus, 1758 in modern biology and medicine). Generic names established as compound words connected with a hyphen should generally be regarded as binominal and available, but we propose to suppress De Geer's spider names *Aranealupus*, *Araneaphalangium* and *Araneacancroides* for the purposes of the Principle of Priority, but not for those of the Principle of Homonymy.

Keywords. Nomenclature; taxonomy; early zoological literature; Arthropoda; Insecta; Chelicerata; De Geer; Retzius.

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1. *Mémoires pour servir à l'histoire des insectes* was a multivolume work published in eight volumes between 1752 and 1783 by the Swedish naturalist Carl De Geer (*1720, †1778) (volumes 1–7) and the Swedish naturalist Anders Jahan Retzius (*1742, †1821) (volume 8). De Geer published the first volume of the *Mémoires* in 1752, it therefore was a pre-Linnean work (Article 3.2). All names of taxa in this and

volumes 2 and 3 (De Geer, 1771a, b) were in French and therefore not available. Latin names for taxa were proposed by De Geer in the five remaining volumes between 1773 and 1778 and in the subsequent work by Retzius (1783). Besides the large number of binominal names (more than 850) described by De Geer and Retzius we identified many polynominal names of taxa, which render each of the six publications not consistently binominal under Article 11.4 of the Code, as we interpret the latter in paras. 5 and 6 below. In none of these works was binominal nomenclature consistently applied.

We herein give a brief introduction to the style of the works followed by a list of polynominal names that should not be regarded as available for nomenclature.

2. To take a decision on binominality it is necessary to understand the style of the author. De Geer's style was largely consistent throughout his last five volumes of the *Mémoires* (De Geer, 1773, 1774, 1775, 1776, 1778). The description of each species started with a French generic name (in capitals and italics), followed by a diagnosis (in French, italicised), e.g. De Geer, 1774, p. 22: '*STAPHYLIN lisse d'un noir luisant, à antennes brunes obscures & à ventre allongé*'). French diagnoses are followed by a line, in which the species are referred to by a Latin name, which is italicised and written in a smaller font.

The Latin generic names are followed either (a) by a Latin diagnosis alone (e.g. De Geer, 1774, p. 22): '*Staphylinus niger nitidus, antennis obscure fuscis, abdomine elongato*' or (b) by a specific name (in parentheses and non-italicised) followed by a Latin diagnosis (e.g. De Geer, 1774, p. 20): '*Staphylinus* (bombilius) *hirsutus niger, capite thorace abdominisque apique viridi-flavis nitidis*'. The binominal name *Staphylinus bombilius* in the above example is a newly proposed scientific name, which is indicated by the absence of a literature citation after the Latin diagnosis; assuming that the work is classified as binominal, *Staphylinus bombilius* De Geer, 1774 should be considered as an available name.

The diagnoses are often followed by citations of previous descriptions or/and illustrations (e.g. De Geer, 1774, p. 22): '*Staphylinus* (politus) *niger, thorace elytrusque nigricantibus nitidis. Linn. Faun. Ed. 2. no. 843. Syst. Ed. 12. p. 683. no. 5*'.

This name (*Staphylinus politus* Linnæus, 1758) was only cited (as from Linnæus, 1761, p. 231 and Linné 1767, p. 683), but not used as a valid name in De Geer's own classification. These scientific names could also differ from those used as valid by De Geer himself (e.g. De Geer, 1774, p. 20): '*Staphylinus* (hirtus) *hirsutus niger, thorace abdomineque postice flavis. Linn. Faun. Ed. 2. no. 839. Syst. Ed. 12. p. 683. no. 1*'.

This passage, following his own description of *Staphylinus bombilius* De Geer, 1774, indicated that he regarded *Staphylinus hirtus* Linnæus, 1758 as a synonym of his own name *Staphylinus bombilius*. From a nomenclatural point of view, De Geer established a subjective junior synonym of the Linnean name. However, the validity of this and other instances of synonymy should be judged based on an analysis of the type specimens, which has not been done for the 850 species-group names involved here.

In some cases De Geer listed references to previously published information and figures without Latin diagnoses and names (e.g. De Geer, 1774, p. 20): '*Schæff. Abhandl. von Ins. Tom. 1. p. 81. Tab. 2. Fig. 12. Icon. Ins. Tab. 36. Fig. 6*'(references to Schäffer (1764) and Schaeffer [1766]).

For some species no previous references were given. These blocks of names, diagnoses and references were followed by an often elaborate French discussion on the species and its biology, non-italicised.

From the author's style it is easy to recognize specific names that were established and used by De Geer. Such names were consistently enclosed in parentheses, were not italicised and followed the generic name at the beginning of the first line of the relevant Latin description. The names used in the literature references were printed in the same font and style, but were only cited and not used by De Geer in his own classification.

The main text body of each volume was followed by several pages of explanations of the many plates at the end of the volumes. De Geer used only French names in the explanations of the plates. No names were mentioned on the plates. De Geer's volumes did not contain an index.

3. Following De Geer's death in 1778, Retzius (1783) published a work based on the *Mémoires*, in which he gave a summary of De Geer's names, supplemented De Geer's data and introduced several new names. In the first chapter Retzius (1783, pp. III-VI) explained the taxonomic system used. This part was followed by a numerical list of the genera which he treated in the work (Retzius, 1783, pp. 7–29). Thereafter followed a numerical list of the species (Retzius, 1783, pp. 30–220). Retzius's (1783) volume did not contain any plates or figures. In the species list the name of each species was consistently given in the first line of the description block, set in italics. It was followed by a descriptive text in Latin (non-italicised), De Geer's volume and page, and the corresponding Linnean name and bibliographical reference (e.g. Retzius, 1783, pp. 102, species 552): '552. *St. bombilius*, hirsutus niger, capite thorace abdominisque apique viridi-flavis nitidis. T. 4. p. 20'. St. hirtus. L. S. N. p. 683.

The expression 'T. 4.' referred to volume 4 of the *Mémoires*. This reference was absent only in the species described by Retzius (1783) himself. In many cases Retzius (1783) referred in the last line to the name that Linnaeus had chosen for the species in his *Systema Naturae* (L. S. N.), and to the page in Linnaeus's (1767) work where the name was originally mentioned. In cases where no reference to Linnaeus was given (e.g. Retzius, 1783, p. 113, species 645), the name had been proposed by De Geer (1773, 1774, 1775, 1776, 1778) or by Retzius (1783) himself (e.g. Retzius, 1783, p. 102, species 556): '556. *St. aeneus*, glaber aeneo-viridis nitidus, abdomine pedibusque nigris. T. 4. p. 23'.

Specific names used as valid by Retzius (1783) were always mentioned at the beginning of the first line of the description blocks and (together with the abbreviated generic name) set in italics. This allows for an unambiguous identification of a specific name in this work. In some cases Retzius mentioned two names in italics in the same paragraph (e.g. Retzius, 1783, p. 156, species 999): '999. *C. carinato-punctatus*, brevirostris, antennis fractis, femoribus muticis, corpore subgloboso rufo-fusco punctis flavo-griseis, elytris carinatis. *C. griseo-punctatus.* T. 5. p. 244'.

Here only the first name *C.* [= *Curculio*] *carinato-punctatus* at the beginning was used for the taxon, whereas the other name *C.* [= *Curculio*] *griseo-punctatus* was merely cited from De Geer's work. This happened in the few cases where De Geer had used the same name for two different species and Retzius replaced one of them

with a new name, in this particular case one of the two *C. griseo-punctatus* De Geer, 1775 (p. 217 and p. 244).

4. Each volume of the *Mémoires* (De Geer, 1773, 1774, 1775, 1776, 1778) and Retzius (1783) contained names that were unambiguously polynominal (totalling 140 names under the interpretation specified in the two following paragraphs), which under any current interpretation of Article 11.4 would certainly render the entire work unavailable for nomenclature. Many of the more than 800 species-group names established by De Geer and Retzius are, however, currently used for various arthropod taxa. Besides insects, De Geer (1778) and Retzius (1783) also studied Araneae, Acari, Pseudoscorpiones, Opiliones, Diplopoda, Crustacea and others. Suppressing these works or regarding them as non-binominal will threaten nomenclatural and taxonomic stability. We therefore propose to set aside the provisions of Article 11.4 and to regard the works of De Geer (1773, 1774, 1775, 1776, 1778) and Retzius (1783) as available for nomenclatural purposes. All new binominal names described therein are proposed to be treated as available.

5. De Geer used many new specific names composed of more than one word. Some of these were binominal, others were not. We did not find a precise definition for the term 'consistent application of binominal nomenclature' in the Code. In the following we intend to propose a guide for exploring the boundaries of binominal nomenclature that can be applied to this multivolume work.

The Principle of Binominal Nomenclature is generally defined in the Glossary as '*the principle that the scientific name of a species, and not of a taxon at any other rank, is a combination of two names (a binomen, q.v.); the use of a trinomen (q.v.) for the name of a subspecies and of uninominal names for taxa above the species group is in accord with the Principle. See Articles 5, 11.4*'. A binomen is defined in the same Glossary as '*the combination of two names, the first being a generic name and the second a specific name, that together constitute the scientific name of a species [Article 5.1]. Any interpolated names [Article 6] are not counted as components of a binomen*'. Accordingly, anything that deviates would not be considered binominal. However, there is little further guidance in the Code as to how the boundaries of this definition can or must be identified in practice.

In Article 11.4 ('*the author must have consistently applied the Principle of Binominal Nomenclature [Article 5.1]*') the explanation of consistent application of binominal nomenclature is reduced to the analysis of specific names, by reference to Article 5.1: '*Names of species. The scientific name of a species, and not of a taxon of any other rank, is a combination of two names (a binomen), the first being the generic name and the second being the specific name.*' The Glossary's general definition for 'name' is '*a word, or ordered sequence of words, conventionally used to denote and identify a particular entity (e.g. a person, place, object, concept)*'.

Nowhere in these definitions is it precisely stated that a specific name must not consist of, for instance, ten words, and how their sequence should or should not be ordered. This is surprising since for a long time there has been a relatively clear and commonly accepted convention among zoologists using binominal nomenclature that beyond a relatively narrowly defined limit or tolerance the use of specific names composed of several words will render a work unavailable for the purposes of zoological nomenclature. Such names, which had been widely used in the pre-Linnean literature, are commonly known as polynominal names. In the absence

of a precise definition in the Code, modern taxonomists who are confronted with early zoological works seem to have problems in differentiating binominal and polynominal names (Fricke, 2008; Dubois & Bour, 2010).

The term 'polynominal' is not mentioned in the Code. We use it here in the sense of 'a specific name that consists of two or more words, and that is beyond the limits provided for a binominal name under Article 11.9.5, wherever this limit may be set by anyone who intends to apply binominal nomenclature'. This definition means that the term 'polynominal name' shall always refer to a name that is not accepted as a binominal name, regardless of a person's detailed interpretation of the Code. It is necessary to give this definition in order to disconnect the term from being defined by the number of words contained in a compound name, and to indicate at the same time that the name is rejected as a scientific name because it contains too many words. We are here referring to Article 11.9.5, which is not part of the definition of binominal nomenclature, but is more useful because it intends to outline the limits beyond which a specific name composed of separate words is not regarded as available. This Article is supplemented by an example saying: 'the words 'aquilegiae flava' in *Aphis aquilegiae flava* (i.e. the yellow aphis of Aquilegia) do not form an admissible species-group name' (in the French Code the term '*acceptable*' is used), the only occasion where a polynominal name is mentioned in the Code, but which gives no statement on the consequences of being '*not admissible*'/'*pas acceptable*'. However examples do not form part of the legal text of the Code (Article 89.2). In accordance with Article 11.9.5. we interpret this name '*Aphis aquilegiae flava*' as an example of what is beyond the limits of tolerance, a polynominal name, which, if used as a scientific name for species and regardless of being a nomen nudum or not, will render a work as not consistently binominal. We interpret the term 'consistent' so that not a single exception is accepted.

6. When we decided which names from De Geer's work should be admissible as binominal and which names not, we had to look closely at the grammatical background of binominality. 'To be available, species group names composed of more than one word must refer to a 'single entity (e.g. host species, geographical area)' (Article 11.9.5). Available names in this sense are *novae hispaniae*, *terrae novae*, *bonae spei*, *sancti johannis*, *quercus phellos*, *striato-radiatus* and *10-lineata* (examples given in Articles 11.9 and 32.5) (Welter-Schultes & Klug, 2011). Apart from host species and geographical areas we also find adjectives combined by a connecting vowel, and cases where one word refers to another word of the specific name (*decem lineata* = with ten lines). In all cases, one of the two words in the specific name refers to the other word in the specific name, not independently to the generic name (Welter-Schultes & Klug, 2011). The term 'single entity' implies that the fact that two words are used to express the idea is only an artifact produced by the selected language, Latin. Welter-Schultes & Klug (2011) noted that there are languages in which a 'single entity' always aligns with a single word, making the grammatical relationship immediately obvious. German, Dutch, Swedish and related languages can be used to facilitate this interpretation, all 'single entity' names in these languages consisting of only one word. In German the compound specific names mentioned above would be literally translated to the single words Neuspanien-, Neuland-, Guthoffnung-, Heiligjohann-, Felloseichen-, Streifenstrahlen-, Zehnlinien-.

Two examples were provided for the other side of the limit (Article 11.9). In *Aphis aquilegiae flava* we see two words in the specific name that both refer to the generic name (the yellow *Aphis*, and the *Aphis* of the host plant *Aquilegia*). In *rudis planusque* two independent words were united by a conjunction ('rough and flat'), both words would refer to the generic name. So the difference between binominal and polynominal is hidden in the grammatical structure of the words.

We believe that our interpretation is in accordance with common usage in zoology, and also with Buchanan et al. (1948, p. 291), who applied the same criteria for bacteriological nomenclature and explained that in the hypothetical name *Bacillus aureus lactis* both terms refer to the generic name, the species has two specific epithets ('two specific names' in zoological terminology), a sequence of two unrelated words. Buchanan et al. (1948) explained that hyphenating the two words (*B. aureus-lactis*) would not improve the situation, both words would still remain unrelated. Only by combining the two words grammatically (*B. aurei-lactis*) would the meaning be changed and the form would be correctly binominal. We found that the bacteriological guide was the only written official document in the biological sciences that could be used for this problem.

Dubois & Bour (2010, p. 8) commented on several species-group names composed of two words found in Laurenti (1768). The authors neglected the grammatical relationships of the words and argued that presence or absence of a hyphen should be regarded as decisive for a consistent application of binominal nomenclature. This was rejected by Welter-Schultes & Klug (2011) for various reasons. Classical Latin did not know the hyphen, early zoological authors did not follow fixed conventions. Some (e.g. Leske, 1778, p. 234) wrote *striato radiatus*, others (e.g. Parkinson, 1830, p. 148) wrote *striato-radiatus*, some (e.g. Linnæus, 1758, p. 365) wrote *10-punctata*, others (e.g. Fabricius, 1775, p. 82) wrote *10 punctata*. Many of the important early works would have to be regarded as not consistently binominal, including most works by Fabricius, Thunberg, Schrank, Leske and others, if such a hyphen rule would be applied. Also Linnæus (1758) established some specific names as separate words without hyphen (for example *Conus Stercus muscarum*). So this proposal is not an option.

In the *Mémoires*, where we had to analyse many names that very closely approached either side of the limit, we only found few cases where it was difficult to identify the border line between binominal and polynominal. We found many specific names composed of two words within the frame outlined here which we consequently regarded as binominal. In all cases where each of the components of the species-group name individually referred to the generic name, we considered the specific name as polynominal. For instance, we did not regard *Elater fuscus flavipes* (as published by De Geer, 1774, p. 151) as binominal because both *fuscus* and *flavipes* grammatically did not refer to each other but were individual adjectives, each one referring to *Elater* (meaning the beetle is brownish *and* has yellow feet, in German Brauner Gelbfuß-[Käfer], such a name can be separated to form two independent terms, Brauner [Käfer] and Gelbfuß-[Käfer]). By using the correct connection vowel the name would become *E. fusco-flavipes*, with a change in the meaning ('brown-yellow-footed', in German Gelbbraunfuß-[Käfer]). The connecting vowel rule was applicable in many cases where the compound specific names consisted of adjectives.

Using the definition given by Buchanan et al. (1948), inserting a hyphen (*E. fuscus-flavipes*) would not modify the situation. Our list of non-binominal names comprises six trinominal names which referred to species and were hyphenated, but gramatically they did not represent a single Latin word (*Cicada foliata-fasciata*, *C. foliata-arcuata*, *C. foliata-fusca*, *C. foliata-sinuosa*, *Bombylius tabaniformis-griseus*, *B. tabaniformis-rufus*). Following the bacteriological guide they are not to be classified as binominal (two unrelated words), but we admit that the zoological Code allows an interpretation by which any sequence of hyphenated words can be regarded as binominal if they are considered to represent one single word (Art. 11.2 and 11.9.1.1 in combination with Art. 32.5.2.3, if *foliata-fasciata* is defined as one single word under Art. 11.3, as one single Latin word or an arbitrary combination of letters formed to be used as a word). So we had two options. We preferred not following the latter interpretation because for a deviation among different biological sciences in this important nomenclatural point, the precise definition of binominality, an official zoological document would be desirable (Art. 89.1.1). We are not aware that the six questionable names have ever been used in the past 200 years. This facilitated our decision to include them in the Index, which we would not like to be interpreted as a case of precedent or preliminary decision in the zoological definition of binominality.

We agree with Dubois & Bour (2010) that it would be very useful if the Code would outline the limits of binominal nomenclature much more precisely than in the 4th edition. An example as given in the Bacteriological Code (Buchanan et al. 1948, p. 291) would be useful; *Elater fuscus flavipes* could serve for this purpose.

7. Names for subspecies or variants were not intended by De Geer. De Geer listed many non-binominal names that differed in the third name only, e.g. *Musca vivipara major* (see De Geer, 1776, p. 63) and *M. vivipara minor* (see De Geer, 1776, p. 70), or *Acarus aquaticus ruber*, *A. aquaticus globosus*, *A. aquaticus maculatus*, *A. aquaticus holosericeus*, and *A. aquaticus marginatus* (see De Geer, 1778, pp. 141, 146, 147, 149, and 152, respectively). These could be interpreted as subspecific names (of the species *Musca vivipara* and *Acarus aquaticus*, respectively). However, there are several examples suggesting that De Geer did not regard such taxa as subspecific. This becomes obvious, for instance, in *Musca major larvarum* (see De Geer, 1776, p. 24) and *Musca minor larvarum* (see De Geer, 1776, p. 25), in which the middle name varied.

Retzius (1783) on the other hand apparently applied a subspecies concept at least in two cases. *Cimex najas* was mentioned with three distinct variants (Retzius, 1783, p. 89), referred to by letter and name, thus covered by Article 72.4.1 of the Code. These were *Cimex najas* [α] *apterus*, [β] *alatus* and [γ] *inermis*. Each of them included an individual description. The second case was *Pediculus humanus* [α] *capitis* and [β] *corporis* (see Retzius, 1783, p. 210; see below for a discussion of this case).

With the exception of these two special cases we propose to regard all trinominal names mentioned by Retzius (1783) and De Geer (1773, 1774, 1775, 1776, 1778) not as names of subspecies but as polynominal names intended to denote species.

8. A special case was created by Retzius (1783, p. 47) who proposed *Phalaena γ-graecum*, using the original Greek (lower case) letter Gamma in the species-group name for a name constructed analogously to *Papilio c-album* (i.e. simply meaning

'the Greek Gamma'). Article 11.2 does not allow non-Latin script in a scientific name. Therefore the use of the Greek letter γ renders the name *γ-graecum* unavailable.

9. Three names referred to the two species of human lice, currently in most taxonomic sources known as *Pediculus humanus* and *Pediculus capitis*. Linnaeus (1758, p. 610) established *Pediculus humanus* for the human louse, mentioning '*Habitat in capite & vestimentis humanis*' (lives on the human head and clothing).

De Geer (1778, p. 67) mentioned two names *Pediculus humanus capitis* and *Pediculus humanus corporis*. His style (see chapter 2) and the fact that he did not apply a proper subspecies concept (see chapter 7) suggests that De Geer did not regard *capitis* and *corporis* as subspecies of *P. humanus*. This is strongly supported by De Geer's own statement with regard to these two names: '*Il y a donc une différence palpable entre ces deux sortes de Poux, & qui semble indiquer qu'ils sont d'espèce différente, à moins qu'on ne veuille plûtôt, comme a fait M. de Linnaeus, les regarder comme de deux variétés.*' (Therefore, there is a palpable difference between these two sorts of lice, and it seems to indicate that they are of different species, unless one would rather, as was done by Mr de Linnaeus, regard them as two varieties). De Geer therefore indicated that he considered the two forms as distinct species, which means that he used *humanus capitis* and *humanus corporis* as species-group names. Both parts of the composite specific name referred to the generic name, not to each other, so they were polynominal under Article 11.9.5 (see chapter 6).

Retzius (1783, p. 210) applied a subspecies concept to these names, addressing them as *Pediculus humanus* [α] *capitis* and [β] *corporis* (see also chapter 7), a classification that was not intended by De Geer (1778).

The name *capitis* is widely used today, predominantly in medical and taxonomic publications, for the human head louse. The name *corporis*, for the human body louse, is today regarded as a synonym of the name *humanus*, so this name is not used in the consistently binominal literature (Durden & Musser 1994, p. 5). In Internet queries we observed that the name *corporis* is still widely used and that many scientists are uncertain about which one should be the correct name for the human body louse. This problem is well illustrated by the example of three publications from 2010 and 2011: Abdel-Ghaffar et al. (2010) used *Pediculus humanus corporis* and *Pediculus humanus capitis*, Cueto & Picollo (2010) used *Pediculus humanus humanus* and *Pediculus humanus capitis*, and Beytur et al. (2011) used *Pediculus corporis* and *Pediculus capitis*. Furthermore, a query for *Pediculus corporis* in May 2011 yielded more than 5,000 hits in Google Scholar. Successful queries in various Wikipedia language sections for *corporis* reflect that moderately skilled authors in a community-controlled web service are also uncertain about the taxonomic and nomenclatural status of that name. Our observations suggest that the Commission's previous statements (ICZN, 1928, p. 28, ICZN; 1957, p. 24) on the identity of *corporis* were either not understood or not known, and that officially suppressing the name in a clear decision could contribute to improve the situation. We propose that the Commission rule under the plenary power that *Pediculus humanus capitis* was made available as a subspecies by De Geer (1778) and suppress the subspecific name *Pediculus humanus corporis* De Geer, 1778 and all subsequent uses of *corporis*.

10. De Geer (1778, p. X) established the genus *Ricinus* for a group of Phthiraptera (Insecta), with a description and without nominal species included, if we interpret De Geer's style as outlined above (para. 2). In the descriptions of the species (pp. 71–81) he indicated their host animals (in italics and not in parentheses). Later these terms were interpreted as specific names (despite their not meeting the conditions of Article 11.5): *R. fringillae* (p. 71), *R. emberizae* (p. 74), *R. cornicis* (p. 76), *R. lari* (p. 77), *R. mergiserrati* (p. 78), *R. gallinae* (p. 79), and *R. canis* (p. 81). Hopkins & Clay (1960, p. 326) suggested regarding this as an accidental style error and the names *R. fringillae*, *R. cornicis*, *R. mergiserrati*, *R. gallinae* and *R. canis* as having been made available on this occasion by De Geer, 1778 (*R. emberizae* and *R. lari* were neglected). The Commission approved this view in Opinion 627 (BZN **19**: 91–96). Otherwise the names would have been made available by Retzius, 1783. The Commission noted that Opinion 627 was not meant to prejudge the general question on the availability of De Geer's work. We proposed this to be done here.

11. The *Aranea-lupus* problem. In his chapter '*Recapitulation de l'arrangement des insectes*' De Geer (1778, pp. 667–862) summarised the taxonomic classification he had applied throughout the *Mémoires*. Therein, De Geer (1778, pp. 849–850) mentioned seven spider 'families' which he had established in the 1778 volume and for which he chose the names Aranea retiaria ('netfighter-spiders', referring to the retiarius, a Roman gladiator who specialized in using weighted fishing nets as weapons), Aranea textoria ('spiders with spidernets'), Aranea vestiaria ('wardrobe-spiders'), Aranea lupus ('wolf spiders'), Aranea phalangium, Aranea cancroides ('crab spiders'), and Aranea aquatica ('water spiders').

For his group of Aranea aquatica De Geer mentioned *Aranea aquatica* Linnæus, 1758 as the only included species. The specific names of the species belonging to his 'families' Aranea retiaria, textoria, and vestiaria were mentioned without exception in combination with *Aranea* as the generic name, so these three names were not used as genus-group names. The terms retiaria, textoria and vestiaria were only mentioned in the descriptive text of the species (following the specific name in parentheses; see para. 2). In contrast to this style, although having introduced them in a higher hierarchy, De Geer used *Aranea-lupus*, *Aranea-phalangium*, and *Aranea-cancroides* as genus-group names in his classification (De Geer, 1778, pp. 269, 285 and 297, respectively).

As suggested by the descriptions of the 'families', De Geer derived their names from the French vernacular names Araignées-loups ('wolf spiders'), Araignées-phalanges ('phalanges' in the French word for phalanx bones, commonly known as finger bones, but this was not consistent with the Latin word, as phalangium refers to a kind of venomous spider), and Araignées-cancroides ('crab spiders') and did not intend to use 'lupus', 'phalangium' and 'cancroides' in a subgeneric sense. After mentioning the vernacular 'family' names De Geer provided their Latin names in parentheses. While Aranea-phalangium was hyphenated in the 'family' description, Aranea lupus and Aranea cancroides were not. However, in the species descriptions assigned to the respective 'families' the three names were unambiguously used as generic names and hyphenated with very few exceptions. All specific names mentioned for these genera were binominal.

Genus-group names composed of more than one word are rare. Screening of Nomenclator Zoologicus (www.ubio.org/NZ, November 2010) for genus-group

names written with hyphen revealed little more than 100 names, of which about 50 were actually used. Examples of original spellings of currently used names are *A-Thienemannia* Viets, 1920 (Arachnida), *Amplexi-Zaphrentis* Vaughan, 1906 (Anthozoa), *Arco-Scalpellum* Hoek, 1907 (Crustacea), *Armato-Balanus* Hoek 1913 (Crustacea), *Austro-Peripatus* Sedgwick, 1908 (Onychophora), *Channo-Muraena* Richardson, 1848 (Actinopterygii), and *Hemi-Ramphus* Cuvier, 1816 (Actinopterygii). Other names like *Xero-Campylaea* Kobelt, 1871 (Gastropoda) were spelled as one word in Nomenclator Zoologicus, with correct reference to the original source, but had originally been spelled with a hyphen. In contrast to specific names (Articles 11.9, 11.9.5), the Code does not provide a regulation for how to treat compound genus-group names that were published as separate words connected by a hyphen. A genus-group name must be 'a word' (Article 11.8), while species-group names (Article 11.9) can either be 'a word' or a 'compound word' formed from separate words (under the provisions of Articles 11.9.5 and 32.5.2.2). This means that the generic names mentioned above are not available. We propose to solve the problem by adding a new Article (11.8.2, equivalent to Article 11.9.5) in the Code's next edition to allow the consolidation of compound words in genus-group names originally established with hyphen. These are more than a negligible number of such names, but still so few among the 400,000 genus-group names of animals (0.01–0.02 %) that previous editors of the Code have not been aware of the problem. We assume that this is an unintended gap in the Code.

Anticipating a possible future ruling in this sense we suggest removing the hyphen and declare *Aranealupus* De Geer, 1778, *Araneaphalangium* De Geer, 1778, and *Araneacancroides* De Geer, 1778 as not available. These three names are currently not used for taxa.

12. We did not verify the current allocations of the more than 850 new names established in this multivolume and multidisciplinary work, with all their potential synonyms and homonyms. It seems that De Geer's work has been widely regarded as not consistently binominal, in accordance with the Code (Article 1.4). But it also seems that many other authors have started accepting De Geer's binominal names as available, and have merely 'skipped' the polynominal names. We elaborated the present proposal in order to reflect this situation, to legalize current usage and to provide nomenclatural stability for the currently used names. However, the Commission's ruling will apply only to the works and names concerned in this application (Article 80.5 of the Code).

13. We identified six names which were most probably not polynominal in the above outlined sense, but ambiguous in their interpretation: *Monoculus Pulex ramosus*, *Monoculus Pediculus ramosus* (both from De Geer, 1778), *Phalaena Noctua major*, *Phalaena Tinea Pini*, *Vespa crabro medius*, *Vespa crabro major* (the latter four from Retzius, 1783). In these names it was unclear if the 'middle name' was meant as a subgeneric name or as part of a specific name. In the case of *Vespa crabro medius* the last name (*medius*) referred to *crabro* and not to *Vespa* (suggesting the same interpretation for *Vespa crabro major*). These six names have never been used. We suggest that they be placed on the Official List to avoid confusion in the future.

14. Previous Opinions on names from the works treated herein:

De Geer, 1773
Cimex rostratus

OPINION 719 (1965, BZN **22**: 24–25): Suppressed under the plenary power for the purposes of the Principles of Priority and Homonymy.

Cimex najas

OPINION 247 (1954, Op. & Dec. **5**: 91–102): Available, type species of *Aquarius* Schellenberg, 1800.

Perla

OPINION 645 (1963, BZN **20**: 29–30): Available, junior homonym of *Perla* Geoffroy, 1762.

De Geer, 1774
Hydrophilus aeneus

OPINION 538 (1959, BZN **20**: 57–64): Suppressed under the plenary power for the purposes of the Principles of Priority and Homonymy.

De Geer, 1778
Ricinus, Ricinus fringillae, Ricinus cornicis, Ricinus mergiserrati, Ricinus gallinae and ***Ricinus canis***

OPINION 627 (1962, BZN **19**: 91–96): Available from De Geer, 1778.

Retzius, 1783
Cimex najas alatus

OPINION 1741 (1993, BZN **50**: 245): Subspecific name, suppressed under the plenary power for the purposes of the Principle of Priority, but not for those of the Principle of Homonymy.

Perla

OPINION 645 (1963, BZN **20**: 29–30): Available, junior homonym of *Perla* Geoffroy, 1762. Incorrectly cited as from p. 50. Name was mentioned on p. 60. Ruling provoked the misunderstanding that Retzius (1783) used *Perla* in a different sense than De Geer (1773), which is not true. This should be corrected, Retzius did not establish a new name *Perla*.

15. The International Commission on Zoological Nomenclature is accordingly asked:

(1) to use its plenary power:

(a) to set aside the provisions of Article 11.4 and declare the volumes of the work *Mémoires pour servir à l'histoire des insectes* published by De Geer (1773), De Geer (1774), De Geer (1775), De Geer (1776), De Geer (1778) and Retzius (1783) to be binominal and available for nomenclatural purposes;

(b) to suppress the 140 names listed below for nomenclatural purposes;

(c) to rule that *Pediculus humanus capitis* was made available by De Geer (1778, p. 67);
(d) to suppress the available name *Pediculus humanus corporis* De Geer, 1778 (p. 67) for the purposes of the Principles of Priority, but not for those of the Principle of Homonymy;
(e) to suppress the available names *Aranealupus* De Geer, 1778, *Araneaphalangium* De Geer, 1778 and *Araneacancroides* De Geer, 1778 for the purposes of the Principle of Priority, but not for those of the Principle of Homonymy;

(2) to place on the Official List of Specific Names in Zoology the name *capitis* De Geer, 1778, as published in the binomen *Pediculus humanus capitis*;
(3) to place on the Official Index of Rejected and Invalid Generic Names in Zoology the following names:
(a) *Aranealupus* De Geer, 1778 as suppressed in (1)(e) above;
(b) *Araneaphalangium* De Geer, 1778 as suppressed in (1)(e) above;
(c) *Araneacancroides* De Geer, 1778 as suppressed in (1)(e) above;
(4) to place on the Official Index of Rejected and Invalid Specific Names in Zoology the name: *corporis* De Geer, 1778, as published in the binomen *Pediculus humanus corporis* as suppressed in (1)(d) above;
(5) to issue an Official Correction amending the entry for *Perla* Retzius, 1783 on the Official Index to record that it is not an available name but a subsequent use of *Perla* De Geer, 1773 (a junior homonym of *Perla* Geoffroy, 1762).

List of 140 polynominal names from De Geer's and Retzius's works proposed for suppression:

We have tried to check whether some of these names are in current usage, but did not find any name in this list that is currently used for a taxon. However, several insect groups were poorly represented on the internet, and it is theoretically possible that we have missed usage of rarely mentioned names. If some were in usage, we would anticipate that some authors would use them, and others in the same field would reject them for not being binominal.

De Geer, 1773

Aphis nuda Pini De Geer, 1773 (p. 27)
Aphis tomentosa Pini De Geer, 1773 (p. 39)
Aphis betulæ nigro punctata De Geer, 1773 (p. 45)
Aphis Salicis farinosa De Geer, 1773 (p. 76)
Aphis Tiliæ nigro-punctata De Geer, 1773 (p. 77)
Cicada spumaria graminis De Geer, 1773 (p. 163)
Cicada spumaria Salicis De Geer, 1773 (p. 180)
Cicada musciformis Ulmi De Geer, 1773 (p. 189)
Cicada musciformis Rosæ De Geer, 1773 (p. 193)
Cicada Laternaria Chinensis De Geer, 1773 (p. 197)
Cicada Laternaria fusca De Geer, 1773 (p. 200)

Cicada foliata-fasciata De Geer, 1773 (p. 205)
Cicada foliata-arcuata De Geer, 1773 (p. 206)
Cicada foliata-fusca De Geer, 1773 (p. 208)
Cicada foliata-sinuosa De Geer, 1773 (p. 208)
Cimex viridis totus De Geer, 1773 (p. 266)
Cimex niger spinipes De Geer, 1773 (p. 269)
Cimex griseus nigro-punctatus De Geer, 1773 (p. 270)
Cimex niger rufipes De Geer, 1773 (p. 286)
Cimex depressus Betulæ De Geer, 1773 (p. 305)
Cimex viridis pensylvanicus De Geer, 1773 (p. 330)
Cimex nanus fasciatus De Geer, 1773 (p. 343)
Locusta viridis cantatrix De Geer, 1773 (p. 428)
Sphex Americana aptera De Geer, 1773 (p. 591)

De Geer, 1774

Lampyris noctiluca communis De Geer, 1774 (p. 31)
Elater fuscus major De Geer, 1774 (p. 146)
Elater fuscus minor De Geer, 1774 (p. 146)
Elater aeneus rufipes De Geer, 1774 (p. 149)
Elater fuscus flavipes De Geer, 1774 (p. 151)
Silpha nigra major De Geer, 1774 (p. 173)

De Geer, 1775

Leptura aquatica spinosa De Geer, 1775 (p. 140)
Leptura aquatica mutica De Geer, 1775 (p. 142)
Leptura aquatica fasciata De Geer, 1775 (p. 142)
Leptura aquatica ænea De Geer, 1775 (p. 143)
Chrysomela marginella Ranunculi De Geer, 1775 (p. 304)
Chrysomela viridis Alni De Geer, 1775 (p. 306)
Chrysomela cærulea Betulæ De Geer, 1775 (p. 317)
Chrysomela cærulea Salicis De Geer, 1775 (p. 318)
Chrysomela grisea Alni De Geer, 1775 (p. 325)
Chrysomela cylindrica 4-punctata De Geer, 1775 (p. 329)
Chrysomela rubra liliorum De Geer, 1775 (p. 339)
Chrysomela 22-punctata obscura De Geer, 1775 (p. 380)

De Geer, 1776

Musca major larvarum De Geer, 1776 (p. 24)
Musca minor larvarum De Geer, 1776 (p. 25)
Musca minor domestica De Geer, 1776 (p. 26)
Musca carnaria cærulea De Geer, 1776 (p. 57)
Musca vivipara major De Geer, 1776 (p. 63)
Musca vivipara minor De Geer, 1776 (p. 70)
Musca domestica major De Geer, 1776 (p. 72)
Bombylius tabaniformis-griseus De Geer, 1776 (p. 270)
Bombylius tabaniformis-rufus De Geer, 1776 (p. 272)

Tipula agarici seticornis De Geer, 1776 (p. 367)
Tipula nigra aquatica De Geer, 1776 (p. 387)
Tipula Marci nigra De Geer, 1776 (p. 428)
Tipula Marci fulvipes De Geer, 1776 (p. 429)
Coccus ovatus Ulmi De Geer, 1776 (p. 436)
Coccus rotundus Salicis De Geer, 1776 (p. 440)
Coccus farinosus Alni De Geer, 1776 (p. 442)

De Geer, 1778

Podura arborea nigra De Geer, 1778 (p. 18)
Podura arborea grisea De Geer, 1778 (p. 21)
Podura aquatica nigra De Geer, 1778 (p. 23)
Podura aquatica grisea De Geer, 1778 (p. 28)
Podura globosa fusca De Geer, 1778 (p. 35)
Pediculus humanus corporis De Geer, 1778 (p. 67)
Acarus aquaticus ruber De Geer, 1778 (p. 141)
Acarus aquaticus globosus De Geer, 1778 (p. 146)
Acarus aquaticus maculatus De Geer, 1778 (p. 147)
Acarus aquaticus holosericeus De Geer, 1778 (p. 149)
Acarus aquaticus marginatus De Geer, 1778 (p. 152)
Aranea viridis punctata De Geer, 1778 (p. 233)
Aranea resupina sylvestris De Geer, 1778 (p. 245)
Aranea resupina domestica De Geer, 1778 (p. 251)
Monoculus Pulex ramosus De Geer, 1778 (p. 442)
Monoculus Pediculus ramosus De Geer, 1778 (p. 467)
Cimex capensis ruber De Geer, 1778 (p. 619)
Sphinx adscita De Geer, 1778 (p. 694) (used as a generic name)

Retzius, 1783

Papilio Argus marginatus Retzius, 1783 (p. 30)
Papilio margaritaceus medius Retzius, 1783 (p. 31)
Phalaena tesseraria pratensis Retzius, 1783 (p. 36)
Phalaena Ziczac tritubercula Retzius, 1783 (p. 37)
Phalaena Ziczac quinquetuberculata Retzius, 1783 (p. 38)
Phalaena diura major Retzius, 1783 (p. 38)
Phalaena diura minor Retzius, 1783 (p. 38)
Phalaena porrecta alba Retzius, 1783 (p. 38)
Phalaena porrecta cana Retzius, 1783 (p. 38)
Phalaena alticauda alba Retzius, 1783 (p. 39)
Phalaena alticauda grisea Retzius, 1783 (p. 39)
Phalaena alticauda furcata Retzius, 1783 (p. 39)
Phalaena fusca trimaculata Retzius, 1783 (p. 40)
Phalaena cinerea bistigmata Retzius, 1783 (p. 40)
Phalaena flava nigro-punctata Retzius, 1783 (p. 40)
Phalaena fusca bistrigata Retzius, 1783 (p. 41)
Phalaena alba nigro-punctata Retzius, 1783 (p. 41)

Phalaena grisea fasciata Retzius, 1783 (p. 41)
Phalaena cristata albo-lineata Retzius, 1783 (p. 41)
Phalaena cristata flavo-punctata Retzius, 1783 (p. 42)
Phalaena cinerea undulata Retzius, 1783 (p. 43)
Phalaena Noctua major Retzius, 1783 (p. 44)
Phalaena viridis bilineata Retzius, 1783 (p. 45)
Phalaena varia albo-maculata Retzius, 1783 (p. 45)
Phalaena cinerea bimaculata Retzius, 1783 (p. 46)
Phalaena viridis maculata Retzius, 1783 (p. 46)
Phalaena ferruginea fasciata Retzius, 1783 (p. 47)
Phalaena flava strigata Retzius, 1783 (p. 48)
Phalaena sulphurea caudata Retzius, 1783 (p. 49)
Phalaena alba trilineata Retzius, 1783 (p. 50)
Phalaena albida biundulata Retzius, 1783 (p. 50)
Phalaena violacea nigro-strigata Retzius, 1783 (p. 50)
Phalaena Tinea Pini Retzius, 1783 (p. 50)
Phalaena argentea convoluta Retzius, 1783 (p. 51)
Phalaena cana nigro-punctata Retzius, 1783 (p. 51)
Phalaena dimidio-alba maculata Retzius, 1783 (p. 53)
Phalaena nigra cristata Retzius, 1783 (p. 53)
Phalaena strobilorum Pini major Retzius, 1783 (p. 53)
Phalaena strobilorum Pini minor Retzius, 1783 (p. 54)
Phalaena pelicaria Pyri Retzius, 1783 (p. 54)
Phalaena chrysagyria Alni Retzius, 1783 (p. 55)
Phalaena chrysagyria Pomi Retzius, 1783 (p. 55)
Phalaena grisea Rosae Retzius, 1783 (p. 55)
Phalaena maculata Frangulae Retzius, 1783 (p. 55)
Phalaena bicristata Chaerophylli Retzius, 1783 (p. 55)
Phryganea nigra fasciata Retzius, 1783 (p. 56)
Apis muraria nitida Retzius, 1783 (p. 60)
Vespa crabro medius Retzius, 1783 (p. 63)
Vespa crabro major Retzius, 1783 (p. 63)
Sphex rufa fasciata Retzius, 1783 (p. 65)
Ichneumon aureus Bedeguaris Retzius, 1783 (p. 69)
Ichneumon aeneus myriventris Retzius, 1783 (p. 70)
Ichneumon aeneus globiceps Retzius, 1783 (p. 70)
Ichneumon fuscus ramicornis Retzius, 1783 (p. 70)
Ichneumon aeneus ramicornis Retzius, 1783 (p. 70)
Tenthredo pectinata major Retzius, 1783 (p. 74)
Tenthredo pectinata minor Retzius, 1783 (p. 74)
Tenthredo pectinata rufa Retzius, 1783 (p. 74)
Formica nigra major Retzius, 1783 (p. 75)
Formica nigra minor Retzius, 1783 (p. 75)
Formica rubra aculeata Retzius, 1783 (p. 76)
Formica fusca aculeata Retzius, 1783 (p. 76)
Cicada laternaria surinamensis Retzius, 1783 (p. 79)
Tipula clavata maculata Retzius, 1783 (p. 195)

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Comments on this case are invited for publication (subject to editing) in the *Bulletin*; they should be sent to the Executive Secretary, I.C.Z.N., c/o Natural History Museum, Cromwell Road, London SW7 5BD, U.K. (e-mail: iczn@nhm.ac.uk).