

PRINCIPLES OF ZOOLOGICAL NOMENCLATURE

Introduction

Jack R. Congrove, BU1424

Recently I had some correspondence with another member of the Biology Unit regarding the nomenclature of some species of butterflies depicted on certain stamps. Some of these stamps were captioned with a particular scientific name, but that was not the name ascribed to it in several insect-on-stamps checklists.

This caused some confusion in my correspondent and by way of clarification, I cited some of the rules for naming that are detailed in the *International Code of Zoological Nomenclature* (ICZN). He was unaware of this publication and, as I considered this later, it occurred to me that perhaps many of our members and readers are also unfamiliar with this fundamental Code that dictates the principles of scientific naming we use in this journal.

I therefore concluded that it might be useful and educational to prepare and publish an article on this subject.

As I began my research, I happened to notice a list I had made in 2013 while working on *The Mother of All Indexes*, which contains the history of the Unit and an index to all the journal articles and contents from Volume 1 through Volume 62. While reviewing all the previous volumes for the index, I encountered several articles that seemed to still hold their original usefulness as references. I thought it would be interesting to republish these when time and space in the publication allowed.

Most of these articles had been published before we had the capability to include illustrations. So republication would also provide an opportunity to enhance them with appropriate images.

Serendipity struck when I noticed on the list an article titled, "Principles of Zoological Nomenclature," by J. J. Parodiz, that was originally published in the April 1976 edition of *Bio-Philately* (Vol. 25, No. 2, pp. 85–89).

As I am a great believer in not reinventing the wheel, herewith is a reprint of Dr. Parodiz's excellent article with additional commentary (in italics) and illustrations provided by me. Parodiz was a superb writer. However, in some limited instances, I have made minimal revisions in the text for more clarity, or to adjust out of date information. I have chosen not to call out these edits in order to avoid interrupting the flow of the article.

The specific information in this article applies only to zoological organisms. Botanical nomenclature is governed by a separate publication, the *International Code of Nomenclature for algae, fungi, and plants* (ICN), though several principles are common to both Codes.

Principles

Dr. Juan José Parodiz, BU1030

The purpose of any technical or scientific nomenclature is to give uniformity and universality to the use of names. Stability is another desirable goal but, since scientific improvements produce changes, these can be applied only when the basics of the nomenclatural system are clearly understood.

The *Rules of Zoological Nomenclature* [now called ICZN, see above] are not only concerned with the spelling and combination of names, but also with punctuation marks, typography, dates, authors of species, and the Law of Priority.

Linnaean System

Before Linnaeus, animals were named in the vernacular and if Latin names were applied, it was inconsistently and unsystematically. German, French, English, and authors of other nationalities used "common names" in their own languages, which (apart from deciding how "common" was a common name) had no universal application. Common names change from place to place, even for animals of the same kind.

In our scientific nomenclature, a few of those names that go back to the Romans and Greeks have been preserved, when legalized and standardized according to the Linnaean system, under the Rules (or Code as it is now called).



Linnaeus
Carl von Linné
Sweden, Sc#298

About the middle of the 18th Century, Linnaeus introduced what is known as the Binomial System, by which each kind of animal was recognized by a double name, the generic (a genus like *Musca*—fly) and the scientific (a species like *domestica*). It took not too long for the scientific world to adopt the system, and one reason for this was its simplicity.

Still, in its early days its application found resistance among some of the well-known zoologists who recalcitrantly continued using vernacular or polynomial names. A genius as he was, Linnaeus had, however, a sarcastic humor using Latinized names that offended the prudery of his contemporaries, and sometimes naming ugly animals for the surname of his enemies. No wonder English naturalists, such as Emanuel da Costa, accused him of obscenity.

But all that was forgotten and by the beginning of the 19th Century, his system had universal acceptance. According to it, any scientific paper in zoology, whether printed in Spanish, Japanese, or any other language must use Latin, or words of Greek roots Latinized for genus-species names.

When derived from persons or places, the names were also Latinized and capitalized in species. The present rules do not allow other capitalization except for the genus (or subgenus) and groups above the species level.

Some authors (Linnaeus himself) called the specific names “trivial.” The present rules still do so but, since in English the word “trivial” may lead to misinterpretation, in this article I shall call them, simply, specific names.

Codification

As in all reforms, when it came to codify the names, complications began. Before the First International Zoological Congress at Paris in 1889, the English had been using the Strickland Code (1842). The Germans had their own code. American zoologists were divided among four different codes: Strickland, the American Ornithologists Code (1885), Dall’s Code (1887), and a somewhat International Code (1889).

A committee was appointed by the Third Congress at Leyden in 1895, to recommend unification. (There were at that time 15 different codes.) At the Fourth Congress at Cambridge in 1898, the final International Rules of Zoological Nomenclature were presented. These were adopted at the Fifth Congress at Berlin in 1901. The first definitive text was printed in French in 1905.

Many other International Congresses have been held since at intervals of four or five years, improving the Rules to cope with the new problems that the practice of taxonomy brings out. But, virtually, the amendments of the rules did not modify substantially the general principles for the last 70 years.

In recent years, there have been some attempts to replace the binomial Latin system for a numerical one, but it is not likely that a substantial change or replacement of the system will occur without altering and producing utter confusion.



17th Intl Zoological Congress
Monaco, 1972, Sc#844

[Since 1976 when this article originally appeared, two revised editions of the Code have been published. The current Fourth Edition of the Code dated 1999, and effective as of 1 January 2000, accommodates not only new genetic information, but also the advent of information technology and electronic publishing.]

[One of the factors considered in revision of the Code was the concept of unifying the botanical and zoological rules into a “Biocode,” but the divergence of the two in fundamental ways since their beginnings has made this impractical and would result in unacceptable nomenclatural instability.]

[Perhaps the most significant update to the Code since this original article is the introduction of a number of automatic courses of action in cases that previously called for intervention by the International Commission on Zoological Nomenclature. This most often occurs in cases that involve misidentification of the type species.]

[The Commission may alter the Code (by declarations and amendments) without issuing a new edition. Therefore, it may be necessary to consult these additions when researching a particular case. The Code is published in both English and French and both versions are official and equivalent in force, meaning, and authority.]

[A Fifth Edition is currently in the planning stage.]

The primordial categories used in zoology are those indicated on the left side of the list below. Those on the right represent optional categories, used only when super- or sub-divisions are needed.

| | |
|------------|--|
| Phylum | |
| Class* | Subclass |
| | Superorder |
| Order* | Suborder |
| | Superfamily (permanently used in some groups) |
| Family | Subfamily |
| | Tribe (very seldom used) |
| Genus* | (Subgenus) |
| | Superspecies (groups of species of great genetic affinity) |
| Species* | |
| Subspecies | variety, form, race (convenience only, no taxonomic value) |
| | deme (smallest unit of a population, non-taxonomic) |

Such hierarchy of subordinated groups always represent, in some way, the “phylogenetic,” or evolutionary basis of classification. Those levels marked with an asterisk are the original groups established by Linnaeus. The others were added subsequently with the improvement of the system.

Curiously, the concept of “family” was the one that took longer to develop. Many of the “genera,” large and comprehensive, made by Linnaeus and Cuvier were actually families later subdivided into other genera.

Any unit, at any level of the hierarchy is a “taxon” (plural “taxa”). The arrangement of the taxa constitutes the taxonomy, or the systematics.

The date 1 January 1758 (publication of the Tenth edition of Linnaeus’s *Systema Naturae*) marks the beginning of the general application of the binomial nomenclature as established by the Rules. Any species described or named before that date is not valid unless it has been officialized by a subsequent author.

For the same reason, any species described and published after that date, which does not follow the rules is not valid either. (These names are usually indicated by the term *nomen nudum*.) What constitutes a “publication” according to the Rules is a subject that may lead to lengthy explanations. Fortunately the topicalist need not be concerned with them.

Naming Principles

Taxa above the genus-species level (such as families, orders, etc.) consist of only one-word names and should not be printed with italics or any other typographical distinction from the text, although sometimes they may appear with all of their letters capitalized.

The names of genus and species should **always** be printed differently from the typography of the text (usually in italics and sometimes in bold). In typed manuscripts or mimeographic print (although no longer in common use), they are **always** underlined.

The name of a genus is **always** capitalized, but species names are not (e.g., *Panthera leo*, the African lion). This is a strict rule without exceptions. Subspecies names are also not capitalized. It is recommended also that the name should not be fully capitalized (e.g., *Panthera leo* instead of *PANTHERA LEO*). An exception to this is the case where the name is used in the title of a paper.



Panthera leo
Ghana, 2004, Sc#2433c

The name of the author of a species, when mentioned, should follow the name of the species, not italicized and without being separated by a comma or any other punctuation mark. If the date of the species description is added, it follows the author’s name separated by a comma. For example, the name for the Queen (or Pink) Conch of Florida

and West Indies is written, *Strombus gigas* Linnaeus, 1758; not *Strombus gigas* Linnaeus 1758; or *Strombus gigas*, Linnaeus 1758.

Names of authors who are classic or better known in a particular field of zoology are usually abbreviated (e.g., “Lam.” for Lamarck and “L.” for Linnaeus). Otherwise, names should be spelled out completely, at least the first time they appear in a list or text.

Also, when a species name is repeated in a text, the genus, after the first use, can be indicated by its initial (e.g., *P. leo*). This should not be done when the species is mentioned only once.

When the name of the author is placed in parentheses, as in the Atlantic Trumpet Shell, *Charonia variegata* (Lamarck), it indicates that the species was originally described as a member of another genus. In the proportion that taxonomy is improved or corrected, such changes are frequent.

Naming authors or dates is not always necessary in amateur or topical work, but for the sake of consistency, if one author is given for a species, then it should be given for other species in a list also.

When a species has been divided into two or more subspecies, the name becomes a trinomial (e.g., *Papilio ulysses orsippus*, a butterfly of the family Papilionidae). If the reference is to the typical, or original, subspecies, then the species name is repeated (e.g., *Papilio ulysses ulysses*, or if mentioned several times, *P. u. ulysses*). The fact that the name is a trinomial does not affect the basic concept of binomial nomenclature.



Papilio ulysses
Micronesia, 2014, unlisted

At this point it is proper to make it clear that a subspecies is not merely a “variety” of the species. Apart from some recognizable morphological differences, it **must** show a geographical segregation or isolation from the other populations of the species.

Such condition is known as “allopatry.” This means that the distribution of two or more subspecies of the same species should not overlap, and if overlapping occurs, it should be at a minimum in the zones of contact.

If “variations” (morphologically) are found having the same area of distribution (“sympatry”), the alternatives are that these represent a different species and are treated as such (and do not qualify for a trinomial), or they are a simple “form” or “race” of the species, which should not be treated taxonomically.

Sympatric variations within a species may be due to ecological factors, genetic composition that produces polymorphism, or the results of hybridization, which do not have taxonomical status in nomenclature (i.e., not recognized by the Rules).

Infraspecific names, however, are used in practical taxonomic works for convenience, provided that in such cases the word “form” (which applies to any variety, race, etc.) is inserted (and not italicized) between the species name and the name of the variety (e.g., *Oliva sayana* form *citrina*, the yellow form of the common large olive shell from Florida). Keep in mind that *citrina* is an auxiliary denomination and not an official taxonomic unit. For that matter, the name can be written also, *Oliva sayana* Ravenel (yellow form).

[The term “infraspecific name” currently applies only in Botany to describe the scientific name for any taxon below the rank of species. The equivalent in Zoology is “trinomial name.” Dr. Parodiz uses the term “infraspecific” in this article to distinguish these names from trinomial names that apply only to actual subspecies, and not to forms, varieties, or races. The term “form” is also sometimes merely abbreviated by the letter “f.”]

A name used for a genus should not be repeated for any similar taxon in the animal kingdom. If by inadvertence an author describes a genus with a name that was already preoccupied for another kind of animal (homonymy), the



Papilio ulysses orsippus
Solomon Islands, 1972, Sc#235

one that has the earlier date is valid (Principle of Priority) and the subsequent one should be given a new name, or one chosen from among any existing available synonyms. This also applies to species names.

Here some complications may arise and the Code establishes that an older name that has been neglected for more than 50 years in the literature while a species has been known better by another name with lesser priority, the second name prevails in order to avoid confusion (*nomina conservanda*) and the older name is disregarded (*nomina oblitum*).

This does not always occur without controversy and if there is a conflict, the case should be presented to the International Commission on Zoological Nomenclature to decide. After a name has been added or rejected in the “Official List,” no more changes are permitted. The trouble is that such decisions may take a long time to be made.

A genus name is always a substantive in the nominative singular. Species names are usually adjectives like *edulis* (edible), or a possessive like *browni* (Brown’s). The gender (masculine or feminine) of the species name must agree with that of the genus name. For example, *Crassostrea* (the oyster) is a feminine word, therefore the common edible oyster of our eastern coast is *Crassostrea virginica*. If the genus name were masculine, the species name would be *virginicus* or *virginianum*.

Names of a subgenus, when inserted between the genus and species names, are **always** placed in parentheses, and the subgenus name does not count as part of the overall name. *Eurema (Terias) hecabe* does not make a trinomial. It is only the genus-species names that count. If we add a subspecific name besides the subgeneric such as *Eurema (Terias) hecabe solifera*, it does not make a quadriminomial either. It is still a trinomial.

Because subgenera have in many cases aleatory (i.e., random) limits, and not all specialists in a group agree in their general application, the amateur collector may not be aware of the morphological differences implied by such names and it is better to keep them out as much as possible. Or when used, it must be done according to some recognizable authority.

When a name is based on a compound one, either geographical or personal, such as New Guinea or Saint George, it should be written as a single word without hyphenation (e.g., *novaeguineae* or *saintgeorgianus/saintgeorgi*).

[Hyphenation is not allowed in zoological nomenclature. However, it is required in botanical nomenclature when a species epithet consists of two or more words.]

Apostrophes, diereses, and other diacritical marks disappear in scientific names (e.g., *mulleri* or *muelleri* for Müller; *orbigny* for d’Orbigny, not *dorbignyi*).

The names of superfamilies end in the letters “-acea” (e.g., Cypraeacea from *Cypraea*, the cowries). Family names end in “-idae” (e.g., Cypraeidae). Subfamily names end in “-inae” (e.g., Cypraeinae). In cases where the original genus name that gives its name to the family contains the letter “i” before the suffix, then the letter is repeated (e.g., *Cardium* translates to Cardiidae). The same applies to subfamily names.

Species named for a person are formed by adding the letter “i” to the name if it is a man (e.g., Forbes equals *forbesi*, Bernardi equals *bernardii*), and the letters “ae” to the name if it is a woman (e.g., Vogel equals *vogelae*). If the names are given in a collective or pluralized form, then the suffixes become “-orum” for men and “-arum” for women.

In a number of cases an animal species is depicted on stamps indicated by a name that is not correct because the postal authorities neglected to consult specialists who are up to date with nomenclature, or they took the name from references that became obsolete in such respect. In other cases, names may be totally omitted.



Eurema (Terias) hecabe solifera
South Africa, 2001, Sc#1233



Harpyopsis novaeguineae
Papua N. G., 1974, Sc#401



Pseudocheirus forbesi
Papua New Guinea, 1993, Sc#801

The following are some examples from my collection of shells on stamps.

Between 1962 and 1965, Japan issued a series of definitive stamps and one of them (Sc#746) depicts an unnamed shell. This is the Emperor's Slit Shell, *Pleurotomaria hirasei* Pilsbry. In 1972, the Republic of China issued a stamp with a Rumphius' Slit Shell. The caption reads *Entemnotrochus rumphii* (Shepman). Since this generic name is still controversial, most conservative authors call it *Pleurotomaria rumphii* Shepman.

If we decide to give full accepted status to the name *Entemnotrochus*, the first shell *P. hirasei* should be named *Mikadotrochus hirasei* (Pilsbry). Some authors give to these names generic rank, other subgeneric, and a large number no rank at all. Thus, it is safer to refer to them as *Pleurotomaria*.

[This is a good example of how complicated naming can become. Subsequent taxonomic study has concluded that these two species belong to two separate genera and not lumped together as *Pleurotomaria*, which name as a result becomes relegated to a junior synonym. To add to the confusion, the Scott Catalogue labels the first stamp *Perotrochus hirasei*, which is yet another junior synonym.]

In 1974, Togo issued a set of four stamps showing seashells. One of them (Sc#881) is captioned *Tympanotomus radula*. This is a misspelling for *Tympanotonos*.

[In fact, this species, the West African Mud Creeper, has endured numerous misspellings and identifications. It was originally described by Linnaeus in 1758, and named *Murex radula*. Linnaeus the same year also named another specimen of this same species *Tympanotonos fuscatus*. Over the years other authors have published other names for this creature, sometimes misspelled, including *Tympanotomus* and *Tympanotonus*. Because *Murex* was a preoccupied name, the current accepted name for this shell is *Tympanotonos fuscatus* (Linnaeus).]



Turbo fluctuosus
Kenya, 1971, Sc#48

In 1971, Kenya released a set of 15 stamps showing various seashells. One of them (Sc#48) depicts a shell captioned *Turbo fluctuosus*. Such species has a discontinuous distribution on the west coast of the Americas. Therefore, its inclusion as a shell from Kenya must be a mistake of identification or illustration.

[As most of us are aware, many stamp issuing authorities in these times pay no attention whatsoever to limiting the biological elements depicted on their stamps to indigenous species. One should not make the assumption that the illustrated specimens actually occur in the environs of the issuing country, even if this is sometimes so indicated. However, in many of the articles published in the earlier editions of the *Unit* journal, authors did hold this belief and proceeded to make identifications based on it.]

Some French colonies of the Pacific issued, in beautiful reproductions, species of cone shells of the genus *Conus*. These shells are shown with their apertures on the left side. Although certain shells are characterized by being sinistral instead of dextral, such is not the case of these *Conus*.

The illustrations may have been taken from old books (in early 19th Century French books on conchology, the figures of shells were shown in reverse) or the shell was engraved in the right position so that the printing is its mirror image with the left side on the right.



Mikadotrochus hirasei
Japan, 1963, Sc#746



Entemnotrochus rumphii
Taiwan, 1971, Sc#1701



Tympanotonos fuscatus
Togo, 1974, Sc#881



Conus lienardi
(erroneous sinistral depiction)
New Caledonia, 1968, Sc#C58



Conus imperialis
(actual dextral shell)
Fiji, 1987, Sc#568

In many stamps sets, species are identified with their vernacular or common names only. In a way that is better than to apply the wrong scientific name, and the topicalist has the privilege to keep his collection at such level if he prefers so. Otherwise, he may find the scientific names in the lists prepared by specialists.

In writing a list or article on bio-philately, the scientific identification adds a greater and permanent value to the work, and it is worthwhile to do so. To keep up to date with nomenclature is not easy. Even specialists may be sometimes behind the current literature. In writing up album pages, it would be convenient to indicate the source of information (e.g., a monograph, list, specialist's identification, or merely the stamp catalogue).

One precaution, however, is not to give or invent common names when there are none. The translation of a scientific name into English does not make it a "common" name. This is a fault usually found in "guides" and popular books.

Those names just remain a translation. To be common, a name should be vernacular (i.e., used by a number of people for a certain time).

It is not necessary to give a synonymy of the species on album pages, but if the topicalist has the knowledge and willingness to do so for his own satisfaction and clarification, the following is an example of how it should be done:

Family Cardiidae (Cockle shells)

Genus *Trachycardium* Mörch, 1853

Subgenus *Dallocardia* Stewart, 1930

Trachycardium muricatum (L.), 1758

(Western Atlantic Common Cockle)

= *Cardium muricatum* L.

= *Cardium campechieme* Röding, 1798

= *Cardium gossei* Deshayes, 1864

Distribution: N. Carolina, Gulf of Mexico, and West Indies south to Argentina

Such sophisticated write-ups would impress any judge in any topical exhibition. But, it implies some time-consuming research.

[Since this article appeared, topical exhibiting has developed into Thematic exhibiting. In Thematic (and Display) exhibiting, it is not necessary (or even encouraged) to include detailed systematic information about species depicted on the stamps used to illustrate the story of the exhibit. An exception to this might be if the theme itself is an explanation of how species have evolved and relate to one another.]

There are many other and more complicated regulations in the Code of Zoological Nomenclature that concern only the specialists in several fields of zoology. Actually the Code consists of 87 articles [now 90] with many subdivisions, exceptions, recommendations, and appendices. For the topicalist, the above outlined information is all you need. If special questions arise, specialists should be consulted.

[Dr. Parodiz goes on to offer his help with any questions about shells on stamps as well as providing bibliographic references. For those readers who have questions about identifications and scientific naming of biological species on stamps, the Associate Editors of this journal are available to help. See their contact information on the inside title page.]

[Frequent readers will have noticed that in our various published listings, there often occur entries labeled "U/I" for unidentified, or sometimes listed with a question mark when there is doubt about an identification. Consider these markings to be an invitation for every reader to offer their view on the proper identification. For after all, one of the main purposes of this journal is to encourage the exchange of information and knowledge.]

[Dr. J. J. Parodiz passed away in 2007, at the age of 95. The following biographical information was taken from an extensive obituary and bibliography by Charles F. Sturm, published by the Carnegie Museum of Natural History where Dr. Parodiz was Curator Emeritus.]

About the Author

Juan José Parodiz (1911–2007) was born in Buenos Aires, Argentina. He received his degree from the *Instituto Nacional Ciencias Naturales*. Parodiz studied paleontology and malacology while in Argentina. While serving in the Argentinian Navy, he participated in several oceanographic expeditions to the South Atlantic and sub-Antarctic region.

Parodiz worked at the *Museo Argentino de Ciencias Naturales* for almost 20 years before moving to the United States. In 1951, Parodiz accepted a position at Carnegie Museum and shortly thereafter was appointed Curator of Invertebrate Biology, a position he held for some 30 years. He accepted the title of Curator Emeritus in 1982 and continued to work on the South American naiads and Neogene fossils of the southeastern United States.



Dr. J. J. Parodiz
1997, CMNH

Parodiz published more than 100 papers. He collected throughout South America in addition to the eastern United States. His activities greatly enlarged the museum's collections in the Unionoida and freshwater and terrestrial gastropods of North and South America, both fossil and recent. He became a member of the American Malacological Society in 1949 and served as president in 1965.

José was a passionate philatelist. He was a member of the American Philatelic Society, the American Topical Association, and the Biology Unit. In addition to his memberships and collecting activities, he also wrote articles about stamps. In the *Pittsburgh Shell Club Bulletin*, Parodiz contributed three articles dealing with shells on stamps. He published six articles in *Bio-Philately* dealing with subjects such as cowries (1977), biogeographic zones (1997), and zoological nomenclature (1976).

Parodiz enjoyed reading novels. In *Topical Time*, he wrote articles about two literary figures that appeared on stamps, Edith Wharton and Thornton Wilder (1980, 1998).

He was married for 48 years to Esther Sell Parodiz, whom he met while on a fellowship in Washington, DC, and who preceded him in death.

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