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Names and More Names:

Folk taxonomies, "kinds" and "particular kinds"
-learned by memorization in preliterate societies
-Ancient Greek/Roman hand-copied manuscripts
-Printing press and expanded exploration increased the distribution/adoption of classifications and initiated a significant increase in the species diversity recognized.

Linnaeus used the tools available to him to basically update the regional taxonomy (northern Europe)
- Simplification and standardization was applied to the system in use.

The system:
- "names" were paragraph long description, diagnosis and identification tool written in Latin.
- Common and well known kinds were already frequently referred to by the genus name, e.g., *Crocus*, *Iris*, *Narcissus*. Particular kinds were sometimes referred to using a binomial, e.g., *Iris sylvestris.*
- Linnaeus used the binomial "nicknames" uniformly and still provided the more protracted "name". The binomial shortcut caught on fast and names proliferated.
- more foreign material and better microscopes and lenses.
- "renaming" species not previously given binomials
- emending names not properly formed
- the result was chaos

Codes and More Codes:

Various rules were proposed, even by Linnaeus, none were applied generally.
-The first general use code was the Strickland Code (1842). It was intended for plants and animals.
- Split between Zoologist and Botanists and in 1867 Candolle and others developed a separate set of rules.
- Dall (1877) combined code.
- International Congress of Geology (1881) code for fossils
- American Ornithologists Union (1886) code for birds
- International Code of Nomenclature of Bacteria (in ICBN then ICNB, 1947 (dropped) 1980) (Future editions to be called the International Code of Nomenclature of Prokaryotes)

International code of Botanical Nomenclature (ICBN): Stems from the Candolle code but was first created in 1905. (Americans kept using N.L.Britton's code for about 25 years). Current edition published in 2006.
The code is here http://ibot.sav.sk/icbn/main.htm

International code of Zoological Nomenclature ("The Code" often as ICZN, but this acronym formally is for the commission not the code, I use it below for brevity.): Draws on the Strickland code but officially dates from 1889 International congress of Zoology, subsequently published in 1905. Currently, fourth edition published in 1999 (effective 2000) is in use.
The Code is here http://www.iczn.org/iczn/index.jsp
And a Wiki for the code of the future http://iczn.ansp.org/

Some shared features of ICBN/ICZN:
- Purpose is to ensure a unique scientific name for every taxon.
- Provides rules for publication, validation, documentation and typification of names.
- Allow assignment and changes in names without interfering with scientific freedom.
- Commissions provide an administrative system to oversee and interpret rules, but not based on "Case law"

Some differences between ICBN/ICZN: Codes are independent, names are not required to be unique, e.g., *Pieris* - butterfly; *Pieris* – heath. It is strongly recommended to avoid this when naming supraspecific taxa.
- ICBN, the concept of priority includes a particular binomial combination
Cucamis chrysocomus Shumacher, (1827) when moved to a different genus it becomes
Rhaphiodiocystis chrysocoma (Shumacher) C. Jeffrey (1962)

- ICZN, species authorship is unchanged.
    Bothynoproctus portai Straneo, 1941 ------ *Neotalis portai* (Straneo, 1941)
- ICBN, regulates Division to subform taxa
- ICZN, regulates Superfamily to subspecies.

(Species number in most inclusive taxa are similar. Probably has something to do with the human mind)

- ICBN, names based on a Recent type specimen have priority over names based on a fossil type
- ICZN, first valid publication in all cases
- ICBN, no tautonyms
- ICZN, tautonyms allowed. *Bison (Bison) bison bison* is an available name.

Types: Designation of a type specimen was made mandatory in 1958 in the ICBN, but not until 2000 in the ICZN (it remained a recommendation for many years).

The "type" is the name bearing specimen associated by description and publication given the rules of nomenclature.

- Acts as an objective basis for the nomenclature
- voucher (or "supervoucher") of our research
- a single datum that provides a fixed reference point for our species-level hypothesis
- not necessarily average or typical in the sense of being the common form
- can't represent variation
- only makes sense in the post-Linnaeus, non-typological context

<u>The kinds of types...</u>

-Type series- All specimens on which a description is based (may be only one).
-Syntypes- Two or more specimens included in the type series
-**Primary types**, these have nomenclature status:

Holotype- Single specimen chosen as the nomenclature type.
Lectotype- A single specimen subsequently chosen from the syntypes to act as nomenclature type.
Neotype- A single specimen subsequently chosen to act as nomenclature type when all syntypes have been destroyed.
Isotype- A duplicate holotype (botany).
Hapanatype- An ontogenetic series that acts as nomenclature type (protistans, ICZN)

-**Secondary types**

Paratype- non-holotype syntypes. Usually distributed as vouchers.
Allotype- paratype selected to represent the opposite sex from the holotype.

Other unregulated and not very useful "types" include Homotype, topotype, plesiotype, hypotype, heautotype, onomatype, morphotype, metatype, ideotype. . . .

Priority- Availability- Validity:

Mostly, these concepts were needed post-Linnaeus to deal with the chaos created by 100 years of unregulated names and to deal with subsequent naming.

Priority- first published name is the correct one to use. (except when it is not)

Availability- a properly published name is "available" (known as "validly published" in ICBN)

- use Latin alphabet to form name as bionomial
- published description
- type designated

Validity- the correct name to use (known as "correct name" in ICBN)

Names in conflict:

<u>Primary Homonyms.</u> Same name used for two species.
Carabus limbatus Fabricius, 1776 [senior homonym]
Carabus limbatus Say, 1823 [junior homonym (later homonym in ICBN)]

<u>Secondary Homonyms.</u> Classification change causes conflict.
Feronia strenua Panzer, 1779
Pterostichus strenuus LeConte, 1852

Csiki (1930) put both in *Pterostichus* so *P. strenuus* becomes a secondary junior homonym and must have new name. [*Pterostichus substrennus* Csiki 1930]

Objective synonyms (nomenclatural synonyms ICBN).

- spelling mistakes, unjustified emendations, e.g., *Abaris* vs. *Abarys* or *Rabdotus* vs. *Rhabdotus*. Priority prevails- oldest name/form in most cases. Even if misspelled (usually).

Subjective synonyms (taxonomic synonyms ICBN).

- Conflicting species definitions and hypotheses. Subjective, but hopefully analysis-based, decision that two described forms constitute one species.
- *Abaris darlingtoni* Straneo 1939 = *Abaris aenea* Dejean 1831.
- Priority determines valid name. However, both names are still available.

Special cases can preserve a newer, more commonly used name.
"Prevailing usage" is new to ICZN. - If the senior name has not been used in 50 years and the junior name occurs in 25 "works" published by 10 authors covering a 10 year span within the last 50 years.

Kinds of publications that involve nomenclature directly:

Descriptions-
Species descriptions- isolated descriptions of taxa in unrevised groups is not recommended, especially if presented without a key or identification aid. However, there are many reasons why it might be necessary to provide a valid name without a full analysis.
Redescription- adds significant information and new material
Description of higher taxa- Less common. Usually within a more extensive analysis. Tends to highlight exceptional novelties.

General treatments-
Synopsis- Summarizes current knowledge with a focus on species identification.
Review- Critical study of previous concepts and material. Usually with new material and taxa.
Revision- Descriptions, phylogeny, classification.
Monograph- All aspects and complete detail.

Special use publications-
Phylogenies- May explore various character systems, biogeography or behaviors in detail.
Classifications- Usually published with phylogenies but may be compiled from various sources.
Floras, faunas, checklists, field-guides, atlases- Focus on identification, synthesis and presentation of knowledge of the group.

Preamble **ICBN**: "Botany requires a precise and simple system of nomenclature used by botanists in all countries, dealing on the one hand with the terms that denote the ranks of taxonomic groups or units, and on the other hand with the scientific names that are applied to the individual taxonomic groups of plants. The purpose of giving a name to a taxonomic group is not to indicate its characters or history, but to supply a means of referring to it and to indicate its taxonomic rank. This Code aims at the provision of a stable method of naming taxonomic groups, avoiding and rejecting the use of names that may cause error or ambiguity or throw science into confusion. Next in importance is the avoidance of the useless creation of names. Other considerations, such as absolute grammatical correctness, regularity or euphony of names, more or less prevailing custom, regard for persons, etc., notwithstanding their undeniable importance, are relatively accessory."

ICZN: "The objects of the Code are to promote stability and universality in the scientific names of animals and to ensure that the name of each taxon is unique and distinct. All its provisions and recommendations are subservient to those ends and none restricts the freedom of taxonomic thought or actions.

Priority of publication is a basic principle of zoological nomenclature; however, under conditions prescribed in the Code its application may be modified to conserve a long-accepted name in its accustomed meaning. When stability of nomenclature is threatened in an individual case, the strict application of the Code may under specified conditions be suspended by the International Commission on Zoological Nomenclature."