PROPOSALS TO AMEND THE CODE

Edited by Nicholas J. Turland & John H. Wiersema

(001) Proposal to add a new Note and Example to illustrate Article 6.11

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Publication of a replacement name is governed by Art. 6.11–6.13 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018). Article 6.11 states that a replacement name is a new name published as an explicit substitute for a legitimate or illegitimate, previously published name. The replaced synonym, when legitimate, does not provide the final epithet, name, or stem of the replacement name. The Examples under Art. 6.11 (Ex. 14–16) offer cases where replacement names were required. However, these Examples falsely imply that a replacement name may be published only when the epithet of the replaced synonym is unavailable. The *Code* does not limit the scope of usage for replacement names. Publication of a legitimate replacement name is possible even when a legitimate name at new rank (stat. nov.) or new combination and name at new rank (comb. & stat. nov.) could be published instead. However, such a replacement name would conflict with Rec. 21B.4 and 24B.2 resulting in unnecessary confusion. We are therefore proposing to include a new Note and Example under Art. 6.11 to clarify the situation.

(001) Add a new Note and a new Example under Art. 6.11:

"***Note 6.*** A replacement name for a legitimate name, for which a legitimate name at new rank (Art. 6.10) could be published, can be legitimate provided that its rank differs from that of the replaced synonym. Such a replacement name would, however, be contrary to Rec. 21B.4 or 24B.2."

"***Ex. n.*** *Bidaria indica* M. A. Rahman & Wilcock (in Blumea 34: 99. 1989) was published as an explicit substitute ("nom. et stat. nov.") for the legitimate name *Gymnema montanum* var. *beddomei* Hook. f. (Fl. Brit. India 4: 32. 1883), even though the epithet *beddomei* was available at specific rank in *Bidaria*. Because the ranks of the replacement name and replaced synonym differ, and names have no priority outside the rank at which they are published (Art. 11.2), *B. indica* is not illegitimate under Art. 52.1."

(002–003) Proposal to change the phrasing of Article 7.2

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Article 7.2 of the *Code* (Turland & al. in Regnum Veg. 159. 2018) defines the term "type". The current paragraphs reads:

"***7.2.*** A nomenclatural type (typus) is that element to which the name of a taxon is permanently attached, whether as the correct name or as a synonym. The nomenclatural type is not necessarily the most typical or representative element of a taxon."

There are two issues with this formulation:

(1) In the first sentence "the name" must be replaced with "a name", as a taxon obviously can have several names.

(2) The last phrase "The nomenclatural type is not necessarily the most typical or representative element of a taxon" is fundamentally flawed. It implies that there *is* such a thing as a most typical or representative element of a taxon, which is contrary to the spirit of the *Code* as a neutral instrument (it also happens to be contrary to the thinking of most taxonomists, but that is not the issue). Non-taxonomists quite often misunderstand the concept of nomenclatural types; for example Daston (in Critical Inquiry 31: 153–182. 2004) misinterpreted the "atypical type" as a true contradiction, and the *Code* should take part of the blame if it contains formulations like this.

The following two proposals are presented as alternatives for resolving the second issue: (1) delete this sentence (Prop. 002); (2) if

a need is felt for an explanatory sentence to avoid misunderstandings, replace the current phrase with a neutral alternative (Prop. 003).

(002) Amend Art. 7.2 as follows (new text in bold, deleted text in strikethrough):

"***7.2.*** A nomenclatural type (typus) is that element to which ~~the~~ **a** name of a taxon is permanently attached, whether as the correct name or as a synonym. ~~The nomenclatural type is not necessarily the most typical or representative element of a taxon.~~"

(003) As an alternative to Prop. 002, amend Art. 7.2 as follows (new text in bold, deleted text in strikethrough):

"***7.2.*** A nomenclatural type (typus) is that element to which ~~the~~ **a** name of a taxon is permanently attached, whether as the correct name or as a synonym. ~~The nomenclatural type is not necessarily the most typical or representative element of a taxon.~~ **This does not imply that any element of the taxon is more typical of the taxon than any other.**"

(004–005) Proposals to include the term "type-species" in the *Code*

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Is there such a thing as "type-species"? According to the current version of the *International Code of Nomenclature for algae, fungi, and plants* (Turland & al. in Regnum Veg. 159. 2018, hereafter "*Code*"), no. A type is either a "single specimen conserved in one herbarium …" or an "illustration" (Art. 8.1). In other words, a type is always a unique element and never a collective entity. It is never a species, nor any other kind of taxon. Yet, the term "type-species" is largely found in taxonomic and systematic literature, which intrinsically deal with nomenclature. With the advance of molecular phylogenetics, this term has experienced a bloom in recent papers. Especially in those dealing with description of new genera or new circumscriptions.

If such a term does not exist, why is it so largely used? There are two reasons, we believe. The first reason is to abbreviate the thought, for the sake of word economy. Instead of writing "we sequenced a specimen that is morphologically similar to the type of [species name A] and therefore, in our judgment, may represent the species itself; this type is also the type of [genus name B]", it is much more convenient to simply write "we sequenced the type species of genus B". Except for very few exceptions, most papers on phylogeny do no extract DNA from types. Generic types are used in even lower numbers – because they are commonly specimens from the 19th century. Instead, most researchers extract DNA from fresh, recently gathered specimens, which they judge to represent a determinate species or genus. (For the sake of brevity of this proposal, we have in mind only names of living plants. Names of fungi have been dealing with massive epitypifications with DNA extractions. For the time being, this action is not needed in plants.)

The second reason we believe some researchers use the term "type-species" is misinformation, due either to a lack of reading the *Code*, or misled by the broad literature using the term. We have personally experienced debates with numerous taxonomists who think that "the type of a species is a specimen, and the type of a genus is a species". With this second reason in mind, we make this proposal: to include the term "type-species" somewhere in the *Code*. We are suggesting a few places, but at least the Glossary should contain it.

(004) Insert a Note after Art. 8.1:

"***Note 0.*** The term "type-species", often found in taxonomic, systematic, and phylogenetic works, is not used in this *Code*. A type is never a collective entity. The same applies to "type-genus", "type-subspecies", and "type-variety"."

(005) Include the following four terms and their respective meaning in the Glossary:

"*type-genus*. See *type-species*.

type-species. [Not defined] – the term *"type-species"* is not used in this *Code* (Art. 8.1 and Note 0). A type is never a collective entity. The same applies to *"type-genus"*, *"type-subspecies"*, and *"type-variety"*.

type-subspecies. See *type-species*.

type-variety. See *type-species*."

Acknowledgements

Pedro Schwartsburd thanks Nicholas Hind (K) for their first discussion regarding the existence or not of "type-species" in 2010 – at that time, Pedro himself believed there were "type-species". Andreza Oliveira thanks CAPES for her Mastership grant. Nelson Pena thanks FAPEMIG for his Doctoral grant. We also thank Nicholas Turland (B) for editing this proposal.

(006) Recommendation for preserving dissected parts of holotype specimens of names of bryophytes

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Article 8.2 of the *Code* (Turland & al. in Regnum Veg. 159. 2018) mentions that "For the purpose of typification a specimen is a gathering, or part of a gathering" and "A specimen is usually mounted on a single herbarium sheet or in an equivalent preparation, such as a box, packet, jar, or microscope slide." For bryophytes, the holotype (and any duplicate, i.e. an isotype) usually consists of many individual plants and is usually kept in a paper packet. Our proposed Recommendation is related to the preservation of bryophyte type specimens and problems faced by researchers while studying such specimens. The dissected parts are very important because authors describe bryophyte taxa based on observations of these parts, which are usually not preserved along with the type specimens. Our recommendation can be justified by the following points:

1. Due to their small size, bryophytes require microscopic examination to ascertain their identity. Hence, to study the type material, dissecting them becomes necessary, which means loss of type material. In many cases, type specimens usually remain scanty (e.g. for *Drepanolejeunea pulla* (Mitt.) Grolle only a single specimen placed between two mica sheets serves as the lectotype housed in BM, pers. obs.) and studying such a type specimen is nearly impossible for later researchers. Preserving the dissected parts of the type material on glass slides or any equivalent material used in mounting eliminates the need for further dissection and hence prevents loss of type material. Such a slide should be kept with and thus remain part of the type specimen.

2. The dissected bryophyte parts may belong to different plants from the holotype specimen, which covers the range of morphological variation observed by the author(s) while describing the taxon for the first time. Later study of such variation as observed by the author(s) becomes nearly impossible if they are not preserved on glass slides.

3. Dissected parts of bryophytes are often too small to be mounted on any herbarium sheet or placed in packets, and preserving them permanently on glass slides or an equivalent material used in mounting is convenient.

In addition to the points discussed above, the importance of parts originally used in establishing the diagnosis is already recommended by the *Code* for fossil-taxa (Rec. 8A.3): "If the type specimen of a name of a fossil-taxon is cut into pieces (sections of fossil wood, pieces of coalball plants, etc.), all parts originally used in establishing the diagnosis should be clearly marked." We therefore would like to propose a new Recommendation for preserving dissected parts of holotype specimens of names of bryophytes.

(006) Add a new paragraph to Rec. 8A:

"***8A.n.*** For bryophytes *(Marchantiophyta, Bryophyta*, and *Anthocerotophyta)*, dissected parts of the holotype specimen such as leaves, anatomical sections, and fertile parts including sex organs should be preserved permanently on labelled glass microscope slides and kept together with the holotype."

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(007–008) Proposals to make clearer the circumstances under which a holotype can exist

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When Art. 9.1 was amended at the Shenzhen Congress of 2017, the wording became clearer, but an unforeseen problem was introduced by replacing the word "designated" in the *Melbourne Code* (McNeill & al. in Regnum Veg. 154. 2012) with "indicated" in the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018). There is a difference between designating and indicating a type. Although Art. 7.11 does not concern holotypes, it tells us that designation of a type requires the type to be "definitely accepted as such by the typifying author" and the type element (specimen or illustration) to be "clearly indicated by direct citation including the term 'type' or an equivalent". In addition, the Glossary defines type designation as "an explicit statement that establishes the type of a name". On the other hand, indication of a type need not be explicit: "indication of the type […] can be achieved by reference to an entire gathering, or a part thereof" (Art. 40.2), and "mention of a single specimen or gathering […] or illustration, even if that element is not explicitly designated as type, is acceptable as indication of the type" (Art. 40.3 second sentence). Given how few details are needed to satisfy "mention of a single specimen or gathering" (Art. 40 Note 2), an indication may be indirect or even cryptic.

For the name of a new species or infraspecific taxon published on or after 1 January 1958, mention in the protologue of a single specimen or gathering or illustration can indicate "the type" for the purpose of valid publication of the name, even if that element is not explicitly designated as the type (Art. 40.3 second sentence). If that element is a single specimen or illustration (not a gathering consisting of more than one specimen), "the type" can really only mean the holotype. On or after 1 January 1990 it is necessary, again for the purpose of valid publication, to use one of the words "typus" or "holotypus" or its abbreviation or equivalent when indicating the type (Art. 40.6), i.e. not merely indicating it but explicitly designating it as the type.

These rules do not, however, apply to names published before 1958. This is explicit in the date limitations of Art. 40.1 and 40.6 and implicit in the reference "For the purpose of Art. 40.1" in the second sentence of Art. 40.3. It should therefore be clear that a single element cited in the protologue of a pre-1958 name is not the holotype merely because it was the single element cited. Nevertheless, the *Code* does not explicitly limit the application of Art. 40.3 by date, and Art. 9.1 allows a holotype to be indicated, which is much less stringent than requiring it to be designated. This could result, for example, in a single cited illustration being regarded as the holotype of a pre-1958 name and an uncited specimen among the original material being considered unavailable as the lectotype, regardless of which element would serve better as the type. Or an element considered to be the holotype on the basis of it being the only element cited in the protologue could conflict taxonomically with the current usage of the name, whereas other, uncited elements of original material could support current usage and provide the lectotype if there was no holotype. The amendments proposed below restore "indicated" to "designated" in Art. 9.1 and provide a new rule explicitly preventing the mere mention of a single element from constituting designation of the holotype, except for names published on or after 1 January 1958.

There is also the rather vague concept in Art. 9.1(b) of an author having "used" only one specimen or illustration, which is therefore the holotype. Such use by the author is specified by Art. 9 Note 1 as "when preparing the account of the new taxon" and is illustrated by Ex. 1. The Note cautions us to consider that uncited specimens or illustrations may also have been used by the author and that these may have been lost or destroyed (which is not uncommon with Linnaean names, for example). The intent of the proposed amendments is to tighten the application of this provision (Art. 9.1(b)) to situations where there is compelling evidence in the protologue or elsewhere to establish that only a single element (specimen or illustration) was used in preparing the protologue. Where subsequent publications have cited the existence of a "holotype" that cannot be defended under the newly proposed wording, Art. 9.10 allows correction of this term to "lectotype" (see Art. 9 Ex. 11), except in those publications appearing on or after 1 January 2001, which must have a more explicit lectotype designation satisfying Art. 7.11 (using the phrase "designated here" or an equivalent).

In order to make clearer the circumstances under which a holotype can exist, the following amendments to Art. 9.1 and Art. 9 Note 1 are proposed. Note 1 is converted to an Article because it contains provisions not covered by other Articles and, as explained in the Preface of the *Shenzhen Code* (p. xxiv), "Notes have binding effect but, unlike Articles, do not introduce any new provision or concept." The proposed new wording for Art. 9.1 brings it into closer agreement with that of the current Art. 9.2, which uses the phrase "designation of holotype", eliminating any possible confusion in applying Art. 9.2 when a type was merely indicated.

Other minor amendments include the following:

- Art. 9.1(a): "in the protologue" is added to make it clear that a holotype designation by the author(s) subsequent to the protologue, or even in a medium not effectively published, e.g. on a herbarium sheet, is not permitted. This is generally understood to be the case, but the current wording allows misinterpretation.
- Art. 9.1(b): "by the author(s)" has been deleted because this could mean either the author(s) of the name or those of the validating description or diagnosis (cf. Art. 9.4); in practice it probably means

only the former and is of minor importance, but an impersonal wording avoids the question being an issue (this wording is also used in Art. 9.1*bis*).

- Art. 9.1(b): "in preparing the protologue" makes it clear what "used" means.
- Art. 9.1*bis*: "at the time of the original publication of the name of the taxon" is simplified to "in the protologue".

(007) Amend Art. 9.1 as follows (new text in bold, deleted text in strikethrough):

"***9.1.*** A holotype of a name of a species or infraspecific taxon is the one specimen or illustration (but see Art. 40.4) either *(a)* ~~indicated~~ **designated** by the author(s) **in the protologue** as the nomenclatural type or *(b)* used ~~by the author(s)~~ **in preparing the protologue** when no type was ~~indicated~~ **designated**. As long as the holotype is extant, it fixes the application of the name concerned (but see Art. 9.15)."

(008) Convert Art. 9 Note 1 to an Article and amend it as follows (new text in bold, deleted text in strikethrough):

"***9.1bis.*** Any designation of the type made by the original author**(s)**, if definitely expressed ~~at the time of the original publication of the name of the taxon~~ **in the protologue**, is final (but see Art. 9.11, 9.15, and 9.16). **Mention of a single specimen or gathering or illustration does not by itself constitute designation of the holotype (but see Art. 40.3 for names published on or after 1 January 1958). However, if there is evidence in the protologue or elsewhere to establish that only one (either cited or uncited) specimen or illustration was used (Art. 9.1(b)) and no additional, uncited specimens or illustrations (which may have been lost or destroyed) could have been used, that specimen or illustration must be accepted as the holotype.** ~~If the author used only one specimen or illustration, either cited or uncited, when preparing the account of the new taxon, it must be accepted as the holotype, but the possibility that the author used additional, uncited specimens or illustrations (which may have been lost or destroyed) must always be considered.~~ If a name of a new taxon is validly published solely by reference to a previously published description or diagnosis, the same considerations apply to specimens or illustrations used by the author**(s)** of that description or diagnosis (see Art. 7.8; but see Art. 7.9)."

Editorially amend Art. 9 Ex. 1 and 2 as follows (changes not shown) and add a new Example:

"***Ex. 1.*** When Tuckerman published *Opegrapha oulocheila* Tuck. (Lich. Calif.: 32. 1866) he referred to "the single specimen, from Schweinitz's herbarium (Herb. Acad. Sci. Philad.) before me". Even though the term "type" or its equivalent was not used in the protologue, Tuckerman's statement is evidence to establish that he used only that specimen (in PH barcode 00007529), which is therefore the holotype."

"***Ex. 2.*** In the protologue of *Coronilla argentea* L. (Sp. Pl.: 743. 1753), Linnaeus cited an illustration by Alpini (Pl. Exot.: 16. 1627) and did not designate a type. Although no uncited specimens or illustrations are known to exist, making Alpini's illustration the only extant element of original material, it is not the holotype because it cannot be established that Linnaeus used only this one element when preparing the protologue; he rarely cited specimens and could have used a specimen that was subsequently lost or destroyed (he is known to have discarded specimens). Moreover, the mention of the illustration does not by itself constitute designation of the holotype. Alpini's illustration was designated as the lectotype of *C. argentea* by Greuter (in Ann. Mus. Goulandris 1: 44. 1973)."

"***Ex. 2bis.*** In the protologue of *Stellaria radians* L. (Sp. Pl.: 422. 1753), Linnaeus cited no specimens, but he did cite a single illustration ("*Amm. ruth*. 83. *t*. 10.") referring to species number 83 on page 64 and "Tab. X" in Amman (Stirp. Rar. Ruth. 1739). The Amman illustration is not the holotype because, as was commonly the case, Linnaeus also used at least one uncited specimen in preparing the protologue: *Gmelin s.n*., Herb. Linn. No. 584.3 (LINN), which was designated by Lazkov (in Taxon 53: 1053. 2004) as the lectotype."

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(009) A proposal to solve a paradox when neotypifying names of fossil-taxa

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History has given us too many examples where types of the names of taxa have been lost. For example, the destruction of the Berlin Herbarium (B) after a bombing raid in 1943 was a severe blow for the botanical world. A major part of one of the world's largest collections and most extensive neotropical type collection was damaged or destroyed, together with many type specimens from all over the world that were on loan in Berlin at the time. Even today, unfortunate events can cause the loss of scientifically valuable type specimens.

If a holotype is lost or destroyed, the *Code* (Turland & al. in Regnum Veg. 159. 2018) has provisions that govern its replacement. Typically, a lectotype must be selected from the surviving original material, but in the absence of the latter a neotype can be designated "to serve as nomenclatural type **if no original material exists**" (Art. 9.8, emphasis added). However, there is a problem for fossil-taxa because Art. 9.4 clauses (a) and (b) specify that original material includes illustrations, but Art. 8.5 requires that the type (epitypes excepted) "of the name of a fossil-taxon at the rank of species or below is always a specimen". It is therefore impossible under these rules to designate a neotype for the name of any fossil-species or infraspecific fossil-taxon when the protologue includes an illustration. Furthermore, this paradox also makes any such previously designated neotypes for fossil taxa ineffective.

This problem is substantial because new names of all fossil-taxa at the rank of species or below published on or after 1 January 1912 must be accompanied by an illustration or figure, or by a reference to one previously and effectively published, in order to be validly published (Art. 43.2). The problem also applies to any names published prior to this date that included an illustration in the protologue, which was common practice well before becoming a requirement in the rules of nomenclature. Numerous examples could be cited to illustrate the scope of this problem, but undoubtedly no field can surpass palaeopalynology for missing or destroyed holotypes. Traverse (in Taxon 59: 666. 2010) estimated that the types of about 25,000 palaeopalynological names are mostly not available, either through loss or degradation of specimens on microscope slides, or are impossible to relocate in a mixed sample with hundreds or thousands of other grains, even if the original slides, from which they were described, are still available. In palaeopalynology, it is also very common for new fossil-species (or infraspecific fossil-taxa) to be described based on just a single specimen of a fossil spore or pollen grain, plus an accompanying illustration.

For many palaeopalynological names described in the 1930s and 1940s in Germany, type specimens are missing. Our attempt to resolve the taxonomy of a disputed Rhaetian palynomorph illustrates the problems perfectly. We enquired for several type specimens for names of fossil-taxa designated by the proliferous group of R. Potonié and coworkers, who described more than 300 new species and later authored the *Synopsis der Gattungen der Sporae dispersae* I–V (in Beih. Geol. Jahrb. 23–87. 1956–1970). Except for a few samples from the Upper Carboniferous, Tertiary of the Geiseltal and A. Ibrahim's doctorate material from the Ruhr Basin, neither the institutes in Berlin and Krefeld, where Potonié worked, nor the Federal Institute for Geosciences and Natural Resources could account for the whereabouts of the requested types or any other of Potonié's material. As Traverse predicted, the majority of Potonié's types are most likely lost.

In the absence of the type and other specimens, the palaeobotanist or palynologist is left with only the illustration depicting the original type, but this does not solve the problem because the illustration cannot serve as the lectotype, although some authors may treat it as such even though it is not permitted. The illustration could be used to guide selection of an appropriate neotype, ideally from the same fossil locality or geological strata that was the source for the original specimens, either from existing museum collections or newly collected material. However, the inclusion of the illustration in original material as currently defined in the *Code* prevents the designation of a neotype. As a result, these names are left unresolved, and increasingly contribute to taxonomic and nomenclatural instability.

This absurd dilemma binds the hands of palaeobotanists and palynologists attempting neotypifications when no original material other than the illustrations are still available. We conclude that the current definition of "original material" has to be considered defective, at least with respect to its application to names of fossil-taxa. We therefore propose the following amendments to Art. 9.4. to clarify the definition of "original material" for names of fossil-taxa at specific or lower rank.

(009) Amend Art. 9.4(a) and (b) (new text in bold):

"***9.4.*** For the purposes of this *Code*, original material comprises the following elements: *(a)* those specimens and illustrations (both unpublished and published prior to publication of the protologue**; illustrations of fossils excepted: see Art. 8.5**) that the author associated with the taxon, and that were available to the author prior to, or at the time of, preparation of the description, diagnosis, or illustration with analysis (Art. 38.7 and 38.8) validating the name; *(b)* any illustrations published as part of the protologue **(fossils excepted: see Art. 8.5)**; …"

(010) Proposal to add a new Note and a new Example after Article 9.6

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According to Art. 9.6 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), the definition of syntype is as follows (words in bold below are our emphasis):

"*9.6*. A syntype is **any specimen cited in the protologue** when there is no holotype, or any one of two or more specimens simultaneously **designated in the protologue** as types (see also Art. 40 Note 1). Reference to an entire gathering, or a part thereof, is considered citation of the included specimens."

This definition says that a syntype must be a specimen either cited or designated in the protologue. Some authors, however, use the term syntype for specimens not cited in the protologue that are original material as defined in Art. 9.4(a):

"*(a)* those specimens … that the author associated with the taxon, and that were available to the author prior to, or at the time of, preparation of the description, diagnosis, or illustration with analysis (Art. 38.7 and 38.8) validating the name".

To avoid misuse of the term syntype for specimens not cited in the protologue, we propose to add the following new Note and Example to the *Code*.

(010) Add a new Note and a new Example after Art. 9.6:

"***Note 4bis*.** Specimens not cited in the protologue that are original material according to Art. 9.4(a) are not syntypes."

"***Ex. n*.** Lavalle (in Darwiniana 41: 68. 2003) cited "SINTIPOS" (syntypes) of the name *Marattia cicutifolia* Kaulf. (Enum. Filic.: 32. 1824). However, they cannot be syntypes because they were not cited in the protologue of that name, where Kaulfuss cited only the locality "Habitat in Brasilia". Instead, they are original material because they satisfy the definition of that term as given in Art. 9.4(a)."

(011) Proposal to amend the *Code* regarding the selection of illustrations as neotypes

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It is widely held that specimens (sensu the *Shenzhen Code* [Turland & al. in Regnum Veg. 159. 2018], Art. 8) are much more informative and useful than illustrations for the application of names, because they offer microscopic and three-dimensional morphological information, and also allow for a number of other types of investigations (e.g. morphological and molecular studies), what is especially relevant as new technologies continue to be developed. This topic has recently been cause of much debate in zoology, and very solid justification has been raised supporting the use of specimens as nomenclatural types (e.g. Krell in Nature 539: 168. 2016; Löbl & al. in Bull. Zool. Nomencl. 73: 83–86. 2016; Santos & al. in Syst. Entomol. 41: 511–515. 2016; see also Cianferoni & Bartolozzi in Zootaxa 4139: 128–130. 2016). It is our opinion that most of these arguments also apply for botany. It is acknowledged that for microorganisms (i.e. microscopic algae and fungi), illustrations can sometimes be more useful for the interpretation and application of names than specimens (see, e.g., Art. 40.5). For these organisms excepted, since 1 January 2007 names of new species and

infraspecific taxa cannot be validly published with illustrations as types (see Art. 40.4), which we believe was a beneficial change to the *Code*. It should be noted that, according to Art. 6.1 footnote of the *Code*, an illustration "designates work of art or a photograph depicting a feature or features of an organism, e.g. a drawing, a picture of a herbarium specimen, or a scanning electron micrograph".

A neotype is a "new type", i.e. an element designated to serve as the type that does not belong to the original material of a name (Art. 9.8). In this sense, neotypifications stand in an analogous situation to that of the indication of types of names of new species and infraspecific taxa (Art. 40.4), in that a completely new element is being selected as a nomenclatural type. Despite this similarity, the current version of the *Code* still allows the selection of a drawing or a photograph as neotype (Art. 9.8). We argue that the *Code* should be amended to allow only specimens to be designated as neotypes, microscopic algae and microfungi excepted (see Art. 40.5). A starting date will permit illustrations previously designated as neotypes to retain their type status. Also, it is important to highlight that illustrations would still be eligible to be designated as epitypes (see Art. 9.9), supporting the application of the type when needed.

Also relevant is the matter of inadvertent neotypifications (see Prado & al. in Taxon 64: 651. 2015) based on illustrations caused by misunderstandings regarding the nomenclatural status of photographs of specimens (see Staples & Prado in Taxon 67: 833–835. 2018). According to Art. 9.10 of the *Code*, those incorrect typifications (e.g. Austin in Ann. Missouri Bot. Gard. 60: 403. 1973; Ronchi & al. in Syst. Bot. 41: 166. 2016) are to be automatically corrected to neotypifications. The approval of the present proposal would preclude future instances of this type of error from being effective typifications.

Based on the above comments we are proposing the following change to the *Code*.

(011) Add the following text to Art. 9.8 (new text in bold):

"***9.8.*** A neotype is a specimen or illustration selected to serve as nomenclatural type if no original material exists, or as long as it is missing (see also Art. 9.16 and 9.19(c)). **A neotype designated on or after 1 January 2025 must be a specimen, except for names of non-fossil microscopic algae and non-fossil microfungi, for which the type may be an effectively published illustration if there are technical difficulties of specimen preservation or if it is impossible to preserve a specimen that would show the features attributed to the taxon by the author of the name.**"

Acknowledgements

We are grateful to Mats Thulin (Uppsala Universitet) for contributing to the conceptualisation of the present proposal, and to Nicholas Turland (BGBM, Freie Universität Berlin) for improving this proposal.

(012) Proposal to modify Article 9.12

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Art. 9.4 has been amended in the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) to make it clear that original material includes illustrations published as part of the protologue irrespective of whether or not they may have been used in the preparation of the validating description or diagnosis. In designating a lectotype, Art. 9.12 mentions as original material the illustration(s) cited in the protologue, but does not refer to the illustration(s) published as a part of the protologue. We are therefore proposing the following changes in Art. 9.12.

(012) Modify Art. 9.12 as follows (new text in bold, deleted text in strikethrough):

"***9.12.*** In lectotype designation, an isotype must be chosen if such exists, or otherwise a syntype or isosyntype if such exists. If no isotype, syntype or isosyntype is extant, the lectotype must be chosen from among the paratypes if such exist. If none of the above specimens exists, the lectotype must be chosen from among the **illustrations and** uncited specimens ~~and cited and uncited illustrations~~ that comprise the remaining original material, if such exist."

Acknowledgements

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(013) Proposal to amend Article 9.20

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According to Mazumdar & al. (in Taxon 66: 1470. 2017), the epitypification of *Isoëtes sahyadrii* Mahab. ex L. N. Rao by Fraser-Jenkins & al. (Annot. Checkl. Ind. Pterid.: 57. 2016) is erroneous because of the difference in the spore character, i.e. in having reticulate megaspores in the epitype instead of unevenly tuberculate megaspores as found in *I. sahyadrii* and clearly described as such in the original description of the species (Mahabale in Curr. Sci. 7: 62. 1938) and, by extension, in the protologue (Rao in Curr. Sci. 11: 286. 1944), where the name was validated solely by reference to the description (Art. 38.1(a)) accompanying Mahabale's earlier provisional name (Art. 36.1(a)). The *Code* (Turland & al. in Regnum Veg. 159. 2018), however, does not have a provision for superseding an epitype that is in serious conflict with the protologue. We therefore propose to amend the Art. 9.20 as follows.

(013) Amend Art. 9.20 as follows (new text in bold, deleted text in strikethrough):

"***9.20.*** The author who first designates (Art. 7.10, 7.11, and F.5.4) an epitype must be followed~~.~~**, but that choice is superseded if it is in serious conflict with the protologue, in which case an element that is not in conflict with the protologue is to be chosen. A** ~~a~~ different epitype may **also** be designated ~~only~~ if the original epitype is lost or destroyed (see also Art. 9.17). A lectotype or neotype supported by an epitype may be superseded in accordance with Art. 9.19 or, in the case of a neotype, in accordance with Art. 9.18. If it can be shown that an epitype and the type it supports differ taxonomically and that neither Art. 9.18 nor 9.19 applies, the name may be proposed for conservation with a conserved type (Art. 14.9; see also Art. 57)."

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(014) Proposal to require a statement of "demonstrable ambiguity" for epitype designation

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Article 9.9 of the *Code* (Turland & al. in Regnum Veg. 159. 2018) currently states that an epitype is selected "to serve as an interpretative type when the holotype, lectotype, or previously designated neotype, or all original material associated with a validly published name, is demonstrably ambiguous and cannot be critically identified for purposes of the precise application of the name to a taxon". The purpose of an epitype, as supporting a nomenclatural type that cannot be identified precisely, is widely understood. Nonetheless, while the *Code* explains what an epitype is, it does not require that authors explicitly state that the type it supports is "demonstrably ambiguous".

Thus, there is the counterintuitive situation that an epitype can be designated without actually stating that the type it supports cannot be identified and is demonstrably ambiguous. At present the *Code* only recommends that authors explain why the current type is ambiguous and the name cannot be applied with certainty. Once designated, an epitype can be overturned only through conservation unless it can be shown that the type it is stated to support is not the actual type of the name involved (Art. 9.20 and Note 8). Given this, I propose to add a new rule to Art. 9, so that when designating an epitype, authors must at minimum state that they consider the type to be demonstrably ambiguous. Even with the addition of this rule, I suggest Rec. 9B.2 should be retained to further encourage authors to explicitly explain the reasons why epitypification is required.

(014) Add a new paragraph to Article 9 as follows:

"***9.24.*** On or after 1 January 2025, epitypification of a name of a species or infraspecific taxon is not effected unless the author designating the epitype states that the type being supported is "demonstrably ambiguous" (or an equivalent)."

(015) Proposal to add a new paragraph to Recommendation 9B concerning lecto-, neo-, and epitypification

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There is no requirement in the *Code* (Turland & al. in Regnum Veg. 159. 2018) for a specimen or illustration being designated as a lecto-, neo-, or epitype to have been seen by the author designating the type. This is, however, a dangerous practice, because the specimen or illustration may prove not to represent the taxon that the typifying author assumed it to represent, likely resulting in serious nomenclatural disruption.

Sealy (in Kew Bull. 1956: 299. 1956) stated of the William Roxburgh *Flora indica* drawings that "It was Roxburgh's practice to number each description as it was written, and to give the same number to the drawing he had made of the plant described. The drawings at Kew all have Roxburgh's number, and thus can be readily associated with the description in a Roxburgh MS. at Kew where the descriptions are in the original numerical sequence." According to Sealy (l.c.: 313), the drawing number 1137 in K is of *Bauhinia ferruginea* Roxb. However, this seems to be based on the number given in Roxburgh's manuscript, because in this particular case drawing number 1137 in K is of *B. integrifolia* Roxb., whereas drawing number 1138 is of *B. ferruginea* (see Bandyopadhyay in Phytotaxa 297: 86–88. 2017). Noting this discrepancy in the numbering, Bandyopadhyay (l.c.: 86) designated as the lectotype of *B. ferruginea* Roxburgh's drawing number 1137 in CAL, which correctly corresponds to *B. ferruginea*. If the drawing in K bearing number 1137 had been designated as the lectotype based on the information given in Sealy (l.c.), without examining it, that lectotypification would have been strictly contrary to the protologue.

The above case clearly points out the need of a new Recommendation in the *Code* so that the authors should examine the specimen or illustration or at least its digital image before designating a lecto-, neo-, or epitype. We are therefore proposing a new Recommendation as follows.

(015) Add a new paragraph to Rec. 9B:

"***9B.3.*** Authors should examine the specimen or illustration or at least its digital image before designating it as a lectotype, neotype, or epitype."

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(016) Proposal to add a new paragraph to Recommendation 9B

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Under circumstances where no original material is extant, Art. 9.13 of the *Code* (Turland & al. in Regnum Veg. 159. 2018) permits the designation of a neotype. The current proposal refers to the selection of a neotype. Some guidance in this regard is provided under Rec. 9B.1 of the *Code*, which states that "particular care and critical knowledge should be exercised" to ensure that the specimen selected as neotype "best fits the protologue". However, no mention is made of the geographic area from where this specimen should be selected, but it is common practice to select a neotype from as close to the cited type locality (if one is cited) as possible. The new Recommendation proposed below aims to provide guidance as to the geographic area from where the neotype can be selected.

(016) Add a new paragraph to Rec. 9B:

"***9B.3.*** In selecting a neotype it is recommended that the specimen be chosen from as close as possible to the type locality that is cited in the protologue, or which can be inferred from the protologue. If no type locality is cited in the protologue, the neotype should be a specimen that best matches the protologue."

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(017) Proposal to add a new Example after Article 11.4

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Article 11.4 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) says "For any taxon below the rank of genus, the correct name is the combination of the final epithet of the earliest legitimate name of the taxon at the same rank, with the correct name of the genus or species to which it is assigned, except …" There are many Examples in the *Code* under Art. 11.4, but none of them makes it clear that, for the purpose of determining the correct name of a taxon, a new combination takes priority from the date of valid publication of its basionym, provided that the new combination and its basionym have the same rank. Hence we feel that the following new Example should be included in the *Code*.

(017) Add a new Example after Art. 11.4:

"***Ex. n.*** When *Aeginetia acaulis* (Roxb.) Walp. (in Repert. Bot. Syst. 3: 481. 1844) and *A. pedunculata* Wall. (in Pl. Asiat. Rar. 3: 13. 1831) are considered to apply to the same species, *A. acaulis* is the correct name because it is the combination of the final epithet of *Orobanche acaulis* Roxb. (Pl. Coromandel 3: 89. 1820), the earliest legitimate name of the taxon at specific rank, with *Aeginetia* L., the correct name of the genus to which the species is assigned."

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(018–020) Proposals for a clearer and more concise Article 40 and to resolve conflict between Art. 40.6 and Art. 9.10

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The purpose of this set of proposals is to achieve a clearer and more concise Art. 40, which deals with the requirement to indicate a type. Over several editions of the *Code*, this Article has become in places repetitive (Art. 40.2 and the second sentence of 40.3), tortuously worded (Art. 40.4 and 40.5), too implicit (e.g. "For the purpose of Art. 40.1"), and with important rules lacking prominence (the second sentence of 40.3).

There is also a serious conflict between Art. 40.6 and Art. 9.10. Article 40.6 requires indication of the type of a name of a new taxon at the rank of genus or below published on or after 1 January 1990 to include one of the words "typus", "holotypus", or its abbreviation or equivalent. Without use of these terms, such a name cannot be validly published. However, Art. 9.10 rules that an incorrectly used term denoting a type is treated as an error to be corrected, hence the misuse of "lectotype" or "neotype" can be corrected to "holotype", thereby satisfying Art. 40.6. But Art. 9 Note 6 claims that a misused term may be corrected to holotype only if Art. 40.6 does not apply. Perhaps the reasoning is that failure to satisfy Art. 40.6 results in a "name" that is not validly published (a designation), with no status under the *Code* and therefore no type to correct under Art. 9.10. On the other hand, if Art. 9.10 is invoked to correct "lectotype" to "holotype", Art. 40.6 is satisfied and the name is validly published. This is the conflict, and Art. 9 Note 6 is introducing a new provision—as would constitute an Article—in order to allow Art. 40.6 to prevail. ("Notes have binding effect but, unlike Articles, do not introduce any new provision or concept", Preface of the *Shenzhen Code*, Turland & al. in Regnum Veg. 159: xxiv. 2018.) The phrase referring to Art. 40.6 was added to Art. 9 Note 6 by a

proposal referred to the Editorial Committee at the Melbourne Congress of 2011 (Art. 9 Prop. X; see McNeill & Turland in Taxon 60: 251. 2011; Flann & al. in PhytoKeys 41: 52. 2014), but the Rapporteurs, Nomenclature Section, and Editorial Committee did not foresee the problem described here. There are names that are currently in "limbo" under the current *Shenzhen Code*, i.e. it is uncertain whether or not they are validly published. It would not serve nomenclatural stability to penalize authors and disallow valid publication of such names merely because an incorrect term was used to denote the type. This would be bureaucracy for its own sake, particularly because in many cases the authors understandably believed that they were typifying already validly published names. Instead, the conflict in the *Code* should be removed so that such names can be validly published without any doubt. Accordingly, in the present set of proposals, Art. 40.6 is amended with consequential adjustment to Art. 9 Note 6.

Firstly, we present a clean version of what the amended Article 40 would look like if all of the following proposals were accepted. The order of the Articles is based on the dates on which they take effect.

Article 40.1 is unchanged:

40.1. Publication on or after 1 January 1958 of the name of a new taxon at the rank of genus or below is valid only when the type of the name is indicated (see Art. 7–10; but see Art. H.9 Note 1 for the names of certain hybrids).

The first sentence of Art. 40.3 is unchanged and becomes Art. 40.2:

40.2. For the name of a new genus or subdivision of a genus, reference (direct or indirect) to a single species name, or citation of the holotype or lectotype of a single previously or simultaneously published species name, even if that element is not explicitly designated as type, is acceptable as indication of the type (see also Art. 10.8; but see Art. 40.4).

Article 40.2 and the second sentence of 40.3 are combined, becoming Art. 40.3, and the date is added to make it explicit that the rule does not apply to names published before 1958 (cf. Art. 9.1*bis* in Prop. 008 by Turland & al. in Taxon 69: 626–627. 2020); minor adjustments are made to Note 1, Notes 2 and 3 remain unchanged, and Notes 1 and 2 are transposed:

40.3. For the name of a new species or infraspecific taxon published on or after 1 January 1958, mention of a single specimen, a single gathering or a part thereof, or an illustration is acceptable as indication of the type, even if that element is not explicitly designated as type (but see Art. 40.4) or if it consists of two or more specimens as defined in Art. 8 (see also Art. 40.5).

Note 1. Mere citation of a locality does not constitute mention of a single specimen or gathering. Concrete reference to some detail relating to the actual type is required, such as the collector's name, collecting number or date, or unique specimen identifier.

Note 2. When the type is indicated by mention of an entire gathering, or a part thereof, consisting of more than one specimen, those specimens are syntypes (see Art. 9.6).

Note 3. Cultures of algae and fungi preserved in a metabolically inactive state are acceptable as types (Art. 8.4; see also Rec. 8B and Art. 40.7).

Article. 40.6 becomes Art. 40.4; a new second sentence is added to resolve conflict with Art. 9.10; as editorial consequences Art. 9 Note 6 is amended and Art. 40 Ex. 5 is amended or deleted:

40.4. For the name of a new taxon at the rank of genus or below published on or after 1 January 1990, indication of the type must include one of the words "typus" or "holotypus", or its abbreviation, or its equivalent in a modern language (see also Rec. 40A.1 and 40A.4). This requirement is also satisfied by use of one of the words "lectotypus" or "neotypus" (or its abbreviation, or its equivalent in a modern language), which are to be treated as errors to be corrected under Art. 9.10. In the case of the name of a monotypic (as defined in Art. 38.6) new genus or subdivision of a genus with the simultaneously published name of a new species, indication of the type of the species name is sufficient.

Article 40.7 is unchanged and becomes Art. 40.5; Note 4 is unchanged:

40.5. For the name of a new species or infraspecific taxon published on or after 1 January 1990 of which the type is a specimen or unpublished illustration, the single herbarium, collection, or institution in which the type is conserved must be specified (see also Rec. 40A.5 and 40A.6).

Note 4. Specification of the herbarium, collection, or institution may be made in an abbreviated form, e.g. as given in Index Herbariorum (http://sweetgum.nybg.org/science/ih/) or in the *World directory of collections of cultures of microorganisms*.

Articles 40.4 and 40.5 are combined and rewritten, becoming Art. 40.6:

40.6. For the name of a new species or infraspecific taxon published on or after 1 January 2007, the type indicated in accordance with Art. 40 must always be a specimen (for fossils see also Art. 8.5); an exception is permitted for names of non-fossil microscopic algae and non-fossil microfungi, for which the type may be an effectively published illustration if there are technical difficulties of specimen preservation or if it is impossible to preserve a specimen that would show the features attributed to the taxon by the author of the name.

Article 40.8 is unchanged and becomes Art. 40.7:

40.7. For the name of a new species or infraspecific taxon published on or after 1 January 2019 of which the type is a culture, the protologue must include a statement that the culture is preserved in a metabolically inactive state.

To achieve the revised Art. 40, as given above, the following three proposals are needed. The proposals all stand independently; none is contingent upon another being accepted or rejected.

(018) Split Art. 40.3 into two Articles and incorporate Art. 40.2 into the second Article, amended as follows:

Editorially renumber the first Article as Art. 40.2, the second one as Art. 40.3; no changes are proposed in the new Art. 40.2 except editorially replace Art. "40.6" with "40.4" in the final cross-reference.

"***40.2.*** For the name of a new genus or subdivision of a genus, reference (direct or indirect) to a single species name, or citation of the holotype or lectotype of a single previously or simultaneously published species name, even if that element is not explicitly designated as type, is acceptable as indication of the type (see also Art. 10.8; but see Art. 40.4)."

"***40.3.*** For the name of a new species or infraspecific taxon published on or after 1 January 1958, mention of a single specimen, a single gathering or a part thereof, or an illustration is acceptable as indication of the type, even if that element is not explicitly designated

as type (but see Art. 40.4) or if it consists of two or more specimens as defined in Art. 8 (see also Art. 40.5)."

Editorially replace "reference to" with "mention of" in Note 1, to accord with the new Art. 40.3, and replace "that consists" with "consisting"; editorially transpose Notes 1 and 2; editorially replace Art. "40.8" with "40.7" in the final cross-reference of Note 3.

(019) Add a new second sentence to Art. 40.6 and amend Art. 9 Note 6 as follows (new text in bold, deleted text in strikethrough):

Editorially renumber Art. 40.6 as Art. 40.4 (and Art. 40.7 as Art. 40.5); editorially add "see also Art. 40.4" to the end of Art. 9.10; editorially amend or delete Art. 40 Ex. 5.

"***40.4.*** For the name of a new taxon at the rank of genus or below published on or after 1 January 1990, indication of the type must include one of the words "typus" or "holotypus", or its abbreviation, or its equivalent in a modern language (see also Rec. 40A.1 and 40A.4). **This requirement is also satisfied by use of one of the words "lectotypus" or "neotypus" (or its abbreviation, or its equivalent in a modern language), which are to be treated as errors to be corrected under Art. 9.10.** ~~But in~~ **In** the case of the name of a monotypic (as defined in Art. 38.6) new genus or subdivision of a genus with the simultaneously published name of a new species, indication of the type of the species name is sufficient."

[Art. 9] "***Note 6.*** A misused term may be corrected **to lectotype, neotype, or epitype** only if the requirements of Art. 7.11 ~~(for correction to lectotype, neotype, and epitype)~~ are met ~~and Art. 40.6 (for correction to holotype) does not apply~~**, in particular inclusion of the phrase "designated here" for typifications on or after 1 January 2001**."

(020) Combine and reword Art. 40.4 and 40.5 as follows:

Editorially renumber the combined Article as Art. 40.6.

"***40.6.*** For the name of a new species or infraspecific taxon published on or after 1 January 2007, the type indicated in accordance with Art. 40 must always be a specimen (for fossils see also Art. 8.5); an exception is permitted for names of non-fossil microscopic algae and non-fossil microfungi, for which the type may be an effectively published illustration if there are technical difficulties of specimen preservation or if it is impossible to preserve a specimen that would show the features attributed to the taxon by the author of the name."

Editorially renumber Art. 40.8 as Art. 40.7.

Acknowledgements

We thank William Woelkerling (La Trobe University) for drawing attention to the contradiction between Art. 33 Ex. 3 and Art. 40 Ex. 5 and thereby the conflict between Art. 40.6 and Art. 9.10. We also thank Heather Lindon (Royal Botanic Gardens, Kew) for querying the IPNI database and providing the names listed in the Appendix.

Appendix

The following names of new taxa are currently (9 May 2020) listed in the International Plant Names Index (IPNI; https://www.ipni.org/) as not validly published, citing failure to satisfy the requirements of Art. 40.6 because terms such as "lectotype" or "neotype" were used to indicate the type instead of "type" or "holotype". The list is certainly not comprehensive and is included here only to provide some concrete examples of names that have an uncertain status—validly published or not—under the current *Shenzhen Code*.

Aeonium* ×*bravoanum Bramwell & G. D. Rowley ex Bañares in Vieraea 43: 190. 2015.
Cistanthe subsect. ***Thyrsoideae*** Hershk. in Phytoneuron 2019-27: 58. 2019.
Cistanthe subspeciosa Hershk. in Phytoneuron 2019-27: 56. 2019.
Corunastylis sect. ***Extensae*** D. L. Jones & M. A. Clem. in Austral. Orchid Rev. 83: 57. 2018, '*Extensa*'.
Corunastylis sect. ***Glanduliferae*** D. L. Jones & M. A. Clem. in Austral. Orchid Rev. 83: 57. 2018, '*Glandulifera*'.
Corunastylis sect. ***Pachychilae*** D. L. Jones & M. A. Clem. in Austral. Orchid Rev. 83: 56. 2018, '*Pachychila*'.
Cotoneaster uzbezicus Grevtsova ex J. Fryer & B. Hylmö, Cotoneasters Compreh. Guide: 78. 2009.
Dendrobium sibuyanense Lubag-Arquiza & al. in Orchid Digest 70: 174. 2006 [see Art. 40 Ex. 5].
Gymnocalycium friedrichii var. ***angustostriatum*** Pazout ex Milt in Cactaceae etc. 26(2): 61. 2016.
Gymnocalycium valnicekianum var. ***bicolor*** H. Till & Amerh. in Gymnocalycium 15: 452. 2002.
Magnolia champacifolia Dandy ex Gagnep. in Adansonia 37: 14. 2015.
Persea himalayaensis M. Gangop. & V. S. Kumar in Nelumbo 51: 254. 2009.
Thingia Hershk. in Phytoneuron 2019-27: 61. 2019.
Typha sect. ***Domingenses*** Krasnova in Biol. Vnutrenn. Vod 3: 26. 2004 [validation or later isonym: *Typha* sect. *Domingenses* Krasnova in Skvortsovia 4: 40. 2018].

(021) Proposal to amend Recommendation 46C.2

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The 97 authors of the "Legume Phylogeny Working Group" (see Taxon 66: 44–77. 2017) ascribed three new subfamily names to "Legume Phylogeny Working Group". This uncommon practice in botanical nomenclature does not prevent valid publication of the names under the *Code* (Turland & al. in Regnum Veg. 159. 2018), but we feel modification is necessary in Rec. 46C.2, which recommends citing only the first of more than two authors followed by "& al." or "et al."

(021) Amend Rec. 46C.2 as follows (new text in bold):

"***46C.2.*** After a name published jointly by more than two authors, the citation should be restricted to the first author followed by "& al." or "et al.", except in the original publication**, or the full title or abbreviation of a working group may be cited, provided that the names of the members of that group are given in the original publication**."

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(022) Proposal to modify Article 60.8(a)

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In Latin, nouns ending in *-er* belong to the second declension. For these nouns, *i* is added after the *-er* to form the genitive singular. Some examples are *bakeri*, *engleri*, *hookeri*, *palmeri*, *wagneri*, and *weberi*. In classical Latin, with few exceptions, nouns of the second declension are either masculine or neuter (Stearn, Bot. Latin. 1973). Botany, however, has feminine nouns ending in *-er* for epithets honouring women. For instance, one may find in the International Plant Names Index (IPNI; https://www.ipni.org/; accessed 31 Mar 2020) 41 records for *walkerae*, 18 for *carterae*, 18 for *barkerae*, 14 for *barberae*, 6 for *alexanderae*, 5 for *bucherae*, 6 for *canterae*, 3 for *rennerae*, and 2 for *weberae*. Other examples exist, as a search of IPNI will reveal. Thus, the practice in botanical Latin has been to add *-ae* to the *-er* termination for women's names. This was not done in classical Latin. It is one way that botanical Latin differs from the classical. Currently, the *Code* (Turland & al. in Regnum Veg. 159. 2018) does not provide an example of this different usage. It should. The *Code* should also provide an example of the plural when a name ends with *-a*. To address these matters, we propose the following two additions to Art. 60.8(a).

(022) Amend Art. 60.8(a) as follows (new text in bold):

"*(a)* If the personal name ends with a vowel or *-er*, substantival epithets are formed by adding the genitive inflection appropriate to the sex and number of the person(s) honoured (e.g. *scopoli-i* for Scopoli (m), *fedtschenko-i* for Fedtschenko (m), *fedtschenko-ae* for Fedtschenko (f), *glaziou-i* for Glaziou (m), *lace-ae* for Lace (f), *gray-i* for Gray (m), ***hooker-i* for Hooker (m), *hooker-ae* for Hooker (f),** *hooker-orum* for the Hookers (m)), except when the name ends with *-a*, in which case adding *-e* (singular) or *-rum* (plural) is appropriate (e.g. *triana-e* for Triana (m), *pojarkova-e* for Pojarkova (f), *orlovskaja-e* for Orlovskaja (f), ***espinosa-rum* for the Espinosas (m)**)."

(023) Proposal to amend Article 60.8: classical Latin adjectival specific epithets commemorating persons

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It has been demonstrated (Mabberley in Taxon 67: 792–793. 2018) that a number of seemingly unconventional adjectival epithets based on personal names, besides many geographical names such as "*aegyptia*", but, like those, formed correctly according to classical Latin usage (as in Julius, used in Forum Julium, the Roman name for Fréjus, France, for example), include some in current use. Unlike the geographical ones, however, these are now not in line with the *Code*, but their "correction" to currently mandated forms would be disruptive in botanical Latin.

Such affected names in current use (often similar in spelling to nouns in apposition derived from previously proposed generic names, e.g. "*thunbergia*", as in *Gardenia thunbergia* Thunb. [*Rubiaceae*] and *Melastoma fothergilla* Desr. [*Melastomataceae*, but see below]) discussed in Mabberley (l.c.) include *Cephalotaxus harringtonia* (J. Forbes) K. Koch (*Taxaceae*; basionym: *Taxus harringtonia* Knight ex J. Forbes; under the current *Code* to be "*harringtoniana*", a rendering so far never used), *Lagunaria patersonia* (Andrews) G. Don (*Malvaceae*; basionym: *Hibiscus patersonius* Andrews; to be "*patersonianus*", a rendering so far never used) and *Syringa josikaea* J. Jacq. ex Rchb. (*Oleaceae*; to be "*josikaeana*", a rendering so far never used) among many others discussed there.

To those can be added *Gladiolus watsonius* Thunb. (1784, *Iridaceae*, never rendered as "*watsonianus*"); *Glossocardia bosvallea* (L. f.) Wight & Arn. (*Compositae*; basionym: *Verbesina bosvallea* L. f., 1782, never rendered as "*bosvalleana*"); *Rhynchosia minima* var. *memnonia* (Delile) T. Cooke (*Leguminosae*; basionym: *Dolichos memnonius* Delile, 1813, never rendered as "*memnonianus*"); *Silene banksia* (Meerb.) Mabb. (*Caryophyllaceae*; basionym: *Agrostemma banksia* Meerb., 1798, never rendered as "*banksianum*"); *Zephyranthes blumenavia* (Carr.) Nic. Garcia & Dutilh (*Amaryllidaceae*; basionym: *Griffinia blumenavia* K. Koch & Bouché ex Carr. (1862, never rendered as "*blumenaviana*"), and, no doubt, others. A very recent such coining is *Fritillaria phitosia* Kamari & al. (2017, *Liliaceae*).

Further such names, among many others currently not in use, include *Amaryllis fothergillia* Andrews (1801, *Amaryllidaceae* [cf. *Melastoma fothergilla* above]), *A.* ×*carnarvonia* DC. (1825), *Camellia mastersia* Griff. (1854, *Theaceae*), *Crinum govenium* Herb. (1822, *Amaryllidaceae*), *Erica leea* Andrews ex Willd. (1799, *Ericaceae*), *E. victoria* B. S. Williams (1869), *Gladiolus mortonius* Herb. (1838, *Iridaceae*), *Ismene macleana* Herb. ex Hook. (1838 [cf. *Macleania* Hook.], *Amaryllidaceae*), *Paeonia* ×*makoya* Marn. (1839, *Paeoniaceae*), *Passiflora* ×*buonapartea* B. S. Williams (1869, *Passifloraceae*), *Pinus buonapartea* Roezl ex Gordon (1858, *Pinaceae*), *Sabal blackburnia* Glazebr., nom. rej. (1829, *Palmae*), *Taxus makoya* J. Forbes (1839, *Podocarpaceae*), *Zephyranthes sessilis* var. *ackermannia* Herb. (1837, *Amaryllidaceae*). These show that such adjectival endings were used for the names of plants in many different families by divers botanists, many of them distinguished, over many decades.

Such names were coined in conformity with sound classical Latin before the genitive and adjectival forms standard today appeared as the only options in Art. 33 of the adopted version (ed. 2) of Candolle's *Lois de la nomenclature botanique* (1867) and in Recommendations IX and XI following Art. 26 in the *Vienna Rules* (Briquet, Règles Int. Nomencl. Bot. 1906). As has been pointed out to me by Vincent Demoulin (in litt., Jan. 2020), standardization of the adjectival form, like that of compounding forms, became mandatory in "the *Paris Code* of 1956 through notes added to Art. 73 by the Editorial Committee, [contrary] to a Congress decision" (the story of this "back-door rule" is set out by Demoulin in Taxon 30: 234. 1981). In the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), this "back-door" rule became an Article (60.8 (c) and (d)).

It is therefore proposed that a clause be added to Art. 60.8, with an Example, thereby ensuring nomenclatural stability and respecting the naming authors' intent, besides providing conformity with geographical epithets:

(023) Amend the last paragraph of Art. 60.8 as follows (new text in bold) and add an Example:

"Terminations contrary to the above standards are treated as errors to be corrected to *[i]i, [i]ae, [i]ana, [i]anus, [i]anum, [i]arum*, or *[i]orum*, as appropriate (see also Art. 32.2). However, epithets formed in accordance with Rec. 60C.1 are not correctable (see also Art. 60.9)**, nor are those with terminations conforming to other classical Latin adjectival usage, namely *-[i]a, -[i]us*, or *-[i]um*, or such epithets ending in an *-ea***."

"***Ex. n.*** *Gladiolus watsonius* Thunb. (Gladiolus: 14. 1784) and *Syringa josikaea* J. Jacq. ex Rchb. (Iconogr. Bot. Pl. Crit. 8: 32. 1830) are not correctable to *G. "watsonianus"* and *S. "josikaeana"*, respectively."

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(024) Proposal to add a voted Example to Article 60.8

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There is a peculiar issue with some epithets that do not quite fit anywhere. These were first put on the map by Sennikov (in Taxon 64: 657. 2015) who, with the example of *Syringa josikaea*, proposed a new Rule that would accept epithets of this kind as (feminine) nouns in apposition, formed by analogy to Rec. 60B; this proposal was rejected at the Shenzhen Congress of 2017, but Art. 60 Note 3 was added to the *Code* (Turland & al. in Regnum Veg. 159. 2018). Rijckevorsel (in Taxon 66: 1471. 2017), dealing with *Cephalotaxus harringtonia*, proposed to handle them by conservation. Mabberley (in Taxon 67: 792–793. 2018), dealing with *Lagunaria patersonia* and several names in *Erica*, showed these epithets likely to be adjectives in classical Latin (the epithet in *Hibiscus patersonius* cannot be a feminine noun), and suggested a Rule allowing them as adjectives, with a cut-off date of 31 December 2023.

Going by cases reported so far, there appear not enough of these names to warrant a new Rule, but the presence of Art. 60 Note 3 shows that there are enough to justify inclusion in the *Code*. By mere numbers, these names could be dealt with by conservation, but, firstly, there is no reason to assume that there may not be an indefinite number of further names (that would each merit further conservation proposals). Secondly, conservation is uncomfortable unless these epithets are unambiguously understood to be adjectives. Conserving *Hibiscus patersonius*, with that spelling, would not save the later combination *Lagunaria patersonia*, if the epithet is taken to be a noun. What would be conclusive is conservation of *Hibiscus patersonius* not only with that spelling, but also with the epithet as being an adjective, an option not provided for by the *Code*.

It seems desirable to set these epithets as adjectives; after all, from a linguistic point of view, *josikaeus*, *-a*, *-um* from Josika is not different from commonly used adjectives like *europaeus*, *-a*, *-um* from Europa or *smyrnaeus*, *-a*, *-um* from Smyrna. Presumably, Rec. 60B finds its origins in forming adjectives to "planta"; comparable to names of taxa above the rank of genus which, mostly, originated as adjectives to "plantae" (Stearn, Bot. Latin, ed. 4: 101. 1992).

A voted Example is allowed "in order to govern nomenclatural practice when the corresponding Article is open to divergent interpretation or does not adequately cover the matter". In this case there is a long-established custom (Pre. 13) to treat these names as not formed under Art. 60.8, opening the door to divergent interpretation, so a voted Example seems a justified and appropriately-sized means to settle the matter.

(024) Add a voted Example to Art. 60.8:

"***Ex. n.*** Tradition has accepted a number of eighteenth and nineteenth century names with epithets based on personal names that are not formed according to Art. 60.8, but that are classical Latin adjectives (formed by analogy to Rec. 60B, but not restricted to a feminine form), such as *Erica bauera* Andrews (Col. Engr. Heaths: t. 221. 1810–1830), *Gladiolus watsonius* Thunb. (Gladiolus: 14. 1784), *Hibiscus patersonius* Andrews (Bot. Repos.: t. 286. 1803) (= *Lagunaria patersonia* (Andrews) G. Don, Gen. Hist. 1: 485. 1831), *Syringa josikaea* J. Jacq. ex Rchb. (Iconogr. Bot. Pl. Crit. 8: 32. 1830), *Taxus harringtonia* Knight ex J. Forbes (Pinet. Woburn.: 217. 1839) (= *Cephalotaxus harringtonia* (Knight ex J. Forbes) K. Koch, Dendrologie 2(2): 102. 1873). This tradition is to be respected, and such epithets are not correctable."

This proposal limits the exception to eighteenth and nineteenth century names and leaves out recent names, such as *Fritillaria* "*phitosia*" Kamari & al. (in Phytotaxa 328: 231. 2017). This is deliberate, firstly, because eighteenth and nineteenth Century names were coined by authors who were working before there were any rules and who can hardly be said to have willingly ignored any rules, and, secondly, because this is intended to save names that by themselves would merit a proposal for conservation. Alternatively, "eighteenth and nineteenth century names" could be replaced by "names published before 1 January 1908" (the date adopted in the first *International Rules* (Briquet & al., Règles Int. Nomencl. Bot.: Art. 36, 37. 1906) as the cut-off date for rules on practices allowed in the past but not in the future).

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I wish to thank David Mabberley for useful discussion.

PROPOSALS TO AMEND THE CODE

Edited by Nicholas J. Turland & John H. Wiersema

(025) Proposal to clarify that a circumscription applies to a taxon, not to a name

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Article 7.2 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) rules that "A nomenclatural type (typus) is that element to which the name of a taxon is permanently attached", yet in many taxonomic journals authors lectotypify "species" or a "taxon" or "taxa", not the name(s) thereof. In fact, a taxon has a circumscription, but no type. On the other hand, a name has a type, but no circumscription. Therefore, a circumscription applies to a taxon, not to a name.

We feel that it would be better if a Note on this aspect were included immediately after Art. 7.2 and the term "circumscription" were added to the Glossary.

(025) Add a new Note after Art. 7.2 and a new entry to the Glossary:

"***Note 0.*** A name of a taxon may have a type (see Art. 7.1) but has no circumscription. The taxon itself has a circumscription but no type."

"*circumscription*. [Not defined] – an indication of the elements (e.g. subordinate taxa, synonyms, specimens, illustrations) that are included in a taxon."

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(026) Proposal to add a new Recommendation after Article 7 and a new entry to the Glossary

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In the protologue of *Polypodium platylobum* Baker (in Hooker & Baker, Syn. Fil.: 307. 1867), the author presented, just after the species description, the following citation of a gathering: "Hab. Tarapota, N. E. Peru, *Spruce*, 4656." Subsequently, 124 years later in *Pteridophyta of Peru*, Tryon & Stolze (in Fieldiana, Bot., n.s., 27: 15. 1991) published the following nomenclatural paragraph for this name:

"*Polypodium platylobum* Baker, Syn. fil. 307. 1867. TYPE: Mt. Guayrapurima, near Tarapoto (San Martín), *Spruce 4656* (holotype, K!; isotypes, BM!, K!, P!)."

An experienced nomenclaturist will notice two things about the kinds of types cited by Tryon & Stolze (l.c.). First, the name was published in 1867, long before the type method became common practice. Baker, when he cited the entire gathering "*Spruce*, 4656" in the protologue, did not mention "type" or anything that would have designated a holotype, as the subsequent paragraph by Tryon & Stolze

appears to claim. Second, there are four specimens of the gathering by Spruce, each in different herbaria. That means there are four syntypes, not a holotype and its isotypes (Art. 9.6 of the *Shenzhen Code* – Turland & al. in Regnum Veg. 159. 2018).

An experienced nomenclaturist will also note that the paragraph by Tryon & Stolze *lectotypified the name*, although nowhere is this evident in the paragraph itself. By citing (even incorrectly) *Spruce 4656* at K as the "holotype", that specimen must be treated as the lectotype under Art. 7.11 (cf. Ex. 13) and Art. 9.10 (cf. Ex. 11) of the *Shenzhen Code*. Note that it was never the intent of Tryon & Stolze to lectotypify, but that is exactly what happened according to the current rules of the *Code*.

Instances such as the above are common for many early names that were based on syntypes or uncited original material. These names were often lectotypified unknowingly when a later author cited one of the syntypes (or uncited specimens) as "type" or "holotype". Much less often, names were neotypified when there was no original material but a specimen wrongly believed to be such was designated as "type" or "holotype" (see Art. 7 Ex. 14). The specimen cited was usually one present in the describing author's herbarium or home institution.

Accordingly, lectotypifications and neotypifications may be achieved in two ways. First, before 1 January 2001, they may be achieved non-explicitly, as in the above example. Second, on or after 1 January 2001, they must be achieved explicitly by stating "lectotypus" or "neotypus" (see Art. 9.23) and "designated here" (see Art. 7.11) or equivalents of these words (e.g. abbreviations or in other languages).

The above example—and thousands like it—cause confusion in two ways. First, the incorrect kind of type (by today's definitions) is accepted, not corrected, by later taxonomists. Second, the lecto- or neotypification is overlooked by taxonomists because it was made non-explicitly, without the conspicuous "designated here" or equivalent. This oversight may result in a new and superfluous lecto- or neotypification. Unfortunately, both confusions tend to be perpetuated in monographs, floras, and databases.

To avoid this situation, it would be helpful to have a term that brings attention to non-explicit lecto- and neotypifications. Accordingly, we propose the term "non-explicit typification". It should help bring attention to this often overlooked manner of lectotypification and (to a far lesser degree) neotypification, not only for a particular name, but also for names in general.

(026) Add a new Recommendation after Article 7 and a new entry to the Glossary:

"***7X.n.*** When citing designations of lectotype and neotype (and their equivalents under Art. 10) that were achieved before 1 January 2001 in a non-explicit manner (i.e. without the use of the words "lectotypus" or "neotypus" (Art. 9.23) and "designated here" (Art. 7.11) or their equivalents), authors should use the phrase "non-explicitly designated by" (or an equivalent) after the kind of type, e.g. "lectotype, non-explicitly designated by [author(s)]" followed by the bibliographic reference or date."

"*non-explicit typification*. [Not defined] – a designation of lectotype or neotype (or its equivalent under Art. 10) that was achieved before 1 January 2001 in a non-explicit manner; that is, without the use of the words "lectotypus" or "neotypus" and "designated here" or their equivalents (Rec. 7X.n)."

(027) Proposal to amend Recommendation 8A.4

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Recommendation 8A.4 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) states "When a single specimen designated as type is mounted as multiple preparations, this should be stated in the protologue, and the preparations appropriately labelled." As per the *Code*, the term "protologue" refers to everything associated with a name at its valid publication. Therefore, Rec. 8A.4 refers to the holotype and does not cover the designation of a lectotype, neotype, or epitype. Therefore, we feel that the terms "type" and "protologue" mentioned in the Recommendation should be replaced with "holotype, lectotype, neotype, or epitype" and "publication containing the type designation", respectively, so as to cover all four kinds of type.

(027) Amend Rec. 8A.4 as follows (new text in bold, deleted text in strikethrough):

"***8A.4.*** When a single specimen designated as ~~type~~ **holotype, lectotype, neotype, or epitype** is mounted as multiple preparations, this should be stated in the ~~protologue~~ **publication containing the type designation**, and the preparations appropriately labelled."

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(028) Recommendation for prohibiting unauthorized division of a type specimen

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According to Rec. 7A.1 of the *Code* (Turland & al. in Regnum Veg. 159. 2018), it is strongly recommended that the material on which the name of a taxon is based, especially the holotype, be scrupulously conserved. For nomenclatural stability, the hope is that the holotype will last forever. For some kinds of plants, however, a type is under severe threat of destruction, especially in the study of bryophytes, where taking without permission portions of the type specimen for making duplicates has occasionally occurred in the past through ignorance or arrogance. Bryophyte specimens usually consist of many individual plants, which are small and kept in a paper packet (or often, historically, glued to a mounting sheet), and thus it may be easier to make duplicates than for vascular plants. Such unauthorized divisions of a type specimen, which contain a much smaller volume than that of the original type, have usually been kept by investigators for their own herbarium, and thus these specimens remain hidden until he/she has passed away. Such specimens are occasionally called "kleptotypes", an unofficial term meaning "(stolen) fragment of type" (Beentje & Williamson, The Kew Plant Glossary. 2010) or "a type or fragment of a type that should not be in its current location (because it was deliberately stolen, borrowed and not returned, etc.)" (Turland, The Code Decoded, ed. 2. 2019). However, according to the current *Code* (Art. 8 Ex. 8), they are merely treated as duplicates, i.e. isotypes, without any mention of the prohibited practice by which these specimens were derived. We believe that unauthorized division of a type specimen should be prohibited explicitly in the *Code*.

Pfister & Rossman (in Taxon 33: 295–296. 1984) already pointed out a problem with the creation of kleptotypes and mentioned that the unauthorized division of a type specimen should be immediately discontinued as it is destructive, wasteful, and unethical. Because the unauthorized division of a type results in a loss from the original type specimen, such action most likely complicates the work of future generations and may lead to confusion regarding the original concept of the species and to ambiguity and may therefore require multiple verifications in future revisions because researchers usually leave few tracks of their investigations. Pfister & Rossman (l.c.: 295) also noted "Most of us could dredge up a story about a collection of kleptotypes being destroyed—accidently or on purpose—because the contents were obtained through theft." Most herbaria now ask that all parts of dissections should be returned and that the unauthorized division of a type specimen should no longer occur. As researchers and curators, however, we also believe that when such specimens are found, they should not be destroyed but kept in herbaria as a formal duplicate, e.g. an isotype. We believe that sharing the hidden or emerging information regarding existing kleptotypes is more useful than destroying them on purpose, even if they may contain only a small volume of material. We therefore propose a new Recommendation to prevent unauthorized division of a type specimen.

(028) Add a new paragraph to Rec. 8A:

"***8A.n.*** The unauthorized division of a type specimen should be prevented to avoid a loss of the type specimen. Such action most likely complicates the work of future generations and the resulting reduced collections may give a misleading concept of the species. When found, such "kleptotype" specimens should not be destroyed but preserved as duplicates. Formal notification of the existence and location of these specimens should also be published."

Acknowledgements

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(029) Proposal to add a new Example after Article 9.1

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From Art. 9 Ex. 2 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) it could be wrongly assumed that for a Linnaean name there cannot be a holotype. However, a very few Linnaean names do have holotypes (see Jarvis, Order out of Chaos: 16. 2007). One such example is *Calycanthus praecox* L. In the protologue of *C. praecox* (Sp. Pl., ed. 2: 718. 1762), Linnaeus cited an illustration by Kaempfer (Amoen. Exot. Fasc.: 879. 1712) and stated that the plant was unknown to him ("Ignota mihi"). There is a specimen in the Linnaean Herbarium at LINN, Herb. Linnaeus No. 660.2, which is annotated by Linnaeus with "*praecox*" at the bottom of the sheet and "india" beneath the right-hand plant on the sheet (http://linnean-online.org/4901/), but, according to Nicely (in Castanea 30: 74. 1965), "The specimen (No. 660.2) in the Linnaean Herbarium, referred to as *praecox* by Savage (1945), is probably *Calycanthus floridus* [L.] on the basis of my observations of the I.D.C. Microfiche No. 346." Linnaeus's annotation of the specimen apparently contradicts his statements in the protologue of *C. praecox*: "*Habitat in* Japonia" and "Ignota mihi". A possible explanation is that the specimen came into Linnaeus's possession after the publication of *C. praecox*. In any case, the specimen can hardly be considered to be original material for the name.

We also note the comment by Jarvis (Order out of Chaos: 17. 2007): "*Calycanthus praecox* L. (1762: 718), however, is arguably an example of a Linnaean name with a holotype because Linnaeus stated that the plant was unknown to him ("*Ignota mihi*"), and cited as the sole source of information a description and illustration (p. 879) from Engelbert Kaempfer's *Amoenitatum Exoticarum* (1712). Kaempfer's illustration is the holotype of this name."

We therefore feel it would be better if this Example is included in the *Code*.

(029) Add a new Example after Art. 9.1:

"***Ex. n.*** In the protologue of *Calycanthus praecox* L. (Sp. Pl., ed. 2: 718. 1762), Linnaeus did not designate a type and cited only one element, an illustration by Kaempfer (Amoen. Exot. Fasc.: 879. 1712); he also stated that the plant was unknown to him ("Ignota mihi"). This is evidence establishing that Linnaeus, when preparing the protologue, used only Kaempfer's illustration, which must therefore be accepted as the holotype."

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(030–033) Proposals regarding lectotypes, neotypes, and epitypes (amendments to Articles 9 and 10)

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Various lectotype rules appear in numerous places in the *Code* (Turland & al. in Regnum Veg. 159. 2018), often without cross-reference. At best, this is inconvenient; at worst, this may result in an ineffective designation by those who are not well-versed in the intricacies of the *Code*.

Briefly, Art. 9.3 defines a lectotype as a specimen designated from the original material, in conformity with Art. 9.11, if one of three conditions is met. Article 9.11 then repeats the same three conditions (and adds that a lectotype can also be designated if a previously designated lectotype is lost or destroyed) and states that, if they are met, a

lectotype (or neotype) may be designated. Only upon closer examination does one realize that Art. 9.3 is a definition, while Art. 9.11 allows the lectotype to be designated but adds nothing that is not readily apparent from Art. 9.3 and its accompanying Example. In clear contrast, Art. 9.9 defines epitype and by implication allows it to be designated.

Furthermore, neither Art. 9.3 nor Art. 9.11 makes any reference to two other critical requirements (in Art. 9.22 and 9.23) that the word "lectotype" be used and the herbarium be specified. Yet another critical requirement is barely mentioned in these rules: Art. 9.23 ends by saying "(see also Art 7.11 and 9.10)". That hardly alerts the reader to the critical importance of the "designated here" requirement to effect a lectotype.

The following proposal is designed to place all lectotype requirements (or at least clear cross-references) in one Article and minimize repetition, but has no substantive changes.

(030) Amend Art. 9.3 as follows (new text in bold, deleted text in strikethrough):

"***9.3. (a)*** A lectotype is one specimen or illustration designated from the original material (Art. 9.4) as the nomenclatural type, in conformity with Art. ~~9.11 and 9.12~~ **9.3(b)**, if **one or more of the following conditions is met:** ***(1)*** the name was published without a holotype**~~;, or if~~** ***(2)*** the holotype **or previously designated lectotype** is lost or destroyed**~~;, or if~~** ***(3)*** a type is found to belong to more than one taxon (see also Art. 9.14)**; or** ***(4)*** **the requirements of Art. 9.17 or Art. 9.19 permitting designation of a lectotype are met**. For sanctioned names (Art. F.3), a lectotype may be ~~selected~~ **designated** from among elements associated with either or both the protologue and the sanctioning treatment (Art. F.3.9).

(b) **If the requirements in Art. 9.3(a) are met, a lectotype (or, if permissible under Art. 9.8, a neotype as a substitute for it) may be designated. Designation is effective only if it is made in an effective publication (Art. 29–31) and conforms with the requirements of Art. 7.11, 9.12, and, if applicable, 9.22, 9.23, and F.5.4.**"

In addition, delete Art. 9.11; at the end of Art. 9.14 and 9.19 and after "lectotypification" in Art. 9.17 add "(see Art. 9.3(b))".

Similar problems exist for neotypes. In fact, they are worse since there are more provisions allowing a neotype to be designated than a lectotype. Other changes conform the definition to Art. 9.3 (stating that the neotype is "one" specimen and must be designated, as opposed to selected).

(031) Amend Art. 9.8 as follows:

"***9.8.*** *(a)* A neotype is one specimen or illustration designated to serve as the nomenclatural type, in conformity with Art. 9.8(b), if one or more of the following conditions is met: *(1)* no original material exists, or as long as it is missing; *(2)* the holotype or previously designated lectotype has been lost or destroyed and it can be shown that all the other original material differs taxonomically from the lost or destroyed type; in this case, a neotype may be designated only to preserve the usage established by the previous typification (see also Art. 9.18); or *(3)* the requirements of Art. 9.17 (see also Art. 9.14) or Art. 9.19 permitting designation of a neotype are met.

(b) If the requirements in Art. 9.8(a) are met, a neotype may be designated. Designation is effective only if it is made in an effective publication (Art. 29–31) and conforms with the requirements of Art. 7.11 and, if applicable, 9.22, 9.23, and F.5.4. A lectotype always takes precedence over a neotype, except as provided by Art. 9.8(a)(2) and 9.19(c)."

In addition, delete Art. 9.13 and 9.16; at the end of Art. 9.14 and 9.19 and after "neotypification" in Art. 9.17 add "(see Art. 9.8(b))"; and in Art. 9.18 make conforming changes, i.e. change "selected" to "designated".

The definition of epitype can be similarly modified. Also, since Art. 9.20 and 9.21 deal solely with epitypes, their provisions can be moved into Art. 9.9. As a result, all the rules for epitypes will appear in Art. 9.9.

(032) Amend Art. 9.9 as follows:

"***9.9.*** *(a)* An epitype is one specimen or illustration designated to serve as an interpretative type, in conformity with Art. 9.9(b), if either *(1)* the holotype, lectotype, or previously designated neotype, or all original material associated with a validly published name, is demonstrably ambiguous and cannot be critically identified for purposes of the precise application of the name to a taxon or *(2)* the requirements of Art. 9.17 (see also Art. 9.14) or Art. 9.9(c) permitting designation of an epitype are met.

(b) If the requirements in Art. 9.9(a) are met, an epitype may be designated. Designation is effective only if it is made in an effective publication (Art. 29–31) and meets all of the following conditions: *(1)* the holotype, lectotype, or neotype that the epitype supports is explicitly cited; *(2)* the designation conforms with the requirements of Art. 7.11 and, if applicable, 9.23 and F.5.4; and *(3)* the herbarium, collection, or institution in which the epitype is conserved is specified or, if the epitype is a published illustration, a full and direct bibliographic reference (Art. 41.5) to it is provided.

(c) The author who first designates an epitype must be followed; a different epitype may be designated only if the original epitype is lost or destroyed (see also Art. 9.17). A lectotype or neotype supported by an epitype may be superseded in accordance with Art. 9.19 or, in the case of a neotype, in accordance with Art. 9.18. If it can be shown that an epitype and the type it supports differ taxonomically and that neither Art. 9.18 nor 9.19 applies, the name may be proposed for conservation with a conserved type (Art. 14.9; see also Art. 57)."

In addition, delete Art. 9.20 and 9.21; at the end of Art. 9.14 and after "epitypification" in Art. 9.17 add "(see Art. 9.9(b))".

Article 7.10 requires that designations of lectotypes, neotypes, and epitypes be effectively published. This condition has been added to each of the rules above. However, it also applies to the equivalents of lectotypes and neotypes of the names of genera and subdivisions of genera.

(033) Amend the first sentence of Art. 10.5 as follows (new text in bold, deleted text in strikethrough):

"***10.5.*** The author who first designates (Art. ~~7.10,~~ 7.11~~,~~ and F.5.4) a type of a name of a genus or subdivision of a genus **in an effective publication (Art. 29–31)** must be followed, but the **designation** ~~choice~~ may be superseded if the author used a largely mechanical method of selection (Art. 10.6). […]."

In addition, delete Art. 7.10.

Acknowledgement

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(034–035) Proposals to amend Article 9.6 and Example 6

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Article 9.6 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) reads as follows: "A syntype is any specimen cited in the protologue when there is no holotype, or any one of two or more specimens simultaneously designated in the protologue as types (see also Art. 40 Note 1). Reference to an entire gathering, or a part thereof, is considered citation of the included specimens."

We feel that it would be better if a cross-reference to Art. 40 Note 2, which explains what does and does not constitute "mention of a single specimen or gathering", were included in the definition of syntype, after "Reference to an entire gathering, or a part thereof", to make clearer the distinction between syntypes and uncited original material (see also Prop. 010 – Prado & al. in Taxon 69: 629. 2020).

(034) Amend Art. 9.6 as follows (new text in bold):

"***9.6.*** A syntype is any specimen cited in the protologue when there is no holotype, or any one of two or more specimens simultaneously designated in the protologue as types (see also Art. 40 Note 1). Reference to an entire gathering, or a part thereof **(see also Art. 40 Note 2)**, is considered citation of the included specimens."

It is commonly considered that syntypes are plural, but a name can have a single syntype when one specimen is cited in the protologue and there is no holotype (Art. 9.6).

In the protologue of *Campanula pulla* L. (Sp. Pl.: 163. 1753), Linnaeus cited "*Burs. IV*. 21", which, according to Jarvis (Order out of Chaos: 39. 2007), precisely refers to the specimen Herb. Burser IV: 21 in UPS (V-173096; image!). There is also an uncited Jacquin specimen associated with *C. pulla*, Herb. Linnaeus No. 221.4 (LINN; http://linnean-online.org/774/), but it cannot be considered original material for the name, because it lacks the relevant species number ("2") from the first edition of *Species plantarum*, which implies a post-1753 addition to Linnaeus's herbarium (see Jarvis, l.c.: 42–46), further supported by Jacquin's correspondence with Linnaeus beginning in 1759 (Jarvis, l.c.: 213). Linnaeus (l.c.) also cited an illustration, "*Campanula foliis subrotundis*" in Bauhin (Prodr.: 35. 1620). The name *C. pulla* has no holotype because Linnaeus did not indicate one and he used two elements (Art. 9.1). The one specimen cited in the protologue is therefore a syntype. Because there is no Example under Art. 9 of the *Code* showing that a name can have a single syntype, we propose to include this case as an addition to Art. 9 Ex. 6, which similarly concerns another Linnaean name that has two Burser specimens as syntypes.

(035) Add a new first sentence to Art. 9 Ex. 6 (new text in bold, deleted text in strikethrough):

"***Ex. 6*. In the protologue of *Campanula pulla* L. (Sp. Pl.: 163. 1753), Linnaeus cited "*Burs. IV.* 21", referring to a specimen in the Burser Herbarium (UPS), in addition to an illustration in Bauhin (Prodr.: 35. 1620). This single specimen is a syntype because it was cited in the protologue and there is no holotype.** ~~In~~ **Similarly, in** the protologue of *Anemone alpina* L. (Sp. Pl.: 539. 1753), two specimens are cited under the (unnamed) varieties β and γ, as "Burs. IX: 80" and "Burs. IX: 81". These specimens, held in the Burser Herbarium (UPS), are syntypes of *A. alpina*."

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(036–037) Proposals regarding neotypes and epitypes (amendment to Articles 9.8 and 9.9)

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There are a number of minor inconsistencies in the rules for neotypes in the *Code* (Turland & al. in Regnum Veg. 159. 2018). This proposal is designed to address these inconsistencies.

Article 9.8 refers to "selection" of a specimen as neotype, but "designation" is the appropriate term. In addition, while a neotype can be designated if the original material is "missing", the lectotype rules (Art. 9.3 and 9.11) refer to "lost or destroyed", which is preferable. Finally, there is no provision to allow designation of a new neotype if the existing one is lost or destroyed or if the prior neotype belongs to more than one taxon, as is the case for lectotypes (Art. 9.11).

(036) Amend Art. 9.8 as follows (new text in bold, deleted text in strikethrough):

"***9.8.*** A neotype is a specimen or illustration ~~selected~~ **designated** to serve as nomenclatural type if ***(a)*** **the name was published without any** ~~no~~ original material ~~exists~~, or ~~as long as it~~ **if the original material** is ~~missing~~ **lost or destroyed, *(b)* the previously designated neotype is lost or destroyed, *(c)* the previously designated neotype is found to belong to more than one taxon (see also Art. 9.14), or *(d)* the conditions in** ~~(see also~~ Art. 9.16 **or** ~~and~~ 9.19(c) **are met**~~)~~."

Conforming amendments to other Articles: amend Art. 9.13 to use the wording of clause (a) as proposed here; in Art. 9.13, 9.16, and 9.18, replace "selected" with "designated".

Similar changes are needed for epitypes.

(037) Amend Art. 9.9 as follows (new text in bold, deleted text in strikethrough):

"***9.9.*** An epitype is a specimen or illustration ~~selected~~ **designated** to serve as an interpretative type ~~when~~ **if *(a)*** the holotype, lectotype, or previously designated neotype, or all original material associated with a validly published name, is demonstrably ambiguous and cannot be critically identified for purposes of the precise application of the name to a taxon**, *(b)* the previously designated epitype is lost or destroyed, or *(c)* the previously designated epitype is found to belong to more than one taxon (see also Art. 9.14)**. Designation of an epitype is not effected unless the holotype, lectotype, or neotype that the epitype supports is explicitly cited (see Art. 9.20)."

Acknowledgement
I thank N.J. Turland for improving the proposal.

(038) Proposal to add a new Example under Article 9.17

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According to Art. 9 Ex. 14 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), a second-step lectotype could be designated when a single gathering in a single herbarium was designated as a lectotype and later found to be more than one specimen. However, this Example does not illustrate that, prior to 1 January 1990, lectotypification or neotypification of a name of a species or infraspecific taxon by a specimen or unpublished illustration could be effective even when the herbarium, collection, or institution in which the type is conserved was not specified; see Art. 9.22.

If a first-step lectotype or neotype designated prior to 1 January 1990 refers to a single gathering distributed in multiple herbaria, the choice of the second-step lectotype or neotype depends on the designating author(s), who are free to choose a single specimen from any

of those herbaria. There is no such Example under Art. 9.17 in the *Code*, so we are proposing to add one, as follows.

(038) Add a new Example under Art. 9.17:

"***Ex. n.*** Brooker & al. (in Boland & al., Forest Trees Australia, ed. 4: 314. 1984) designated a first-step lectotype for the name *Eucalyptus oreades* R. T. Baker (in Proc. Linn. Soc. New South Wales 24: 596. 1900), fulfilling the requirements of Art. 7.11 by citing "Type: Near Lawson, New South Wales, Apr. 1899, R. T. Baker and H. G. Smith." No herbarium was specified, but this was not a requirement in 1984 (see Art. 9.22). Bean (in Telopea 12: 316. 2009), noting that *R. T. Baker & H. G. Smith* was a single gathering represented by five specimens, one in K and four in NSW, designated the specimen NSW325376 as the second-step lectotype."

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(039) Proposal to add a new paragraph to Recommendation 9A

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Most lectotypifications for which all the original material belongs to the same taxon are merely of academic interest. Such lectotypifications are just to "tidy up" the nomenclature. The main importance of lectotypification arises when the existing original material represents more than one taxon and the application of the name is in doubt. So we are proposing the following new Recommendation.

(039) Add a new paragraph to Rec. 9A:

"***9A.5.*** Preference should be given to carrying out those lectotypifications where the application of the name is in doubt."

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(040) How to deal with imprecise dates – proposal to add a new rule to Article 31

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The exact date of effective publication of any new name is important for citation purposes and essential for establishing priority of names (Art. 11 of the *Shenzhen Code* – Turland & al. in Regnum Veg. 159. 2018). Unfortunately, it is often very hard or impossible, especially for the older and/or less-known sources, to determine the publication date with necessary precision (i.e. to the day). This might cause controversy, e.g. in case of almost-parallel publication of the same name or of different names applicable to the same taxon. Several papers in journals, books, or preprints that bear only the calendar year, month, or range of dates (e.g. January–March) must sometimes be temporally compared

to determine the order of precedence. For the sake of caution and certainty, the last day of a respective time period seems a rational determination of the precise date of publication for nomenclatural purposes. Although this solution has not been employed in the *Shenzhen Code* (nor previous editions), for other reasons, when fixing starting dates in Art. 13, it seems that this would help to solve many potential controversies as to the priority of names published afterward. A similar solution was accepted in Art. 21.3 of the *International Code of Zoological Nomenclature* (ed. 4, International Commission on Zoological Nomenclature. 1999; https://www.iczn.org/the-code/the-international-code-of-zoological-nomenclature/the-code-online/ accessed 30 Dec 2019). Therefore, we propose the following.

(040) Add a new paragraph after Art. 31.3:

"***31.4.*** When the date of effective publication of a work cannot be determined precisely to the day, it should be regarded for nomenclatural purposes as the last day of the time period that can be demonstrated with certainty (except dates stated in Art. 13)."

If the above is accepted, as an illustration, the following Example may serve:

"***Ex. n.*** *Pulsatilla ×janczewskii* Zapał. was published in parallel in: *(a)* Rozpr. Wydz. Mat.-Przyr. Akad. Umiejętn., Dział B, Nauki Biol. 8B(48B): 200. 1909, *(b)* Consp. Fl. Galic. Crit. 2: 244. 1908, and *(c)* Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1908(5): 448. 1908 (issue dated 3 Jun 1908). None of these sources indicated that the name had already been published elsewhere. From external evidence, Paszko & al. (in PhytoKeys 155: 53–85 & suppl. material. 2020) dated source *(a)* as having become available no later than Jul–Aug 1908 and source *(b)* as available no later than Aug–Oct 1908. Therefore, for nomenclatural purposes, the dates should be regarded as: *(a)* 31 Aug 1908, *(b)* 31 Oct 1908, and *(c)* 3 Jun 1908, respectively."

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(041) Proposal to amend Article 35.2 and add a new Example

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During the preparation of a paper on the correct type of *Schizachyrium* Nees (*Poaceae*) (Welker & al., in prep.), we detected that Art. 35.2 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) has a difficult interpretation considering its current reading.

This Article rules (our emphasis in bold): "A combination (autonyms excepted) is not validly published unless the author **definitely associates the final epithet with the name of the genus or species**, …". There is no explanation in the Article about the meaning of "associates the final epithet with". To understand the meaning of these words it is necessary to read the Examples. The four current Examples presented under Art. 35.2 cover different situations in which a combination is validly or not validly published, but none of them explains the full meaning of these words.

We believe that an amendment to this Article is necessary to clarify this point. By clarifying these details, it will be easier to determine whether or not a new combination was validly published, especially for those names published before 1953.

(041) Add a new sentence to Art. 35.2 (new text in bold) and a new Example:

"***35.2.*** A combination (autonyms excepted) is not validly published unless the author definitely associates the final epithet with the name of the genus or species, or with its abbreviation (see Art. 60.14). **This association can be achieved typographically by the position of the final epithet in the text, by use of a symbol, or by the epithet agreeing with the gender of the generic name.**"

"***Ex. n.*** *Andropogon brevifolius* Sw. was assigned to *Schizachyrium* Nees (in Martius, Fl. Bras. Enum. Pl. 2(1): 332. 1829) when Nees described that genus as new: "Hujusce generis species, praeter enumeratas, sunt et *Andropogon brevifolius*, Sw. (Pollinia Spr.) … [Species of this genus, besides those enumerated, are also *Andropogon brevifolius*, Sw. (Pollinia Spr.) …]". However, Nees did not associate the final epithet of the species name with *Schizachyrium* and did not therefore validly publish a new combination. *Schizachyrium brevifolium* (Sw.) Nees ex Buse (in Miquel, Pl. Jungh.: 359. 1854) was validly published when Buse wrote "… a *Schiz. brevifolio* Nees (i. e. *Andr. brevifolio* Sw.) …", thereby referring to the basionym and definitely associating the final epithet with *Schizachyrium*."

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We are grateful to Mark Garland for the Latin translation and to Nicholas Turland and John Wiersema for their helpful suggestions to improve this proposal.

(042) Proposal to add a new Example under Article 36.1

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Article 36.1(b) of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) rules that a name is not validly published when it is merely cited as a synonym. We propose to include a new Example under Art. 36.1 related to an intended new combination that was included in synonymy.

(042) Add a new Example under Art. 36.1:

"***Ex. n.*** (b) The intended new combination "*Henckelia membranacea* (Bedd.) Janeesha & Nampy *comb. nov.*" was included by Janeesha & Nampy (in Rheedea 30: 77. 2020) in the synonymy of *H. missionis* (Wall. ex R. Br.) A. Weber & B. L. Burtt (in Beitr. Biol. Pflanzen 70: 350. 1998). *"Henckelia membranacea"* was not therefore validly published."

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(043) Proposal to amend the definition of "diagnosis" in Article 38.2

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According to Art. 38.2 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), "A diagnosis of a taxon is a statement of that which in the opinion of its author distinguishes the taxon from other taxa." We feel that instead of "other taxa" it should be the nearest allied taxon or taxa, which is in actuality followed when describing a new taxon. So, we propose to amend the Article.

(043) Amend Art. 38.2 as follows (new text in bold, deleted text in strikethrough):

"***38.2.*** A diagnosis of a taxon is a statement of that which in the opinion of its author**(s)** distinguishes the taxon from ~~other~~ **its nearest allied taxon or** taxa."

The entry for "diagnosis" in the Glossary is to be modified accordingly.

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(044) Proposal to amend Recommendation 40A.1

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According to Rec. 40A.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), the indication of the nomenclatural type should immediately follow the description or diagnosis and should include the Latin word "typus" or "holotypus". However, Art. 40.6 states "indication of the type must include one of the words "typus" or "holotypus", or its abbreviation, or its equivalent in a modern language". We are of the opinion, therefore, that there is no need for Rec. 40A.1 to recommend using the Latin word "typus" or "holotypus", and we propose the following change.

(044) Amend Rec. 40A.1 as follows (deleted text in strikethrough):

"***40A.1.*** The indication of the nomenclatural type should immediately follow the description or diagnosis ~~and should include the Latin word "typus" or "holotypus"~~."

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(045–046) Proposals to convert Article 41 Example 17 to a voted Example and delete Article 41 Example 19

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Article 41 Ex. 17 and 19 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) imply that errors in the citation of the date or place of publication of the basionym do not prevent valid publication of a new combination. Some action is needed to support the correction of incorrect dates.

The valid publication of a new combination must state five items: the basionym, its author citation, its place of valid publication, the page or plate reference, and the date (Art. 41.5). Article 41.6 states that errors in the "citation of the basionym or replaced synonym, including incorrect author citation" do not preclude valid publication; it does not mention the place, page/plate or date of publication.

There are two arguments that would allow correction of a date. While "citation of the basionym" is widely recognized to mean quoting the basionym, it could be interpreted to include bibliographic references. A second argument is that date errors can be corrected because nothing prohibits their correction. If either is correct, then both incorrect page numbers and places of publication (as long as they do not reference another real work) are correctable. Article 41 Ex. 15 would be wrong because page references would be correctable. As to the latter argument, nothing prohibited the correction of a holotype citation, yet Art. 9.2 was added to support Art. 9 Ex. 3.

Therefore, Art. 41 Ex. 17 and 19 appear to be wrong. However, it would be horribly disruptive to not permit correction of incorrect dates given that the actual date of publication for many older works differs from its stated date.

Articles 41.5 and 41.6 are presumably "open to divergent interpretation or [do] not adequately cover the matter" (Art. 7 *Ex. 16 footnote); a regular Example, as opposed to a voted Example, does not

have the force of a rule in that case. Converting Ex. 17 into a voted Example would have the force of a rule and permit correction of dates.

(045) Convert Art. 41 Ex. 17 into a voted Example.

Article 41 Ex. 19 provides that the bibliographic reference to volume 59 of "Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl." (*Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Mathematisch-Naturwissenschaftliche Classe. I. Abtheilung*), instead of "Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl." (*Anzeiger der Akademie der Wissenschaften in Wien. Mathematisch-Naturwissenschaftliche Klasse*) is a correctable error of citation of the journal name. For the reasons noted above, Art. 41.6 does not permit this correction. In addition, Art. 41.7 prohibits correction of a reference made to "any work other than that in which the name was validly published …" except for matters addressed by Art. 41.8. Because the reference cited by the author in Ex. 19 is an actual, different publication (see https://www.biodiversitylibrary.org/bibliography/6888#/summary; https://www.biodiversitylibrary.org/bibliography/39807#/summary), Ex. 19 is incorrect and should be deleted.

(046) Delete Art. 41 Ex. 19.

(047) Proposal to add a new paragraph with a new Example to Recommendation 50D

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There is no instruction in the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) regarding citation of a heterotypic name as a synonym for the first time. Hence, we propose the following under General Recommendations on Citation, Rec. 50D.

(047) Add a new paragraph with a new Example to Rec. 50D:

"***50D.2.*** In the citation of a name as a heterotypic synonym for the first time, its status should be indicated by adding the words "synonymum novum" or "syn. nov."."

"***Ex. 2.*** Bhattacharjee (in Candollea 67: 32. 2012) cited *Cheirostylis seidenfadeniana* C. S. Kumar & F. N. Rasm. (in Nordic J. Bot. 7: 409. 1987) as "syn. nov." indicating that it was newly considered as a heterotypic synonym of *Cheirostylis parvifolia* Lindl. (in Edwards's Bot. Reg. 25(Misc.): 19. 1839)."

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(048) Proposal to amend Article 60.8 and Example 17, and add an associated new Glossary entry

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The current *International Code of Nomenclature for algae, fungi, and plants* (*Shenzhen Code*; Turland & al. in Regnum Veg. 159. 2018) prescribes how to form the genitive case for personal names that are not of Latin form and that end in a consonant other than *er*. Article 60.8(b) specifies that the genitive for masculine nouns is formed by adding *ii* (singular) or *iorum* (plural), and for feminine nouns by adding *iae* (sing.) or *iarum* (pl.). Thus, one would render the genitive of the personal name "Smith" as, depending on the gender and number, *smithii* or *smithiorum*, or as *smithiae* or *smithiarum*.

Latin grammar books (e.g. LaFleur, Wheelock's Latin, ed. 7. 2011), however, prescribe a slightly different set of genitive endings for these nouns: namely, for masculine, *i* (sing.) or *orum* (pl.), and for feminine, *ae* (sing.) or *arum* (pl.). As many taxonomists have probably noted, these endings are used by the *International Code of Zoological Nomenclature* (ed. 4, International Commission on Zoological Nomenclature. 1999), resulting in names such as *Paramecium woodruffi* (honouring Woodruff, masculine) and *P. grohmannae* (honouring Grohmann, feminine). Therefore, by comparison, it would appear that the *Shenzhen Code* requires an extra *i* between the noun and its genitive case ending. This interpolated *i* is called a "stem augmentation" in Art. 60.8(b) and (d). Why does the *Shenzhen Code* apparently use different endings than those of classical Latin and the zoological *Code*?

Actually, the *Shenzhen Code* uses the same endings as in classical Latin and the zoological *Code*. The difference is how the *Shenzhen Code* creates the stem of the noun to which the genitive endings are added. The process is thus: the surname "Smith" is first put into Latin form by adding *ius*, resulting in *smithius*. Note that this process gives rise to stem augmentation because the interpolated *i* is part of the newly latinized stem. The genitive is then formed by the normal rules of Latin grammar: the *us* is dropped, resulting in *smithi*, and then the appropriate genitive ending is added. If the word is a masculine singular noun, *i* is added, resulting in *smithii*; or if plural, *orum* is added, resulting in *smithiorum*. Nowhere is this process explained in the *Code*. It should be. Without an explanation, taxonomists will not understand how a stem augmentation arises. Also, they will not readily appreciate why names already of Latin form lack a stem augmentation and end in a single *i*, as when, for example, Hieronymus (meaning "Jerome") is inflected with only one *i*, resulting in *hieronymi*. To address this deficiency in the *Code*, we propose the following amendments to Art. 60.8 clauses (b) and (d) and Ex. 17, and a new entry in the Glossary defining "stem augmentation".

(048) Amend Art. 60.8(b) and (d) and Ex. 17 as follows (new text in bold, deleted text in strikethrough) and add a new entry to the Glossary:

"*(b)* If the personal name ends with a consonant (but not in *-er*), substantival epithets are formed by **latinizing them with *-ius*, then dropping the *-us* and** adding ~~*-i-* (stem augmentation) plus~~ the genitive inflection appropriate to the gender and number of the person(s) honoured (e.g. ***Lecard-ius*, *lecard-i-i*** for Lecard (m), ***Wilson-ius*, *wilson-i-ae*** for Wilson (f), ***Verlot-ius*, *verlot-i-orum*** for the Verlot brothers, ***Braun-ius*, *braun-i-arum*** for the Braun sisters, ***Mason-ius*, *mason-i-orum*** for Mason, father and daughter)."

"*(d)* If the personal name ends with a consonant, adjectival epithets are formed by **latinizing the personal name with *-ius*, then dropping the *-us* and** adding ~~*-i-* (stem augmentation) plus~~ *-an-* (stem of adjectival suffix) plus the nominative singular inflection appropriate to the gender of the generic name (e.g. *Rosa* ***webbi-ana*** for Webb, *Desmodium* ***griffithi-anum*** for Griffith, *Verbena* ***hassleri-ana*** for Hassler)."

"***Ex. 17.*** In *Rhododendron 'potanini'* Batalin (in Trudy Imp. S.-Peterburgsk. Bot. Sada 11: 489. 1892), commemorating G. N. Potanin, the epithet is to be spelled *potaninii* under Art. 60.8 (b) **because Potanin is first put in Latin form by adding *-ius* to create *potaninius*; then the genitive is formed by first dropping the *-us* to yield *potanini-* (the final *-i-* is the stem augmentation) and then adding the masculine genitive singular ending *-i*, resulting in the epithet *potaninii*)**. However, in *Phoenix theophrasti* Greuter (in Bauhinia 3: 243. 1967), commemorating Theophrastus, it is not spelled *'theophrastii'* because Rec. 60C.1 applies."

"*stem augmentation*. [Not defined] – the *-i-* at the end of the stem of a specific or infraspecific epithet derived from a personal name not already of Latin form and ending in a consonant. It results from latinizing the personal name by adding *-ius* (e.g. Smith to *smithius*), then dropping the *-us* to yield the stem (*smithi-*), to which is added the appropriate genitive ending (*smithi-i*, masc. sing.; *smithi-orum*, masc. pl.; *smithi-ae*, fem. sing.; *smithi-arum*, fem. pl.) (Art. 60.8(b) and (d)). Similarly, adjectival epithets are formed by first latinizing the personal name by adding *-ius*, then adding an adjectival suffix (*-an-*) to which is attached the appropriate nominative singular inflection."

(049) Proposal to amend Article 60.11 and its Examples, and to add a new Example

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Article 60.11 and Examples 40–43 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) prescribe rules for hyphenating compound epithets. The Article and its Examples need to be modified for clarity. First, Art. 60.11 should state that its rules are *obligatory*, not merely "permitted". Also, the Examples should be organized differently to facilitate use, and they should briefly state the reason why hyphenation is being required or not. We propose the following modifications.

(049) Amend Art. 60.11 and Ex. 40–43 as follows (new text in bold, deleted text in strikethrough) and add a new Example:

"***60.11.*** The use of a hyphen in a compound epithet is treated as an error to be corrected by deletion of the hyphen. ~~A~~ **However, a** hyphen ~~is permitted only when~~ **must be used if** ***(a)*** the epithet is formed of words that usually stand independently **(see also Art. 23.1 and 23.3), including separately latinized personal names, but excluding a leading prefix**, or ***(b)*** when the letters before and after the hyphen are the same ~~(see also Art. 23.1 and 23.3)~~. **The absence of such a hyphen is treated as an error to be corrected by insertion of the hyphen.**"

"***Ex. 40.*** Hyphen ~~to be deleted~~ **not used because it was originally published in error**: *Acer pseudoplatanus* L. (Sp. Pl.: 1024. 1753, *'pseudo-platanus'*); *Croton ciliatoglandulifer* Ortega (Nov. Pl. Descr. Dec.: 51. 1797, *'ciliato-glandulifer'*); *Eugenia costaricensis* O. Berg (in Linnaea 27: 213. 1856, *'costa-ricensis'*); ~~*Eunotia rolandschmidtii* Metzeltin & Lange-Bert. (Iconogr. Diatomol. 18: 117. 2007, *'roland-schmidtii'*), in which the given name and surname do not stand independently because the former is not separately latinized;~~ *Ficus neoebudarum* Summerh. (in J. Arnold Arbor. 13: 97. 1932, *'neo-ebudarum'*); *Lycoperdon atropurpureum* Vittad. (Monogr. Lycoperd.: 42. 1842, *'atro-purpureum'*); ~~*Mesospora vanbosseae* Børgesen (in Skottsberg, Nat. Hist. Juan Fernandez 2: 258. 1924, *'van-bosseae'*); *Peperomia lasierrana* Trel. & Yunck. (Piperac. N. South Amer.: 530. 1950, *'la-sierrana'*);~~ *Scirpus* sect. *Pseudoeriophorum* Jurtzev (in Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 70(1): 132. 1965, *'Pseudo-eriophorum'*)."

"***Ex. 41.*** Hyphen ~~to be maintained~~ **used because the letters before and after the hyphen are the same**: *Athyrium austro-occidentale* Ching (in Acta Bot. Boreal.-Occid. Sin. 6: 152. 1986); ~~*Enteromorpha roberti-lamii* H. Parriaud (in Botaniste 44: 247. 1961), in which the given name and surname stand independently because they are separately latinized;~~ ***Loranthus pseudo-odoratus*** **Lingelsh. (in Repert. Spec. Nov. Regni Veg. Beih. 12: 357. 1922, *'pseudoodoratus'*);** *Piper pseudo-oblongum* McKown (in Bot. Gaz. 85: 57. 1928); ~~*Ribes non-scriptum* (Berger) Standl. (in Publ. Field Mus. Nat. Hist., Bot. Ser. 8: 140. 1930); *Solanum fructu-tecto* Cav. (Icon. 4: 5. 1797); *Vitis novae-angliae* Fernald (in Rhodora 19: 146. 1917)~~."

"***Ex. 42.*** Hyphen ~~to be inserted~~ **used because the two words stand independently**: *Arctostaphylos uva-ursi* (L.) Spreng. (Syst. Veg. 2: 287. 1825, *'uva ursi'*); *Aster novae-angliae* L. (Sp. Pl.: 875. 1753, *'novae angliae'*); *Coix lacryma-jobi* L. (l.c.: 972. 1753, *'lacryma jobi'*); ~~*Marattia rolandi-principis* Rosenst. (in Repert. Spec. Nov. Regni Veg. 10: 162. 1911, *'rolandi principis'*);~~ *Veronica anagallis-aquatica* L. (Sp. Pl.: 12. 1753, '*anagallis* ▽') (see Art. 23.3); *Veronica argute-serrata* Regel & Schmalh. (in Trudy Imp. S.-Peterburgsk. Bot. Sada 5: 626. 1878, *'argute serrata'*) **(see also Art. 23 Ex. 20)**."

"***Ex. 43.*** Hyphen not ~~to be inserted~~ **used in an epithet derived from personal names that are not separately latinized or have a leading prefix**: ***Acer shihweii*** **F. Chun & W. P. Fang (in Acta Phytotax. Sin. 11: 165. 1966) – named for Teng Shih Wei;** ***Astragalus langranii*** **Podlech (in Novon 14: 225. 2004, *'lang-ranii'*) – named for "Xu Lang-Ran";** ***Calamus johndransfieldii*** **W. J. Baker (in Phytotaxa 197: 144. 2015);** ***Cardamine cheotaiyienii*** **Al-Shehbaz & G. Yang (in Harvard Pap. Bot. 3: 73. 1998) – named for "Cheo Tai-yien";** ***Corydalis harrysmithii*** **Lidén & Z. Y. Su (in Novon 17: 482. 2007, *'harry-smithii'*);** ***Mesospora vanbosseae*** **Børgesen (in Skottsberg, Nat. Hist. Juan Fernandez 2: 258. 1924, *'van-bosseae'*);** ***Peperomia lasierrana*** **Trel. & Yunck. (Piperac. N. South Amer.: 530. 1950, *'la-sierrana'*);** ***Erysimum handelmazzettii*** **Polatschek (in Phyton (Horn) 34: 200. 1994, *'handel-mazzettii'*);** ***Ligusticum kingdonwardii*** **H. Wolff (in Repert. Spec. Nov. Regni Veg. 27: 306. 1930, *'kingdon-wardii'*);** ***Polypodium alansmithii*** **R. C. Moran (in Ann. Missouri Bot. Gard. 77: 845. 1990);** ***Symphyopappus lymansmithii*** **B. L. Rob. (in Contr. Gray Herb. 96: 19. 1931);** *Synsepalum letestui* Aubrév. & Pellegr. (in Notul. Syst. (Paris) 16: 263. 1961, *'Le Testui'*)~~, not *'le-testui'*~~."

"***Ex. n*. Hyphen used in an epithet derived from separately latinized personal names:** ***Englerodoxa alberti-smithii*** **Sleumer (in Notizbl. Bot. Gart. Berlin-Dahlem 12: 57. 1934);** ***Kalanchoe adolphi-engleri*** **Raym.-Hamet (in Bull. Soc. Bot. France 102: 239. 1955);** ***Pleurothallis curti-bradei*** **Pabst (in Arch. Jard. Bot. Rio de Janeiro 14: 10. 1956).**"

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(050) Proposal to amend the definition of "synonym" in the Glossary

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Each of two or more names that apply to the same taxon are synonymous to one another. One of them may or may not be a correct name for that taxon. In our opinion, this is not clearly reflected in the definition of "synonym" in the Glossary of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018). The Glossary merely reflects what is in the body of the *Code* (see Preface, p. xxii), where the term synonym is currently used to mean one of two or more names that apply to the same taxon; but a synonym may or may not be a correct name for that taxon. Hence, we propose the following amendment.

(050) Amend the definition of "synonym" in the Glossary as follows (new text in bold):

"*synonym*. [Not defined] – one of two or more names that apply to the same taxon. **It may or may not be a correct name for that taxon** (see *heterotypic synonym, homotypic synonym*)."

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PROPOSALS TO AMEND THE CODE

Edited by Nicholas J. Turland & John H. Wiersema

(051–052) Proposals on the retroactivity of Division III

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The Shenzhen Congress of 2017 adopted a very extensive new Division III. Hopefully, this will help those who participate in the process of amending, and applying, the *Code*. However, the present Div. III is so detailed that clearly it cannot be used to evaluate actions of the past. For example, there were International Botanical Congresses making decisions on the *Code* before there ever was a General Committee (or a journal *Taxon*), so at that time Prov. 1.4 could not have been followed. As Prin. VI states "[t]he rules of nomenclature are retroactive unless expressly limited", it seems best to expressly limit the application of the provisions for governance of the *Code*. There appear to be two logical places to do this, in Div. III itself (probably in Prov. 1) and in Pre. 7; both together is an option as well. Placement in Pre. 7 would have the advantage of making this newly proposed provision retroactive, so that the Div. IIIs of past editions would (expressly) be not retroactive as well, which feels like a nice safety feature.

(051) Amend Pre. 7 (new text in bold):

"*7*. The provisions regulating the governance of this *Code* form its last Division (Div. III). **These provisions are not retroactive.**"

As to how necessary it is to have a retroactive rule on this, two lines of thought suggest themselves. On the one hand, once the *Rio de Janeiro Code* supersedes the *Shenzhen Code*, the latter will be as dead as a doornail (as are all previous editions), and it will have become irrelevant if the retroactivity of anything in it is expressly limited by a later edition of the *Code*. On the other hand, someone evaluating past actions (taken under Div. IIIs of past editions) and subsequent actions taken in response to those past actions may find it comforting to have a blanket retroactive rule stating that no Div. III is retroactive. This may prevent many a headache.

(052) Add a new Provision following Prov. 1.4:

"*1.5*. The provisions for governance of the *Code* (Div. III) apply to the edition of the *Code* of which they form a part: they are not retroactive."

If Prop. 051 is accepted this will be redundant, but it is a useful redundancy: Pre. 7 is not the place where the reader will necessarily look first for something like this. Another option would be to add a Note, referring to the amended Pre. 7.

(053–054) Proposals to clarify Art. 6 Note 2 and add a new Example concerning isonyms published by the same author

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The three places of publication of the name *Bignonia tomentosa* Thunb. represent recognition by C. P. Thunberg of a single species, as presented fully in Thunberg (Fl. Jap.: 252. Aug 1784). The advance publication in Murray (Syst. Veg., ed. 14: 563. May–Jun 1784) is, as Murray noted, simply the diagnosis from Thunberg's *Flora japonica* ("B. fol. simplicibus cordatis subtus tomentosis, flor. axillaribus paniculatis. *Thunb. japon. mspt*. M.") with a few words abbreviated. The paper "Kaempferus illustratus […]" by Thunberg (in Nova Acta Regiae Soc. Sci. Upsal. 4: 31–40. late 1784–1785) is a listing of Thunberg's identifications of Kaempfer's illustrations (Amoen. Exot. Fasc. 1712), and when these are of new species, as with "Too, vulgo Kiri & Nippon Kiri. p. 859" (p. 35), Thunberg also included diagnoses of these new species (p. 39), probably expecting the journal article to be published ahead of the *Flora japonica*. The diagnosis of *B. tomentosa* is identical, except for two abbreviations, to that in the *Flora japonica*.

Although Art. 52 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) applies primarily to names that are nomenclaturally superfluous when published and therefore illegitimate (Art.

52.1), it also establishes that the type of an earlier name may be definitely included in the protologue of a later name by citation of the earlier name itself (Art. 52.2(e)) or its exact diagnostic phrase name (Art. 52.3). The publications of *Bignonia tomentosa* in the *Flora japonica* and *Nova acta regiae societatis scientiarum upsaliensis* have the same diagnostic phrase name as, and therefore include the type of, the first publication of *B. tomentosa* in the *Systema vegetabilium*. Consequently, the two later names were nomenclaturally superfluous when published and are to be automatically typified (Art. 7.5) by the type of the name that ought to have been adopted under the rules, i.e. *B. tomentosa* Thunb. (in Murray, l.c.), the lectotype of which is *Thunberg s.n*. (UPS-THUNB 14260), designated by Akiyama & al. (in J. Jap. Bot. 92: 271. 2017). The three names are not homonyms, which would have to be heterotypic (Art. 53.1), but isonyms (Art. 6 Note 2).

Article 6 Note 2 states: "When the same name, based on the same type, has been published independently at different times, **perhaps by different authors** [our emphasis], then only the earliest of these "isonyms" has nomenclatural status." We have provided an Example where three isonyms have been published by the same author. Although the current wording of Note 2 does not exclude this possibility, it could be made clearer. We are, therefore, proposing to amend the Note as follows.

(053) Amend Art. 6 Note 2 as follows (new text in bold, deleted text in strikethrough):

"*Note 2*. When the same name, based on the same type, has been published independently at different times, ~~perhaps~~ by **the same or** different authors, then only the earliest of these "isonyms" has nomenclatural status. The name is always to be cited from its original place of valid publication, and later isonyms may be disregarded (but see Art. 14.14)."

The definition of isonym might be amended accordingly in the Glossary.

(054) Add a new Example after Art. 6 Note 2:

"*Ex. n*. The name *Bignonia tomentosa* Thunb. was independently published by Thunberg in three different places (Murray, Syst. Veg., ed. 14: 563. May–Jun 1784; Fl. Jap.: 252. Aug 1784; in Nova Acta Regiae Soc. Sci. Upsal. 4: 39. late 1784–1785). The two later names have the same diagnostic phrase name as *B. tomentosa* in its original place of valid publication and therefore include its type (Art. 52.2(e), 52.3). Consequently, the two later names were nomenclaturally superfluous when published (Art. 52.1) and are to be automatically typified (Art. 7.5) by the type of *B. tomentosa* Thunb. (in Murray, l.c.). Because the three names are the same and based on the same type, they are isonyms, the later two of which may be disregarded."

Acknowledgements

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(055–064) Proposals to clarify Articles 6.9–6.13 and Article 41

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Article 6.10 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) introduces and defines the terms "new combination" and "name at new rank" together in the same sentence. One might not realize they are also defined in the Glossary, where further information concerning rank is given. It would be preferable to use the definitions in the Glossary in Art. 6.10.

(055) Amend Art. 6.10 as follows (new text in bold, deleted text in strikethrough):

"*6.10*. A new combination (combinatio nova, comb. nov.) ~~or name at new rank (status novus, stat. nov.)~~ is a new name **for a taxon below the rank of genus** based on a legitimate, previously published name, which is its basionym. **A name at new rank (status novus, stat. nov.) is a new name based on a legitimate, previously published name at a different rank, which is its basionym.** The basionym does not itself have a basionym; it provides the final epithet[1], name, or stem of the new combination or name at new rank. (See also Art. 41.2)."

Do new combinations need to be validly published under Art. 41? Article 6.10 defines a new combination as a "name" (which includes a name validly published under Art. 38) based on an earlier name; therefore, one potential misreading is that Art. 6.10 permits valid publication of a new combination under Art. 38. It seems desirable to alert the reader that Art. 41 is the appropriate publication rule.

(056) Amend the first sentence of Art. 6.10 as follows (new text in bold):

"*6.10*. A new combination (combinatio nova, comb. nov.) or name at new rank (status novus, stat. nov.) is a new name **validly published in accordance with Art. 41 and** based on a legitimate, previously published name, which is its basionym."

While the interaction among Art. 6.9, 6.10 and 41 is generally clear, there are a few questions. The rules in Art. 41 state that, in order to be validly published, a new combination must refer to certain items. The first question is whether the "based on" requirement in Art. 6.10 imposes an additional requirement beyond that required by the reference rules in Art. 41. For example, is a name based on an earlier name if there is no evidence that the later author is aware of the validly published earlier name and its author? The Examples in Art. 41.3 and 41.4 dealing with indirect references and "presumed intent" imply that no additional requirement is imposed by the "based on" rule.

Another question is whether a name that meets all the publication requirements in both Art. 38 (dealing with names of new taxa) and Art. 41 can be either a new combination or the name of a new taxon with a different type. (This is possible for some replacement names, as seen in Art. 6.13.) Article 48.1 provides the answer: a name is the name of a new taxon if it has an "apparent" basionym but the author "explicitly excludes" the type of that earlier name. This suggests that a name is not "based on" an earlier name if the author explicitly excludes the type of the earlier name; as a result, the earlier name is not a basionym but is an "apparent" basionym. But Art. 6.10 does not mention Art. 48.

(057) Amend Art. 6.10 as follows (new text in bold, deleted text in strikethrough):

"*6.10*. A new combination (combinatio nova, comb. nov.) or name at new rank (status novus, stat. nov.) is a new name based on a legitimate, previously published name, which is its basionym. **The new name is based on the earlier name if *(1)* the earlier name provides the final epithet[1], name, or stem of the new name, *(2)* the new name is validly published in accordance with Art. 41, and *(3)* the type of the earlier name is not explicitly excluded (see Art. 48.1).** The basionym does not itself have a basionym~~; it provides the final epithet[1], name, or stem of the new combination or name at new rank~~. (See also Art. 41.2)."

The same concerns giving rise to Proposal (056) apply to replacement names in Art. 6.11 and 6.12. The latter Article is trickier due to its two-part definition. In addition, Art. 6.12(b) seems to state incorrectly that a name as described in Art. 7.5(b) is both a replacement name and name of a new taxon.

(058) Amend the first sentence of Art. 6.11 as follows (new text in bold):

"*6.11*. A replacement name (nomen novum, nom. nov.) is a new name **validly** published **in accordance with Art. 41** as an explicit substitute (avowed substitute) for a legitimate or illegitimate, previously published name, which is its replaced synonym."

(059) Amend Art. 6.12 as follows (new text in bold, deleted text in strikethrough):

"*6.12*. A name not explicitly proposed as a substitute for an earlier name is nevertheless a replacement name either ~~*(a)*~~ if it is ***(a)* validly published in accordance with Art. 41 and** validated solely by reference to that earlier name or *(b)* **treated as a replacement name** under the provisions of Art. 7.5."

Under the *Shenzhen Code*, there are now three ways in which replacement names may be published, yet Art. 6.11 suggests otherwise. A cross-reference to Art. 6.12 and 6.13 should be added to Art. 6.11.

(060) Amend Art. 6.11 as follows (new text in bold):

"*6.11*. A replacement name (nomen novum, nom. nov.) is a new name published as an explicit substitute (avowed substitute**; but see Art. 6.12 and 6.13**) for a legitimate or illegitimate, previously published name, which is its replaced synonym. The replaced synonym, when legitimate, does not provide the final epithet, name, or stem of the replacement name (see also Art. 41.2 and 58.1)."

Added to the *Shenzhen Code*, the new Art. 6.13 provides flexibility regarding the treatment of a name as a replacement name or name of a new taxon if the protologue cites the potential replaced synonym and the rules for valid publication of the name of a new taxon are otherwise met. Literally read, Art. 6.13 does not apply if the protologue of a replacement name published before 2007 meets all the conditions needed to satisfy Art. 41 but does not cite the replaced synonym itself as first required in 2007 (Art. 41.5). Conversely, it is not clear if Art. 6.13 applies to a name published from 1953 onward if the replaced synonym is cited but the protologue does not refer to its place of publication or another item required by Art. 41.5.

In addition, the second sentence of Art. 6.13 does not contemplate that a name might already be typified in a manner that was not based on predominant usage; it therefore seems to imply that such a type is unacceptable. Furthermore, it seems undesirable to allow a future designation of a type to be disputed by a later party who disagrees with the earlier party's assessment of the name's predominate usage.

(061) Amend Art. 6.13 as follows (new text in bold, deleted text in strikethrough):

"*6.13*. A name not explicitly proposed as a substitute for an earlier name and not covered by Art. 6.12 may be treated either as a replacement name or as the name of a new taxon if in the protologue[1] both *(a)* ~~a potential replaced synonym is cited~~ **all requirements of Art. 41 for valid publication of a replacement name are met** and *(b)* all requirements for valid publication of the name of a new taxon are independently met. Decision on the status of such a name is ~~to be based on predominant usage and is to be~~ effected by means of appropriate type designation (Art. 9 and 10)."

(062) Add a new Recommendation 6A.1 as follows:

"*6A.1*. The decision on typification under Art. 6.13 should be based on predominant usage of the name."

Article 6.9 states that the name of a new taxon cannot be "based on" a previously validly published name. The term "based on" raises two concerns. First, while the definition of replacement name in Art. 6.11 of the *Melbourne Code* (McNeill & al. in Regnum Veg. 154. 2012) used the term "based on", it is no longer used in the *Shenzhen Code*; no ancillary revisions were made in Art. 6.11 to reflect the new language in Art. 6.11–6.13. Second, some names might qualify as new combinations, except for the omission of a detail required by Art. 41.5, but nonetheless meet the Art. 38 publication rules. Prior to the *Melbourne Code*, Art. 33.8 of the *Vienna Code* (McNeill & al. in Regnum Veg. 146. 2006) stated that these names were not validly published; however, Art. 33.8 of the *Vienna Code* was deleted, because it "serves no useful purpose, but instead does harm" (Turland in Taxon 59: 1921. 2010). However, some might still read Art. 6.9 as precluding valid publication of those names on the basis that such a name is "based on a previously validly published name".

(063) Amend Art. 6.9 as follows (deleted text in strikethrough):

"*6.9*. The name of a new taxon (e.g. genus novum, gen. nov., species nova, sp. nov.) is a name validly published in its own right, i.e. ~~one not based on a previously validly published name;~~ it is not a new combination, a name at new rank, or a replacement name."

Article 41.5 provides that in order to publish a replacement name after 1952, the publication must refer to the replaced synonym and its bibliographic reference. However, this is not correct in the case of a replacement name under Art. 6.12(b) (i.e. an illegitimate superfluous name under Art. 52); such a name can exist by virtue of including the type of the replaced synonym, even if the replaced synonym is not referenced. (As a result, one could read the *Shenzhen Code* as providing that illegitimate superfluous names that do not meet the requirements under Art. 41 are not validly published names!)

(064) Add a new Art. 41.9 as follows:

"*41.9*. None of the foregoing requirements in Art. 41 applies to a replacement name that is illegitimate under Art. 52 if neither Art. 7.5 (a) nor (b) applies."

Acknowledgements

I thank J.H. Wiersema and N.J. Turland for significantly improving these proposals.

(065) Proposal to amend Article 7.2 and add a definition of "typify" to the Glossary

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Lidén (in Taxon 69: 623–624. 2020) has proposed changes to the final sentence of Art. 7.2 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), which explains that nomenclatural types may be neither typical nor representative of the taxon. The current wording has its origins in proposals made by British botanists to the 1930 International Botanical Congress (Sprague & al., Nom. Prop. Brit. Bot.: 9. 1929) and is first used in the 1935 *Cambridge Rules* (Briquet, Int. Rules Bot. Nomencl. Cambridge: 3. 1935), where the term "nomenclatural type" is also used in the *Rules* for the first time. However, the Brussels *Règles* of 1912 had used the French terms "le type de nomenclature de ce groupe", "le genre-type" and "l'espèce-type" (Recommendation XVIII^{bis}) (Briquet, Règles Int. Nomencl. Bot. Vienne, ed. 2 Bruxelles: 22. 1912) that were presented in English as "the type of the group", "the typical genus" and "the typical species", respectively (Briquet, l.c.: 42. 1912), and may have been the reason for emphasizing in a Note that "The nomenclatural type is not necessarily the most typical or representative element of a group" in the 1935 *Cambridge Rules*. The problem is further compounded by the more recent use of three terms derived from the verb to typify, i.e. "typification" (of a name), "typified" (name) and "typifying" (author), which normal dictionary definitions link to typical, i.e. distinguishing or characteristic or representative of a kind or category. None of these terms is mentioned in the Glossary. Defining the terms and breaking their link to their normal linguistic use is an alternative solution. The following changes are therefore proposed.

(065) Amend Art. 7.2 as follows (new text in bold, deleted text in strikethrough):

"*7.2*. A nomenclatural type (typus) is that element to which the name of a taxon is permanently attached, whether as the correct name or as a synonym. ~~The nomenclatural type is not necessarily the most typical or representative element of a taxon.~~ **The terms nomenclatural type, type, typify (including typified and typifying), and typification are technical terms used in this *Code* and are not to be interpreted as meaning typical in normal linguistic use.**"

Add the following definition to the Glossary:

"*typify*. [Not defined] – to attach a nomenclatural type to a name of a taxon; the process of which is *typification* (Art. 7–10, F.5.4, and F.5.5) (see also ***automatic typification***, ***nomenclatural type***, and *type designation*)."

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(066–068) Proposals regarding type designation requirements (amendments to Articles 7 and 9)

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At least five different Articles in the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) impose conditions on the designation of a lectotype (or its equivalent in Art. 10), neotype or epitype. Yet the language used is rather different. Articles 9.21, 9.22 and 9.23 state the type "is not effected unless" the applicable condition is met. In clear contrast, Art. 7.10 and 7.11 state "For purposes of priority (Art. 9.19, 9.20, and 10.5), designation of a type is achieved only" if the applicable condition is met. The only apparent reason for the difference is that the language was proposed by different authors.

The language in Art. 7.10 and 7.11 is a bit troubling. Article 7.10 provides that types (other than holotypes) must be effectively published. Apparently some thought a type could be established merely by writing "type" on the specimen. However, the "for purposes of priority" implies that a type can be designated for other purposes without effective publication. One interpretation might be that writing "type" on the specimen makes it a lectotype that is permanently attached to the name (Art. 7.2), but because it is not effectively published anyone can later supersede it. That hardly seems like a desirable result.

Similarly, the proposal adding what is now Art. 7.11 (McNeill in Taxon 35: 873–874, prop. (292). 1986) said it set forth the minimum requirements to designate a type. Again, the "for purposes of priority" language implies otherwise.

(066) Amend Art. 7.10 as follows (new text in bold, deleted text in strikethrough):

"*7.10*. ~~For purposes of priority (Art. 9.19, 9.20, and 10.5), designation~~ **Designation** of a type is **not** achieved **unless made in an** ~~only by~~ effective publication."

(067) Amend Art. 7.11 as follows (new text in bold, deleted text in strikethrough):

"*7.11*. ~~For purposes of priority (Art. 9.19, 9.20, and 10.5), designation~~ **Designation** of a type is **not** achieved ~~only if~~ **unless** the type is definitely accepted as such by the typifying author, ~~if~~ the type element is clearly indicated by direct citation by including the term "type" (typus) or an equivalent and on or after 1 January 2001, ~~if~~ the typification statement includes the phrase "designated here" (hic designatus) or an equivalent."

Make a conforming change in Art. F.5.4.

Various rules in Art. 9 state a designation is not "effected" unless certain conditions are met. In order to be consistent with Art. 7.10 and 7.11, "achieved" is substituted for "effected".

(068) Amend Art. 9.21 as follows (new text in bold, deleted text in strikethrough):

"*9.21*. Designation of an epitype is not ~~effected~~ **achieved** unless the herbarium, collection, or institution in which the epitype is conserved is specified or, if the epitype is a published illustration, a full and direct bibliographic reference (Art. 41.5) to it is provided."

Make conforming changes in Art. 9.9, 9.22 and 9.23.

(069) Recommendation for adding photographs of type specimens to the protologues of new names of taxa at the rank of species or below

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Article 7 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), dealing with typification, ends with the Recommendation 7A.1, "It is strongly recommended that the material on which the name of a taxon is based, especially the holotype, be deposited in a public

herbarium or other public collection with a policy of giving bona fide researchers access to deposited material, and that it be scrupulously conserved." I propose to add a further Recommendation.

(069) Add a new Recommendation 7B to read as follows:

"*7B.1*. It is strongly recommended that the protologue of the name of a new taxon at the rank of species or below include at least one photograph of the mounted holotype with its label."

To my mind, adding even the simplest photographs would improve the utility of type material for current and future researchers, not to mention Artificial Intelligence (machine reading, machine learning). It might also help improve the quality of labels.

Acknowledgement

I thank John McNeill for his encouragement and Nicholas Turland for improving my wording.

(070) Proposal to add a new Example after Article 9 Note 6 to illustrate when the term "holotype" cannot be corrected

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Some confusion may arise regarding the application of Art. 9.10 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018). When the term "holotype" is misused, it can be corrected (to lecto-, neo- or epitype). For this, the requirements of Art. 7.11 must be met. While Art. 9 Ex. 11 illustrates when the misused term "holotype" can be corrected, there is no Example illustrating when the term cannot be corrected. Although Art. 7.11 is clear, and a typification statement on or after 1 January 2001 must include the phrase "designated here" or an equivalent, adding an Example after Art. 9 Note 6 could be clarifying. Hence, I feel that the following new Example should be included in the *Code*.

(070) Add a new Example after Art. 9 Note 6:

"*Ex. n*. Bohley & al. (in Syst. Bot. 42: 138. 2017) cited the specimen *Balansa 2263* (G) as the "type" and "holotype" of *Cypselea meziana* K. Müll. (in Bot. Jahrb. Syst. 42(Beibl. 97): 72. 1908). However, this use of the term holotype cannot be corrected to lectotype because the requirement of Art. 7.11 to include, on or after 1 January 2001, the phrase "designated here" or an equivalent was not met. As a consequence, designation of a lectotype was not achieved until Jocou & Minué (in Phytotaxa 461: 69. 2020) wrote "Lectotype (designated here)" selecting a specimen from the same *Balansa* gathering in P."

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I thank N.J. Turland for the suggestions that improved this proposal.

(071) Proposal for accountability in designating types based on virtually seen original material

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Online databases have provided considerable advantages to many fields of investigation, including plant taxonomy. Despite the positive impacts of digital resources for taxonomists, especially in providing ease of access to information regarding literature and (potential) type specimens, there can be surprising negative consequences. In recent years there has been a very significant increase in the number of papers

that include typifications based on inspection of digital images of original material rather than the actual specimens. There is a common curatorial issue associated with undertaking typifications, especially those based on web-sourced, digital images. This problem is not caused by web access *per se*, but it is certainly exacerbated by it. In our experience, authors infrequently notify herbaria that one or more of their specimens has been selected or nominated as a particular type, lectotype being a common example. Authors infrequently send their publications (and/or appropriately annotated determinavit/confirmavit slips) to affected herbaria. Therefore, these institutions are very often unaware that changes have occurred that affect their holdings, and the appropriate specimen curation is not done. A possible (but seemingly not common) consequence of this is that it could lead to an inadvertent retypification of the typified name.

We are aware of very many examples from a range of journals where herbarium specimens have not been annotated as to their type status following publication of the article. It is relevant to remember here that the purpose of typification is (hopefully) to bring more precision and stability to names involved. Therefore, in our view, these goals would be best served if specimens newly designated as types were appropriately annotated as an integral part of the typification process. In view of the above, we feel that a new Recommendation in the *Code* (Turland & al. in Regnum Veg. 159. 2018) is warranted.

(071) Add a new paragraph to Rec. 9C:

"*9C.2*. In the case that a choice of holotype, lectotype, neotype, or epitype is based on web-sourced, digital images of specimens, the author(s) designating the type should notify the curator of the herbarium, collection, or institution to update the labelling of the specimen and thereby reduce the chances of further nomenclatural amendments or inadvertent retypification."

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(072) Proposal to clarify Article 20.3 concerning the form of a generic name, to amend its Examples and to add a new Example

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The present Art. 20.3 needs to be clarified by stating its main clause positively, not negatively as at present. As currently worded, it could give the false impression that a generic name formed from two words combined into one is not admissible, although *Quisqualis* in the current Ex. 8 (our Ex. 7 below) shows that this is not the intention. Also, the Examples in Art. 20.3 could be made more understandable by slight modifications and rearrangement. We propose the following amendments.

(072) Amend Art. 20.3 (new text in bold, deleted text in strikethrough):

"*20.3*. The name of a genus ~~may not consist of two words, unless these words are~~ **must consist of one word (which may be formed by combining two or more words into one), or of two words** joined by a hyphen (but see Art. 60.12 for names of fossil-genera **and Art. H.6.2 for names of bigeneric hybrids**)."

Replace Ex. 7 and 8 with the following three Examples:

"*Ex. 7*. Names validly published that consisted of one word when originally published: *Quisqualis* L. (Sp. Pl., ed. 2: 556. 1762, *'Qvisqvalis'*) (formed by combining two words into one); *Asplenium* L. (Sp. Pl.: 1078. 1753); *Mnium* Hedw. (Sp. Musc. Frond.: 188. 1801)."

"*Ex. 8*. Designation not validly published (Art. 32.1(c)) because it was composed of two separate words not connected by a hyphen: *"Uva ursi"* (Miller, Gard. Dict. Abr., ed. 4: *Uva ursi*. 1754); the corresponding name is correctly attributed to Duhamel (Traité Arbr. Arbust. 2: 371. 1755) as *Uva-ursi* (hyphenated when published)."

"*Ex. 8bis*. Names validly published that consisted of two words hyphenated when originally published: *Neves-armondia* K. Schum. (in Engler & Prantl, Nat. Pflanzenfam. Nachtr. 1: 302. 1897), *Sebastiano-schaueria* Nees (in Martius, Fl. Bras. 9: 158. 1847), and *Solms-laubachia* Muschl. ex Diels (in Notes Roy. Bot. Gard. Edinburgh 5: 205. 1912)."

(073–075) Proposals to clarify the status of epithets in the ablative case

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Article 23 in the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) is unclear about whether species names with epithets in the ablative case are validly published, even though botanical tradition has regarded such names as unacceptable and the *Berlin*, *Tokyo*, *Saint Louis*, *Vienna*, and *Melbourne Codes* regarded such names as not validly published (Garland in Taxon. 2021, https://doi.org/10.1002/tax.12455). This lack of clarity arises because Art. 23.6(a) only prohibits phrase names (Linnaean "nomina specifica legitima"), i.e. diagnostic polynomial names usually in the ablative case, not binomial epithets (Linnaean "nomina trivialia") in the ablative case. Moreover, the *Shenzhen Code* added *Solanum fructu-tecto* Cav., which has an epithet in the ablative case, to Art. 60 Ex. 41, implying that the name is validly published. The following proposals are offered to make the *Code* clearly state that names with epithets in the ablative case are not validly published. Proposal (073) is one alternative. Proposal (074) is another alternative that may better fit the current structure of Art. 23, in which Art. 23.1 is a positive statement about what a species name can be and Art. 23.6 is a series of negative statements about what a species name cannot be. If either alternative is accepted, Prop. (075) should be accepted as well. Proposal (075) makes clear that Art. 23.7 applies only to Linnaean names with epithets in the form of ablative phrases, not to all Linnaean names with phrase epithets, and that, despite the prohibition on epithets in the ablative case, such Linnaean names are validly published and correctable. Proposal (075) also deletes *Solanum fructu-tecto* from Art. 60 Ex. 41.

(073) Amend Art. 23.1 and Art. 23 Ex. 1 as follows (new text in bold):

"*23.1*. The name of a species is a binary combination consisting of the name of the genus followed by a single specific epithet in the form of an adjective, a noun in the genitive, or a word in apposition**, but not a phrase in the ablative case** (see also Art. 23.6 **and 23.7**). […]"

"*Ex. 1. Adiantum capillus-veneris, Atropa bella-donna, Cornus sanguinea, Dianthus monspessulanus, Embelia sarasinorum, Fumaria gussonei, Geranium robertianum, Impatiens noli-tangere, Papaver rhoeas, Spondias mombin* (an indeclinable epithet), *Uromyces fabae***, but not *Solanum "fructu-tecto"* (Cavanilles, Icon. 4: 5. 1797)**."

(074) As an alternative to Prop. (073), add a new clause to Art. 23.6 and a new Example as follows:

[*23.6*. The following designations are not to be regarded as species names:]

"*(x)* Designations consisting of a generic name followed by an epithet in the form of a phrase in the ablative case (but see Art. 23.7)."

"*Ex. 11bis. Solanum "fructu-tecto"* (Cavanilles, Icon. 4: 5. 1797) is a generic name followed by an epithet in the form of a phrase in the ablative case. It is not to be regarded as a species name."

(075) If either Prop. (073) or Prop. (074) is accepted, amend Art. 23.7 and Art. 60 Ex. 41 as follows (new text in bold, deleted text in strikethrough):

"*23.7*. **Names in which Linnaeus used phrases in the ablative case** ~~Phrase names used by Linnaeus~~ as specific epithets ("nomina trivialia") are to be corrected in accordance with later usage by Linnaeus himself ~~(but see Art. 23.6(c))~~."

[Art. 60] "*Ex. 41*. Hyphen to be maintained: *Athyrium austro-occidentale* Ching (in Acta Bot. Boreal.-Occid. Sin. 6: 152. 1986); *Enteromorpha roberti-lamii* H. Parriaud (in Botaniste 44: 247. 1961), in which the given name and surname stand independently because they are separately latinized; *Piper pseudo-oblongum* McKown (in Bot. Gaz. 85: 57. 1928); *Ribes non-scriptum* (Berger) Standl. (in Publ. Field Mus. Nat. Hist., Bot. Ser. 8: 140. 1930); ~~*Solanum fructu-tecto* Cav. (Icon. 4: 5. 1797);~~ *Vitis novae-angliae* Fernald (in Rhodora 19: 146. 1917)."

(076–077) Proposals to amend Article 38.4, to extend its application to an illustration with analysis, and to add a new Article with a new Example

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According to Art. 38.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), "In order to be validly published, a name of a new taxon (see Art. 6.9) must *(a)* be accompanied by a description or diagnosis of the taxon (see also Art. 38.7 and 38.8) or, […]."

According to Art. 38.4, "When it is doubtful whether a descriptive statement satisfies the requirement of Art. 38.1(a) for a "description or diagnosis", a request for a decision may be submitted to the General Committee, […]." If all steps of the process described in this Article are ratified, it will become a binding decision with retroactive effect.

According to Art. 38.8, "The name of a new species or infraspecific taxon published before 1 January 1908 may be validly published even if only accompanied by an illustration with analysis (see Art. 38.9 and 38.10)." Although an illustration with analysis has the same power as a description or diagnosis to achieve valid publication of a name published before 1908, doubts may arise about whether an illustration satisfies the requirement of Art. 38.1(a) when it is accepted in place of a description or diagnosis according to Art. 38.7 or 38.8. Currently, there is no explicit provision allowing these doubts to be submitted to the General Committee for an evaluation that would eventually result in a binding decision. For example, several names published by Vellozo in his *Florae fluminensis* are validated by plates that were published in 1831 before the written descriptions, which were published 50 years later (in Arq. Mus. Nac. Bot. Rio de Janeiro 5: 1–461. 1881). These plates vary in quality, and several names based upon them have been considered by different authors to be either validly or not validly published. In other words, the validity of these names rests upon the arbitrary opinion of the taxonomist.

To reduce confusion as to whether an illustration in place of a description or diagnosis satisfies the requirement of Art. 38.1(a) for valid publication, we suggest amending Art. 38.4 to explicitly permit a request for a decision on the matter to be submitted to the General Committee.

We also propose a new Article to rule that when established practice has been to treat a particular descriptive statement or illustration with analysis as validating a name, this practice must be followed in order to maintain nomenclatural stability. This new Article would be parallel to a similar provision in Art. 53.2 governing established practice on parahomonymy, the other situation in the *Code* for which binding decisions can be requested.

A new Example is presented to illustrate when a name should be accepted when it is based on an illustration with analysis.

(076) Amend Art. 38.4 as follows (new text in bold):

"*38.4*. When it is doubtful whether a descriptive statement satisfies the requirement of Art. 38.1(a) for a "description or diagnosis" **or whether an illustration with analysis is acceptable in its place (Art. 38.7 and 38.8)**, a request for a decision may be submitted to the General Committee, which will refer it for examination to the specialist committee for the appropriate taxonomic group (see Div. III Prov. 2.2, 7.9, and 7.10). A Committee recommendation as to whether or not the name concerned is validly published may then be put forward to an International Botanical Congress and, if ratified, will become a binding decision with retroactive effect. These binding decisions are listed in App. VI."

(077) Add a new Article with a new Example after Art. 38.4:

"*38.4bis*. When the established practice has been to treat a descriptive statement as satisfying the requirement of Art. 38.1(a) for a "description or diagnosis" or whether an illustration with analysis is acceptable in its place (Art. 38.7 and 38.8), this practice is to be continued if it is in the interest of nomenclatural stability."

"*Ex. n. Mimosa monjollo* Vell. (Fl. Flumin. Icon. 11: ad t. 26. 1831) was validly published based on an illustration. When Martius published the new combination *Enterolobium monjollo* (Vell.) Mart. (in Flora 20(2 Beibl.): 117. 1837, *'mongollo'*), he implicitly considered the illustration as diagnostic, i.e. an illustration with analysis, and accepted it to validate the name. Martius's position has become established practice, which must therefore be followed."

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(078) Proposal to add a new Example of an indirect reference after Article 38.14

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According to Art. 38.14 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), an indirect reference is a clear (if cryptic) indication that a previously and effectively published description or diagnosis applies to the name of a new taxon. *Statice minuta* L. (Mant. Pl.: 59. 1767) was cited by Tenore (Syll. Pl. Fl. Neapol.: 162. 1831) as a plant reported for the Kingdom of Naples by Petagna (Inst. Bot. 2: 562. 1787), who simply transcribed the protologue by Linnaeus (l.c.). Later, in Appendix Tertia of his *Sylloge*, Tenore (l.c.: 593. 1833) identified as *S. minuta* a plant observed near Naples (southern Italy), but did not include any description or diagnosis. Gussone (Enum. Pl. Inarim.: 268. 1855) published *S. tenoreana* without a description or diagnosis, but reported as a synonym "*S. minuta* Ten. Syll. p. 593 (non Lin.)", referring to the plant identified as *S. minuta* in Appendix Tertia of Tenore's *Sylloge*; this appendix (l.c.: 581–639. 1833) cited additional records for the species listed in the main part of the work (l.c.: 7–529. 1831). Gussone's citation can be considered as a cryptic reference to another work by Tenore (Fl. Napol. 5: 338. 1835–1838), in which Tenore cited the relevant page (593) of the *Sylloge* and provided a description of his concept of *S. minuta* L. Note that the *Sylloge* and most of its appendices were published also *in folio* together with the *Flora* (see Del Guacchio & Gargiulo in Delpinoa, n.s., 46: 29–50. 2004).

The following new Example can clarify that a name of a new taxon can be validly published, and is not necessarily a nomen nudum, when the previously and effectively published description or diagnosis was published later than the work directly cited in the protologue.

(078) Add a new Example after Art. 38.14:

"*Ex. 23*. The name *Statice tenoreana* was originally proposed by Gussone (Enum. Pl. Inarim.: 268. 1855) without any description or diagnosis but citing "*S. minuta*. Ten. Syll. p. 593 (non Lin.)". However, Tenore (Syll. Pl. Fl. Neapol.: 593. 1833) did not include any description of *S. minuta*, which was provided only later (Tenore, Fl. Napol. 5: 338. 1835–1838), along with a reference to page 593 of the *Sylloge*. *Statice tenoreana* Guss., although lacking a description or diagnosis both in the protologue and in the directly cited *Sylloge* of Tenore, is validly published by the indirect reference to the description in Tenore's *Flora napolitana* (1835–1838)."

(079) Proposal to convert Recommendation 41A.1 into an Article

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Recommendation 41A.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) states that "The full and direct reference to the place of publication of the basionym or replaced synonym should immediately follow a proposed new combination, name at new rank, or replacement name. It should not be provided by mere cross-reference to a bibliography at the end of the publication or to other parts of the same publication, e.g. by use of the abbreviations 'loc. cit.' or 'op. cit.'" However, this Recommendation has not been followed by some authors in their publications owing to strict adherence to the format required by some journals, i.e. "Author(s) (year: page/plate number(s))" with full bibliographic details given in the References section of the paper. This is especially apparent in the journal *Phytotaxa*, but not in all cases (e.g. Kanokorn & al. in Phytotaxa 162: 120. 2014). Furthermore, there are a few other taxonomic journals such as *Blumea* and *Telopea* that follow this format for bibliographic/nomenclatural citation. However, when it comes

to new combination, name at new rank or replacement name, a full and direct reference to the place of publication is also given immediately after the basionym or replacement name.

As pointed out by Turland (Code Decoded, ed. 2: 39. 2019), we strongly feel that this method of citation is against what the *Code* recommends, even though it technically complies with what the *Code* rules. To bring uniformity to such citations, we would like to make Rec. 41A.1 mandatory by upgrading it to an Article by means of an amendment to the existing Art. 41.5, as follows.

(079) Amend Art. 41.5 as follows (new text in bold) and delete Rec. 41A.1:

"*41.5*. On or after 1 January 1953, a new combination, name at new rank, or replacement name is not validly published unless its basionym or replaced synonym is clearly indicated and a full and direct reference given to its author and place of valid publication, with page or plate reference and date (but see Art. 41.6 and 41.8). On or after 1 January 2007, a new combination, name at new rank, or replacement name is not validly published unless its basionym or replaced synonym is cited. **On or after 1 January 2025, a new combination, name at new rank, or replacement name is not validly published unless it is immediately followed by the full and direct reference to the author and place of publication of its basionym or replaced synonym.**"

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(080) Proposal to amend Article H.5.2 concerning a nothotaxon with parent taxa at unequal ranks

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Article H.5.2 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) currently states that "If the postulated or known parent taxa are at unequal ranks, the appropriate rank of the nothotaxon is the lowest of these ranks." This wording, perhaps unintentionally, creates a problem in certain cases. If the nothotaxon is the only one known for hybrids between the species to which its unequally ranked parent taxa belong, the rule could be interpreted as the author being instructed to publish an autonym at the lower rank, without valid publication of the name of an infraspecific nothotaxon that does not include the type of the nothospecies to which it is subordinate. This would be contrary to Art. 22.3.

To clarify this situation, it is proposed that an explanatory clause and a further Example be added to Art. H.5.2.

(080) Amend Art. H.5.2 as follows (new text in bold):

"*H.5.2*. If the postulated or known parent taxa are at unequal ranks, the appropriate rank of the nothotaxon is the lowest of these ranks**, unless the nothotaxon is the only one known for hybrids between the species to which the parent taxa of the nothotaxon belong**."

"*Ex. 3*. Smith & Figueiredo published the name *Aloe* ×*engelbrechtii* Gideon F. Sm. & Figueiredo (in Phytotaxa 464: 253. 2020) for the nothospecies with parents *A. arborescens* Mill. var. *arborescens* and *A. hardyi* Glen. If a nothotaxon is described between *A. arborescens* var. *mzimnyati* van Jaarsv. & A. E. van Wyk and *A. hardyi*, it will be at the rank of nothovariety and valid publication of its name will establish an autonym that will apply to *A. arborescens* var. *arborescens* × *A. hardyi*."

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(081–082) Proposals to allow the use of a hyphen to be treated as a correctable error in all nothogeneric names that are condensed formulas

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In the current *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), one might infer from the last sentence of Art. H.6.2, which covers nothogeneric names of bigeneric hybrids that are condensed formulas ("The use of a hyphen instead of or in addition to a connecting vowel is treated as an error to be corrected by deletion of the hyphen."), that this rule applies only to names of bigeneric hybrids. When this sentence, which was new in the *Shenzhen Code*, was originally proposed by Greuter (in Taxon 65: 419. 2016), its relevance to other nothogeneric names that are condensed formulas was not apparently appreciated. Indeed, the new Ex. 5 under Art. H.6.2 presents two nothogeneric names that both involve bigeneric hybrids, originally published with a hyphen, which are accepted and used without the hyphen: ×*Anthematricaria* and ×*Brassocattleya*, having been originally published as *'Anthe-Matricaria'* and *'Brasso-Cattleya'*, respectively.

The current placement of this hyphenation rule under Art. H.6.2 suggests that it does not cover all situations for nothogeneric names that are condensed formulas. In particular, for nothogeneric names of trigeneric hybrids covered under Art. H.6.4, a parallel provision to permit deletion of hyphens in names published with one or more hyphens does not currently exist. Yet the first case cited in Ex. 7 under this Article is of one such nothogenus, ×*Sophrolaeliocattleya* Hurst (in J. Roy. Hort. Soc. 21: 468. 1898) (*Cattleya* Lindl. × *Laelia* Lindl. × *Sophronitis* Lindl.), which, although not indicated in the Example, was actually published as *'Sophro-Lælio-Cattleya'*. As such, this condensed formula was not, as Art. H.6.4 requires, "combined into a single word", owing to the intercalated hyphens, so the nothogeneric name cannot be validly published (Art. 32.1(c)). Another related example is the case of ×*Brassolaeliacattleya* J.G. Fowler (in Gard. Chron., ser. 3, 41: 290. 1907, *'Brasso-Lælia-Cattleya'*), the subject of conservation proposal no. 2457 (Shaw in Taxon 65: 887. 2016), currently awaiting the judgement of the General Committee, which deferred action until after the Shenzhen Congress (see Taxon 66: 743. 2017), presumably wrongly believing the matter of its valid publication would be resolved there.

The main objective of the present proposal is to address this problem by creating a new Article under Art. H.6 to clarify that when a nothogeneric name, whether bigeneric or trigeneric, is a condensed formula (see Art. H.6.2 and H.6.4) published with hyphen(s), the name can be validly published and is correctable by deletion of the hyphen(s).

The new Article and its new Example, and one small change in Art. H.6 Ex. 7, are presented below.

(081) Add a new Article under Art. H.6:

"*H.6.n*. The use of a hyphen instead of or in addition to a connecting vowel in a nothogeneric name that is a condensed formula is treated as an error to be corrected by deletion of the hyphen(s) (but see Art. 20.3 for non-hybrid generic names; see also Art. 60.12 for names of fossil-genera)."

Consequently amend Art. H.6.2 as follows (deleted text in strikethrough):

"*H.6.2*. The nothogeneric name of a bigeneric hybrid is a condensed formula in which the names adopted for the parental genera are combined into a single word, using the first part or the whole of one, the last part or the whole of the other (but not the whole of both) and, optionally, a connecting vowel. ~~The use of a hyphen instead of or in addition to a connecting vowel is treated as an error to be corrected by deletion of the hyphen.~~"

(082) Amend Art. H.6 Ex. 5 as follows (new text in bold, deleted text in strikethrough) and place it after the new Art. H.6.n:

"*Ex. n*. The nothogeneric name ×*Anthematricaria* Asch. (in Ber. Deutsch. Bot. Ges. 9: (99). 1892), proposed for **bigeneric** hybrids with the parentage *Anthemis* L. × *Matricaria* L., was originally published as *'Anthe-Matricaria';* ~~the nothogeneric name~~ ×*Brassocattleya* Rolfe (in Gard. Chron., ser. 3, 5: 438. 1889), proposed for **bigeneric** hybrids with the parentage *Brassavola* R. Br. × *Cattleya* Lindl., was originally published as *'Brasso-Cattleya';* **×*Brassolaeliacattleya* J. G. Fowler (in Gard. Chron., ser. 3, 41: 290. 1907), proposed for trigeneric hybrids with the parentage *Brassavola* R. Br. × *Cattleya* Lindl. × *Laelia* Lindl., was originally published as *'Brasso-Laelia-Cattleya';* ×*Sophrolaeliocattleya* Hurst (in J. Roy. Hort. Soc. 21: 468. 1898), proposed for trigeneric hybrids with the parentage *Cattleya* Lindl. × *Laelia* Lindl. × *Sophronitis* Lindl., was originally published as *'Sophro-Laelio-Cattleya'***."

Consequently amend Art. H.6 Ex. 7 as follows (deleted text in strikethrough):

"Ex. 7. ~~×*Sophrolaeliocattleya* Hurst (in J. Roy. Hort. Soc. 21: 468. 1898) (*Cattleya* Lindl. × *Laelia* Lindl. × *Sophronitis* Lindl.);~~ ×*Rodrettiopsis* Moir (in Orchid Rev. 84: ix. 1976) (*Comparettia* Poepp. & Endl. × *Ionopsis* Kunth × *Rodriguezia* Ruiz & Pav.); ×*Holttumara* Holttum (see Art. H.8 Ex. 3) (*Arachnis* Blume × *Renanthera* Lour. × *Vanda* W. Jones ex R. Br.)."

PROPOSALS TO AMEND THE CODE

Edited by Nicholas J. Turland & John H. Wiersema

The XX International Botanical Congress will take place in Madrid, Spain in 2024 instead of in Rio de Janeiro, Brazil in 2023. Proposals to amend the *Code* are transferred to the Madrid Congress and no further action by the authors is required. *Taxon* will close for proposals on 31 March 2023, i.e. one year later than originally scheduled (see Turland & Wiersema in Taxon 68: 1372–1373. 2019). Late submissions received by 30 June 2023 may be accepted at the editors' discretion if no reviewing or major editing is necessary.

(083–087) Proposals to amend Article 10 concerning the typification of generic names

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Article 10 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) uses the words "indicated", "designated", "selected" and "chosen" in connection with types of genus names. Designated and indicated are the correct terms.

(083) Amend Art. 10.1 as follows (new text in bold, deleted text in strikethrough):

"*10.1*. The type of a name of a genus or of any subdivision of a genus is the type of a name of a species (except as provided by Art. 10.4). For purposes of designation or ~~citation~~ **indication** of a type, the species name alone suffices, i.e. it is considered as the full equivalent of its type (see also Rec. 40A.3)."

While Art. 9.1 and its Note 1 generally specify the conditions under which an original type (i.e. a holotype) of a species name or infraspecific name exists, Art. 10 does not use the term "original type" of a name of a genus or subdivision of a genus, despite the fact that this term is referenced throughout the *Shenzhen Code* (e.g. in Art. 6 Ex. 4, Art. 22.2, Art. 22 Ex. 4, Art. 48 Note 2, Art. 48.2, Art. 52.2 and Art. 58 Ex. 4). In fact, perhaps the most important rule (how an author of a generic or subdivisional name establishes its original type) is buried in Art. 10.2 ("unless […] the type was indicated […] or designated by the author of the name") and Art. 40.3. The rule should be affirmatively stated in Art. 10.2. Also, like Art. 9 Note 1, the proposed Art. 10.2 now states that an original type is final.

The proposed wording of Art. 10.2 makes clear that if the type of only a single species name is definitely included in the protologue of a generic or subdivisional name, the type of the species name is the original type of the generic or subdivisional name (unless the latter name is sanctioned, as typification of such names must also consider the sanctioning treatment). This follows from the first sentence of Art. 40.3. However, because Art. 40 deals with the requirement to "indicate" a type after 1957 for valid publication and Art. 40.3 reveals how "indication" of a type is achieved for generic and subdivisional names, its application unrelated to valid publication to pre-1958 names is not readily apparent. Nor does Art. 40.3 properly exclude sanctioned names from being considered as having an acceptable "indication of the type" in the protologue, as is clarified in the proposed wording.

While Art. 10.3 provides the precise meaning of "definite inclusion of the type of a name of a species" for purposes of Art. 10.2, that phrase is not used in Art. 10.2. Instead, Art. 10.2 uses the phrase "the holotype or lectotype of one or more previously or simultaneously published species name(s) is definitely included", which is already embraced in that meaning in Art. 10.3. Accordingly, Art. 10.2 is revised to reflect the phrasing in Art. 10.3.

Article 10.2 suggests that if there is no original type, a type must be designated. This is incorrect – like Art. 9, there is no requirement that a type be designated in this case. However, if one is designated, it must be designated from the types of species names definitely included in the protologue or the sanctioning treatment, unless there are no such types.

(084) Amend Art. 10.2 as follows (new text in bold, deleted text in strikethrough):

"*10.2*. If in the protologue of a name of a genus or of any subdivision of a genus **(excluding sanctioned names: Art. F.3)** the ~~holotype or lectotype~~ **type** of ~~one or more previously or simultaneously published~~ **a single** species name~~(s)~~ is definitely included (see Art. 10.3)**, or indicated (Art. 10.8, 40.1, and 40.3) or designated as the type, that is the original type that fixes the application of the name and is final. If a name of a genus or of any subdivision of a genus has no original type (but see Art. 40.1), a type may be designated, but that** ~~the~~ type must be ~~chosen~~ **designated** from among ~~these~~ **the** types **of any species name(s) definitely included in the protologue**, unless ~~*(a)* the type was indicated (Art. 10.8, 40.1, and 40.3) or designated by the author of the name; or *(b)*~~ the name was sanctioned (Art. F.3), in which case the type may also be ~~chosen~~ **designated** from among the types of species names **definitely** included in the sanctioning treatment **(but see Art. 10.5)**. If no type of a ~~previously or simultaneously published~~ species name was definitely included, a type ~~must~~ **may** be otherwise ~~chosen~~ **designated**,

but the designation is to be superseded if it can be demonstrated that the selected type is not conspecific with any of the material associated with either the protologue or the sanctioning treatment."

The proposed amended Art. 10.2 would read as follows:

"*10.2*. If in the protologue of a name of a genus or of any subdivision of a genus (excluding sanctioned names: Art. F.3) the type of a single species name is definitely included (see Art. 10.3), or indicated (Art. 10.8, 40.1, and 40.3) or designated as the type, that is the original type that fixes the application of the name and is final. If a name of a genus or of any subdivision of a genus has no original type (but see Art. 40.1), a type may be designated, but that type must be designated from among the types of any species name(s) definitely included in the protologue, unless the name was sanctioned (Art. F.3), in which case the type may also be designated from among the types of species names definitely included in the sanctioning treatment (but see Art. 10.5). If no type of a species name was definitely included, a type may be otherwise designated, but the designation is to be superseded if it can be demonstrated that the selected type is not conspecific with any of the material associated with either the protologue or the sanctioning treatment."

Although this is not indicated, it only makes sense that a "previously designated" lectotype is what is intended in the current Art. 10.2 and 10.3, as it would not make sense for a subsequent lectotype designation for a species name not included in a generic protologue to retroactively impact the typification of that generic name. A similar issue arises with regard to Art. 40.3 (involving the valid publication of a generic name), and a conforming change to that Article should also be considered. Furthermore, it would be impossible to cite the lectotype of a name that is "simultaneously published", as lectotypification is always a later act, nor could one cite the holotype of such a name apart from the name itself if that name was "simultaneously published", so the proposed wording of Art. 10.3 has been adjusted accordingly.

(085) Amend Art. 10.3 as follows (new text in bold, deleted text in strikethrough):

"*10.3*. For the purposes of Art. 10.2, definite inclusion of the type of a **species** name ~~of a species~~ is effected by citation of, or reference (direct or indirect) to, a validly published species name, whether accepted or synonymized by the author, or by citation of the holotype or **previously designated** lectotype of a previously ~~or simultaneously~~ published species name."

In Art. 10.5 it should be made clear that the supersession rules do not apply to an original type in the protologue of the name of the genus. Also, a phrase is added to stipulate that a type designation must be followed only when made in accordance with Art. 10.2. A similar statement appears in Art. 9.19, which governs supersession of types of species names or infraspecific names.

(086) Amend the first sentence of Art. 10.5 as follows (new text in bold, deleted text in strikethrough):

"*10.5*. **If there is no original type,** ~~T~~the author who first designates (Art. 7.10, 7.11, and F.5.4) a type of a name of a genus or subdivision of a genus **in conformity with Art. 10.2** must be followed, but the ~~choice~~ **designation** may be superseded if the author used a largely mechanical method of selection (Art. 10.6)."

Because the type of a name of a genus or subdivision of a genus is the type of a name of a species, it is desirable to explicitly state what happens if the type of the species name is changed, e.g. by designation of a lectotype or neotype to replace a lost, destroyed or superseded type, or by conservation.

(087) Add a new Note after Art. 10.1 as follows:

"*Note n*. Because the type of a name of a genus or subdivision of a genus is the type of a name of a species, any change in the type of that species name (e.g. by lectotypification or conservation) also affects the application of the generic name or subdivisional name."

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PROPOSALS TO AMEND THE CODE

Edited by Nicholas J. Turland & John H. Wiersema

(088–090) Proposals to amend Articles 7.11, 9.23 and 40.6 to clarify equivalence to their terms

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Article 7.11 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) rules that "designation of a type is achieved only […] if the type element is clearly indicated by direct citation including the term "type" (typus) or an equivalent […]". In this formulation there is some vagueness about what should be considered as an equivalent of the term "type" (typus). This is clarified partly in the Examples given after Art. 7.11, but, in my opinion, a more precise formulation is needed. An equivalent of the term "type" (typus) can take different forms, i.e. its equivalent in a modern language other than English, a term containing the word element "type" (either in Latin or its equivalent in a modern language), an abbreviation of any of these Latin or modern-language terms or the phrase "standard species" as provided in Art. 7 *Ex. 16.

The unclear formulation "or an equivalent" with respect to "type" in Art. 7.11, which has been unchanged since the adoption of the respective proposal (McNeill in Taxon 35: 873–874, prop. (292). 1986) for the *Berlin Code* (Greuter & al. in Regnum Veg. 118. 1988), is still a source of confusion and misinterpretation. For example, Jarvis (Order out of Chaos: 466. 2007) considered that a designation of lectotype of *Thymus pulegioides* L. (Sp. Pl.: 592. 1753) was achieved by Ronniger (in Heilpfl.-Schriftenr. 18: 19. 1944), who used the following phrase in his discussion of the original material of this name (in German): "Die Originalpflanze liegt im Herbar Linné heute noch aufbewahrt" [The original plant is still preserved in the Linnaean Herbarium today] (see Nachychko & Sosnosky in Willdenowia 50: 23–27. 2020). Following the conditions of Art. 7.11, Jarvis (l.c.) obviously took Ronniger's "Originalpflanze" for an equivalent of "type", and this debatable viewpoint has been adopted in modern taxonomies where the "typification" by Ronniger (l.c.) is treated as acceptable (e.g. Morales in Castroviejo & al., Fl. Iber. 12: 403. 2010; Bartolucci & al. in Taxon 62: 1309. 2013; Nachychko & al. in Phytotaxa 409: 77. 2019).

Therefore, I feel that it would be better to amend Art. 7.11, specifying more precisely what an equivalent of the term "type" (typus) is.

(088) Amend Art. 7.11 as follows (new text in bold, deleted text in strikethrough):

"*7.11*. For purposes of priority (Art. 9.19, 9.20, and 10.5), designation of a type is achieved only if ***(a)*** the type is definitely accepted as such by the typifying author, ~~if~~ ***(b)*** the type element is clearly indicated by direct citation including ~~the~~ **a** term **that is or contains the word element** "type" (typus~~;) or an~~ equivalent**s in other modern languages and abbreviations permitted; see also Art. 7 *Ex. 16)**, and~~,~~ ***(c)*** on or after 1 January 2001~~, if~~ the typification statement includes the phrase "designated here" (hic designatus) or an equivalent."

Additionally to Art. 7.11 and the Examples given after it, Art. 9.23 and 40.6 specify what are the equivalents of the Latin terms lectotypus, neotypus, epitypus, typus and holotypus, by equating the respective term with "its abbreviation, or its equivalent in a modern language". However, if the *Code* is interpreted literally, this formulation does not include the abbreviation of the term's equivalent in a modern language. Hence, I propose the following amendments.

(089) Amend Art. 9.23 as follows (new text in bold, deleted text in strikethrough):

"*9.23*. On or after 1 January 2001, lectotypification, neotypification, or epitypification of a name of a species or infraspecific taxon is not effected unless indicated by use of the term "lectotypus", "neotypus", or "epitypus", ~~its abbreviation, or~~ its equivalent in a modern language**, or abbreviations of these** (see also Art. 7.11 and 9.10)."

(090) Amend Art. 40.6 and Art. 40 Ex. 7 as follows (new text in bold, deleted text in strikethrough):

"*40.6*. For the name of a new taxon at the rank of genus or below published on or after 1 January 1990, indication of the type must include one of the words "typus" or "holotypus", ~~or its abbreviation, or~~ its equivalent in a modern language**, or abbreviations of these** (see also Rec. 40A.1 and 40A.4). But in the case of the name of a monotypic (as defined in Art. 38.6) new genus or subdivision of a genus with the simultaneously published name of a new species, indication of the type of the species name is sufficient."

"*Ex. 7*. When Stephenson described "*Sedum mucizonia* (Ortega) Raym.-Hamet subsp. *urceolatum*" (in Cact. Succ. J. (Los Angeles) 64: 234. 1992) the name was not validly published because the protologue lacked the indication "typus" or "holotypus", ~~or its abbreviation, or~~ its equivalent in a modern language, **or abbreviations of these,** a requirement for names published on or after 1 January 1990."

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(091–092) Proposals to amend Recommendation 7A on deposition of type material in institutions of countries of origin, and to add a new Recommendation 51A regarding avoiding potentially inappropriate or unacceptable names of taxa

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The "Convention on Biological Diversity" Art. 17 (Exchange of Information: https://www.cbd.int/convention/articles/?a=cbd-17; all online sources cited here and below accessed 5 Aug 2021) states: "1. The Contracting Parties shall facilitate the exchange of information, from all publicly available sources, relevant to the conservation and sustainable use of biological diversity, taking into account the special needs of developing countries. 2. Such exchange of information shall include exchange of results of technical, scientific and socio-economic research, as well as information on training and surveying programmes, specialized knowledge, indigenous and traditional knowledge as such and in combination with the technologies referred to in Article 16, paragraph 1. It shall also, where feasible, include repatriation of information."

Also, *The Nagoya Protocol* (Secretariat of the Convention on Biological Diversity, 2011, https://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf) states that the countries of origin of biodiversity resources should have just access to the relevant biodiversity information and resources.

Several initiatives (in particular, those relevant to taxonomy) have been established and developed in that respect. In particular, the "Global Plants Initiative" (GPI, http://plants.jstor.org), an international partnership of many herbaria from more than 70 countries of the world, has the goal to digitize, unite and provide access to type specimens of plants, fungi and algae worldwide (see Ryan in Taxon 62: 417–423. 2013; Smith & Figueiredo in Taxon 63: 703–709. 2014). However, even the best digital images cannot replace the actual specimens, which can be used for molecular, biochemical, micromorphological and other studies. Also, deposition of type material in collections located in the countries of origin of the new taxa will promote local interest in these taxa and their conservation (if necessary).

Considering the above ideas and goals, I think that it would be useful to amend the current Rec. 7A.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), therefore encouraging the authors of new taxa to deposit at least some representative type material in herbaria and/or other institutions/collections in the countries of origin of the newly described taxa.

(091) Amend Rec. 7A.1 as follows (new text in bold):

"*7A.1*. It is strongly recommended that the material on which the name of a taxon is based, especially the holotype, be deposited in a public herbarium or other public collection with a policy of giving bona fide researchers access to deposited material, and that it be scrupulously conserved. **Authors publishing names of new species or infraspecific taxa are encouraged to deposit some type material (holotype, isotypes, and/or paratypes) in one or more herbaria, collections, or other specialized institutions in the country or countries of origin of the newly described taxon.**"

Article 51.1 of the *Shenzhen Code* states: "A legitimate name must not be rejected merely because it, or its epithet, is inappropriate or disagreeable, or because another is preferable or better known (but see Art. 56.1 and F.7.1), or because it has lost its original meaning." However, authors of recent publications (Gillman & Wright in Commun. Biol. 3: art. 609. 2020; Knapp & al. in Taxon 69: 1409–1410. 2020) initiated a discussion regarding options of possible rejection or replacement of at least some names that may be considered inappropriate, disagreeable or even offensive by some national, ethnic, political, racial and/or other groups. In my opinion, such considerations not directly relevant to the nomenclature of algae, fungi and plants should not be ruled on by the *Code*, because that would be contrary to the mentioned Art. 51.1 and the centuries of nomenclatural tradition. Only rare, well-justified *ad hoc* exceptions are possible in such cases, and those cases should be dealt with based on the existing principles, procedures and practice of botanical, mycological and phycological nomenclature, e.g. conservation (Art. 14) and rejection (Art. 56) (see, e.g., de Lange & al. in Taxon 69: 1373–1375. 2020).

Nevertheless, I suggest that a new Recommendation after Art. 51, aimed at avoidance of potentially inappropriate, disagreeable or unacceptable names of new taxa and replacement names, would be a good response and solution to the concerns that have been expressed.

It should be also noted that the *International Code of Zoological Nomenclature* (*ICZN*; International Commission on Zoological Nomenclature. 1999, https://www.iczn.org/the-code/the-code-online/) contains Appendix A: Code of Ethics, with ethical provisions regarding potentially problematic (offensive, unacceptable, disagreeable etc.) names: "4. No author should propose a name that, to his or her knowledge or reasonable belief, would be likely to give offence on any grounds." The provisions of that Code of Ethics are *de facto* directly comparable to Recommendations of the *International Code of Nomenclature for algae, fungi, and plants* because (*ICZN* App. A) "7. The observation of these principles is a matter for the proper feelings and conscience of individual zoologists, and the Commission is not empowered to investigate or rule upon alleged breaches of them."

I therefore propose to add the following Recommendation after Art. 51.

(092) Add a new Rec. 51A.1:

"*51A.1*. When publishing names of new taxa or replacement names, authors are strongly encouraged to avoid such names as may be viewed or treated as inappropriate, disagreeable, offensive, or unacceptable by any national, ethnic, cultural, or other groups of actual or potential users."

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(093–096) Proposals to permit nuclear DNA sequences as nomenclatural types when preservation of specimens is not feasible

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As argued by Turland & Wiersema (in Taxon 66: 225. 2017), the *International Code of Nomenclature for algae, fungi, and plants* provides the means to name a species or infraspecific taxon based on an illustration if there are technical difficulties of preservation or if it is impossible to preserve a specimen that would show the features attributed to the taxon by the author of the name (Art. 40.5; Turland & al. in Regnum Veg. 159. 2018). I agree with these authors that a DNA sequence is analogous to an illustration in that it depicts the features of an organism. In addition, it is readily preserved and shared at any time, and is thereby useful as we strive to name the World's biodiversity. As argued before (Turland & Wiersema, l.c.), it would not be a great change in the *Code* to allow nuclear DNA sequences as nomenclatural types under restricted circumstances, as proposed here, since we already allow illustrations as types.

This would bring the *International Code of Nomenclature for algae, fungi, and plants* in line with the *International Code of Zoological Nomenclature* (International Commission on Zoological Nomenclature. 1999), which states (Declaration 45) that establishing a new species name without preserved name-bearing type material is permissible when capture or preservation of specimens is not feasible for technical reasons or for conservation concerns or when specimens must be destroyed to reliably diagnose a new species. Examples of minute animals whose holotypes had to be ground up to obtain DNA have existed for over 20 years (e.g. Westheide & Hass-Cordes in J. Zool. Syst. Evol. Res. 39: 103–111. 2001).

Concerns that the proposed change would open the floodgates to an avalanche of bad taxonomy recall similar concerns before January 2012, when the *International Code of Nomenclature for algae, fungi, and plants* permitted electronic publication and dropped the requirement to use Latin in diagnoses or descriptions of new taxa. A subsequent analysis showed that no such floodgates opened (Nicolson & al. in B. M. C. Evol. Biol. 17: art. 116. 2017). The nuclear sequences used in the protologue as the nomenclatural type might be designated as "seqtype". Such a designation might facilitate future work. For example, for fungi there is a curated set of internal transcribed spacer (ITS) sequences (the fungal primary barcode region) with specimen data and accepted names. Collaborators at MycoBank (https://www.mycobank.org/), Index Fungorum (http://www.indexfungorum.org/) and culture and herbarium collections around the world contribute to this effort. So-called ITS RefSeq accessions include sequences mostly obtained from type specimens and a few from verified specimens (ultimately to be replaced with sequences from type specimens). The collection source of type material is indicated in each record and collection acronyms follow the collection codes maintained at the NCBI collections database (https://www.ncbi.nlm.nih.gov/refseq/targetedloci/ITS_process/).

I therefore propose to amend Art. 8.1 and 40.4 and add two new paragraphs to Rec. 8A. Consequent amendments will be needed in Art. 9, 10.4 and possibly elsewhere, and these should be proposed ahead of the Madrid Congress.

(093) Amend Art. 8.1 as follows (new text in bold, deleted text in strikethrough):

"*8.1*. The type (holotype, lectotype, or neotype) of a name of a species or infraspecific taxon is either a single specimen conserved in one herbarium or other collection or institution, ~~or~~ a published or unpublished illustration**, or an assembled nuclear genome or informative parts thereof accessioned in a public repository** (but see Art. 8.5; see also Art. 40.4, 40.5, and Art. 40 Ex. 6)."

(094) Amend Art. 40.4 as follows (new text in bold):

"*40.4*. For the purpose of Art. 40.1, the type of a name of a new species or infraspecific taxon (fossils excepted: see Art. 8.5) may be an illustration prior to 1 January 2007; on or after that date, the type must be a specimen except ***(a)*** as provided in Art. 40.5 **or *(b)* on or after 1 January 2026, the type may be an assembled nuclear genome or informative parts thereof**."

(095) Add a new Rec. 8A.5:

"*8A.5*. When the type (holotype, lectotype, or neotype) of a name of a species or infraspecific taxon is an assembled nuclear genome or informative parts thereof, the original or typifying author(s) should provide detailed information on the source of the material that gave rise to the genome and, in the case of a holotype, explain why at least one specimen cannot be preserved and why formal naming of the taxon is nevertheless needed."

(096) Add a new Rec. 8A.6:

"*8A.6*. When publishing the name of a new species or infraspecific taxon with an assembled nuclear genome or informative parts thereof as the type, authors should document potentially diagnostic characters of the taxon as completely as possible."

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(097–100) Proposals to clarify Articles 8.2 and 8.3 and their footnotes with regard to specimens, gatherings and duplicates

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Those not well versed in herbarium practices may have difficulty with some of the provisions in Art. 8 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018). These proposals aim to clarify them. While Art. 8.3 allows certain multiple preparations to qualify as a single specimen, Art. 8.2 only indirectly notes this possibility.

(097) Amend Art. 8.2 as follows (new text in bold, deleted text in strikethrough):

"*8.2*. For the purpose of typification, a specimen ***(a)*** is a gathering[2], or part of a gathering, of a single species or infraspecific taxon, disregarding admixtures (see Art. 9.14)~~. It may,~~ **that** consist**s** of a single organism, parts of one or several organisms, or ~~of~~ multiple small organisms **and** ***(b)***~~. A specimen~~ is ~~usually~~ **a single preparation** ~~mounted on~~ **(i.e.** a single herbarium sheet or ~~in~~ an equivalent preparation, such as a box, packet, jar, or microscope slide**) or, to the extent permitted by Art. 8.3, multiple preparations**."

Article 8 Ex. 10 states "Three specimens collected by Martius (Brazil, Maranhão, "in sylvis ad fl. Itapicurú", May 1819, *Martius s.n.*, M) are syntypes of *Erythrina falcata* Benth. (in Martius, Fl. Bras. 15(1): 172. 1859). Only one of the sheets (barcode M-0213337) has Martius's original blue label, whereas the other two (barcodes M-0213336 and M-0213338) have been labelled with the locality to identify them as the same gathering. Because the three specimens do not bear a single, original label in common, and are not cross-labelled, they are treated as duplicates." The Example implies that specimens collected by the same collector at the same locality in a single month, or perhaps any 30-day period, constitute a single gathering. In the absence of more information, it also suggests that specimens at the same herbarium collected by the same collector at the same locality are presumed to be collected on the same date unless there is some clear indication otherwise.

However, this assumption arguably ignores the footnote of Art. 8.2, which states "The possibility of a mixed gathering is always to be considered, especially when designating a type." Similar language was added to the "usage test" in Art. 9 Note 1, which states, referring to Art. 9.1(b), "the possibility that the author used additional, uncited specimens or illustrations (which may have been lost or destroyed) must always be considered". The Examples for Art. 9.1 reveal that these considerations preclude a holotype under the usage test unless the author stated that he or she only used one specimen. Should we therefore assume that multiple specimens, as well as any single specimen consisting of multiple parts, are multiple gatherings unless there is an explicit statement that they were collected by the same collector(s) at the same time (presumably the same day) from a single locality? To avoid such an assumption being considered necessary or proposing a blanket rule to that effect, we are proposing an amendment to the footnote of Art. 8.2.

(098) Amend the footnote of Art. 8.2 as follows (new text in bold, deleted text in strikethrough):

[footnote] "[2] Here and elsewhere in this *Code*, the term "gathering" is used for a collection presumed to be of a single taxon made by the same collector(s) at the same time from a single locality. ~~The~~ **If specimens lack information on collector, date, or locality, this does not necessarily preclude their being part of the same gathering, but the** possibility of a mixed gathering is always to be considered, especially when designating a type."

Article 8.3 states "A specimen may be mounted as more than one preparation, as long as the parts are clearly labelled as being part of that same specimen, or bear a single, original label in common. Multiple preparations from a single gathering that are not clearly labelled as being part of a single specimen are duplicates […]". The first sentence is somewhat tautological – it assumes at the outset that there is a specimen, yet then adds an additional requirement. It would be preferable for the first sentence to be worded similarly to the formulation in the second sentence.

While the first sentence provides two methods for multiple preparations to qualify as a specimen (cross-labelling and a single, common label), the second sentence addresses only one of these methods. The second sentence does not mention preparations with a common

label. Therefore, under Art. 8.3, two or more preparations from a single gathering that bear a single, original label in common appear to qualify as both a single specimen and duplicates.

The second test of Art. 8.3 is puzzling for those not familiar with this practice. It requires a "single" label. How can two sheets have a single label? Example 9 does not really help because it seems to say the two sheets each have a single common label but fails to explain how they do so; the additional statement that they are in the same folder seems irrelevant because it is not mentioned in the rule itself. It was impossible for the first author of this proposal to understand the common-label rule until he discussed it with the second author, a member of the Editorial Committee.

The *Code* does not make it clear that duplicates cannot be considered a single specimen. For example, Art 8.2 states that a specimen is a gathering of a single taxon. Two duplicates meet that test. Nothing in Art. 8.3 states that duplicates are not a single specimen. For those not versed in curatorial practices, a modest expansion of the definition of duplicate would be helpful.

Numerous changes are proposed below to amend Art. 8.3 and its footnote.

(099) Amend Art. 8.3 and its footnote as follows (new text in bold, deleted text in strikethrough):

"*8.3*. ~~A specimen may be mounted as more than one preparation, as long as the parts~~ **Multiple preparations that otherwise meet the requirements in Art. 8.2 do not qualify as a single specimen unless the preparations** are ***(a)*** clearly labelled as being part of that same specimen, or ***(b)*** **housed together (e.g. in a single folder) and either the housing or one of the preparations** bear**s** a single, original label in common **applicable to all such preparations**. Multiple preparations from a single gathering that ~~are not clearly labelled as being part of a single specimen~~ **do not meet one of these conditions** are duplicates[1], irrespective of whether the source was one individual or more than one."

[footnote] "[1] Here and elsewhere in this *Code*, the word "duplicate" is given its usual meaning in curatorial practice. ~~A~~ **Each** duplicate **is a separate specimen that** is part of a single gathering of a single species or infraspecific taxon."

Neither Art. 8.3 nor the Examples clearly address a frequent situation – are two or more preparations a single specimen if they merely have the same collection data? While Ex. 7 suggests the answer is no, it can be read otherwise: if the two sheets were not labelled "Sheet 1" and "Sheet 2", they would all be the same specimen.

Article 8 Ex. 8 and Art. 9 Ex. 5 imply that a single gathering in two herbaria constitutes at least two specimens (or duplicates). While it is clear that these two preparations of a single specimen cannot qualify as a type specimen (e.g. a holotype) under Art. 8.1 because they are in different herbaria, neither Art. 8.2 nor 8.3 mentions herbaria. Therefore, those two Articles can be read as stating that two preparations (e.g. two sheets) from a single gathering that are labelled as part of the same specimen constitute one specimen (but not a type, e.g. a holotype), even if held in two herbaria.

We are proposing a new Note to address each of these issues.

(100) Add a new Note after Art. 8.3:

"*Note n*. Multiple preparations do not constitute a single specimen merely by being labelled with the same collection information. Preparations of a single gathering housed at different herbaria or other collections or institutions are always considered separate specimens (duplicates) even if they are clearly labelled as being part of a single specimen (e.g. "part 1 of 2", "part 2 of 2")."

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(101–106) Proposals to clarify rules referring to types designated or indicated and to extend Article 9.2 to other kinds of types

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As a result of a proposal by Prado & Moran (in Taxon 63: 448. 2014), Art. 9.3 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) provides that a lectotype may be designated if the name "was published without a holotype"; the prior rule permitted a designation if "no holotype was indicated". The change reflected the fact that the prior rule did not account for the different ways to establish a holotype under Art. 9.1, including the so-called usage test in Art. 9.1(b).

Like Art. 9.3 (as in effect before the *Shenzhen Code*), numerous other provisions apply if a holotype is not "designated" or if it is not "indicated" or in some cases "indicated or designated". None addresses the possibility of a holotype by virtue of the usage test. Some of these provisions, like Rec. 9A.1, should be amended in a manner consistent with the Prado & Moran (l.c.) proposal, while others should be clarified.

Prior to the *Shenzhen Code*, Art. 9.1 required a holotype be "designated" rather than "indicated"; there is at least one current proposal (Prop. 007 by Turland & al. in Taxon 69: 626–627. 2020) to reinstate this designation requirement. This author fully supports Prop. 007, but if it is not adopted, certain provisions should be revised to change "designation" to "indication". If Prop. 007 is adopted, it is worth noting that Art. 40 provides that a type must be indicated to validly publish the name of a new taxon after 1957, and does not refer to designation.

(101) Amend Rec. 9A.1 as follows (new text in bold, deleted text in strikethrough):

"*9A.1*. Typification of names ~~for which no~~ **published without a** holotype ~~was designated~~ should only be carried out with an understanding of the author's method of working; in particular it should be realized that some of the material used by the author in describing the taxon may not be in the author's herbarium or may not even have survived, and conversely, that not all the material surviving in the author's herbarium was necessarily used in describing the taxon."

Note that the language of this proposal does not appear to change if Prop. 007 is adopted.

Article 9.2 needs a similar correction to reflect the indication of a holotype. In addition, it should be explicitly stated these errors do not prevent valid publication under Art. 40.

(102) Amend Art. 9.2 as follows (new text in bold, deleted text in strikethrough):

"*9.2*. If ~~a designation~~ **an indication** of holotype **under Art. 9.1 or type under Art. 40** ~~made in the protologue~~ of the name of a taxon is later found to contain errors (e.g. in locality, date, collector, collecting number, herbarium code, specimen identifier, or citation of an illustration), these errors are to be corrected provided that the intent of the original author(s) is not changed **(and these errors do not prevent valid publication of the name under Art. 40)**. However, omissions of required information under Art. 40.6–40.8 are not correctable."

If Prop. 007 is adopted, "indication" should not replace "designation" and "indication of" should be inserted before "type under Art. 40".

The principles of Art. 9.2 logically should be applied to lectotypes, neotypes and epitypes as well.

(103) Move Art. 9.2 to the end of Art. 9 and amend it as follows (new text in bold, deleted text in strikethrough):

"*9.n*. If ~~a designation~~ **an indication** of holotype, **designation of lectotype, neotype, or epitype, or other citation of an isotype, syntype, or paratype** ~~made in the protologue~~ of the name of a taxon is later found to contain errors (e.g. in locality, date, collector, collecting number, herbarium code, specimen identifier, or citation of an illustration), these errors are to be corrected provided that the intent of the original author(s) **(or designating or citing author(s), if applicable)** is not changed. However, omissions of required information under Art. 40.6–40.8 **(in the case of a holotype) or Art. 7.11 and 9.21–9.23 (in the case of a lectotype, neotype, or epitype)** are not correctable."

Article 40 uses the term "indication" of a type in order to validly publish a new name. However, some provisions refer to Art. 40 and use "designation". These provisions should be amended to use indication or neither term to avoid future problems.

(104) Amend Rec. 8A.2 as follows (deleted text in strikethrough):

"*8A.2*. When an illustration is ~~designated as~~ the type of a name under Art. 40.5, the collection data of the illustrated material should be given (see also Rec. 38D.2)."

A similar change is needed for Rec. 8A.4. There are numerous instances of "designate" or "designation" that the Editorial Committee may wish to change, such as Art. 9 Note 1 and Ex. 2 and 3. Similar conforming changes may be needed for Art. 14.9, 22.2, 26.2, 33 Ex. 2 and 3, 40 Ex. 1, Rec. 40A Ex. 1, Art. 48 Note 2 and H.6 Ex. 4.

Articles 9.6 and 9.7 define a syntype by referring to two or more specimens "simultaneously designated as types" and Art. 9.6 refers to Art. 40 Note 1 in that situation. Because Art. 40 uses indication, not designation, Art. 9.6 and 9.7 should be revised (even if Prop. 007 is adopted). Because the usage test is not applicable for these various provisions, it is not mentioned.

(105) Amend Art. 9.6 as follows (new text in bold, deleted text in strikethrough):

"*9.6*. A syntype is any specimen cited in the protologue when there is no holotype, or any one of two or more specimens simultaneously ~~designated~~ **indicated** in the protologue as types (see also Art. 40 Note 1). Reference to an entire gathering, or a part thereof, is considered citation of the included specimens."

Conforming changes are needed in Art. 9.7, the Examples and Note under Art. 9.6 and 9.7, and Rec. 9A.1.

Article 7.8 generally provides that the name of a new taxon published by reference to a previously published description or diagnosis must be typified by an element from the entire context of the earlier description or diagnosis unless the validating author "definitely designated" a different type.

The requirement that the validating author designate the type appears to conflict with Art. 9.1, 10.1 and 40.1, which allow indication to establish a type, without mentioning Art. 7.8. Given the Prado & Moran (l.c.) proposal, the present author assumed that this was an oversight. However, based on a review of earlier versions of Art. 7.8 and accompanying proposals, it is arguable that the use of "definitely" was intended to make clear that the usage test and indication of a type (in each case by the validating author) are insufficient to establish a type. Since that is not readily apparent, the proposal below adds that point.

Finally, Art. 7.8 also incorrectly suggests that a neotype may not be designated if there are no elements from the entire context of the validating description.

(106) Amend Art. 7.8 and Art. 9 Note 3 as follows (new text in bold, deleted text in strikethrough):

"*7.8*. A name of a new taxon validly published solely by reference to a previously and effectively published description or diagnosis (Art. 38.1(a)) (and not by a reproduction of such a description or diagnosis) is to be typified by an element ~~selected~~ from the entire context of the validating description or diagnosis, unless **there are no such elements or** the validating author has ~~definitely~~ designated a different type **in the protologue (indication or usage by the validating author is insufficient to establish a type)**, but not by an element explicitly excluded by the validating author (see also Art. 7.9)."

[Art. 9] "*Note 3*. For names falling under Art. 7.8, only elements from the **entire** context of the validating description are considered as original material, unless the validating author has ~~definitely~~ designated a different type."

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(107) Proposal to add an Example to Article 9.9 for when not to designate an epitype

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According to Art. 9.9 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), "An epitype is a specimen or illustration selected to serve as an interpretative type when the holotype, lectotype, or previously designated neotype, or all original material associated with a validly published name, is demonstrably ambiguous and cannot be critically identified for purposes of the precise application of the name to a taxon."

Based on Art. 9.9, some authors have designated epitypes with no explanation of why an epitype is required. In response to this, Bandyopadhyay & Bhattacharjee (in Taxon 64: 1338. 2015) proposed a new paragraph for Rec. 9B: "*9B.2*. Authors designating an epitype should state why the holotype, lectotype, neotype, or all original material is ambiguous such that epitypification is necessary." This Recommendation makes clear the importance of a justification when an epitype is designated, and it was accepted at the Shenzhen International Botanical Congress.

Article 9.9 provides Examples showing the proper application of an epitype (Ex. 9 and 10). However, it would also be useful to include an Example of when an epitype designation is not required. For instance, when the type already provides sufficient diagnostic characters to allow determination of the taxon.

Considering this, most of the Neotropical *Monimiaceae* taxa require staminate flowers and fruits for a correct species determination, whereas pistillate flowers are less informative (e.g. Lírio & al., Monimiaceae in Flora do Brasil 2020, http://reflora.jbrj.gov.br/reflora/floradobrasil/FB166, accessed 26 Mar 2021). Whereas a type that lacks staminate flowers and fruits could lead to the designation of an epitype, vegetative characters and pistillate flowers may occasionally for some species be sufficient for a correct determination. Therefore, they can provide an Example for when not to designate an epitype.

(107) Insert a new Example following Art. 9.9:

"*Ex. 9bis*. Martínez-Laborde & al. (in Phytotaxa 220: 96. 2015) designated a specimen with pistillate flowers (*Balansa 2342*, P00080325) as the lectotype of *Hennecartia omphalandra* J. Poiss. (in Bull. Soc. Bot. France 32: 41. 1885). Although fruits and staminate flowers are important diagnostic characters for this species, the vegetative organs and pistillate flowers in the lectotype are also clearly diagnostic. Therefore, according to Art. 9.9, an epitype is not necessary because the type can be critically identified in order to precisely apply the name to a taxon."

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(108–109) Proposals to amend Articles 9.9 and 9.20 to allow more than one epitype

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In Art. 9.20 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), it is stated that "a different epitype may be designated only if the original epitype is lost or destroyed (see also Art. 9.17)". However, there may be situations in which a single epitype is not sufficient to enable precise application of the name to a taxon and hence serve nomenclatural stability. I show these with three different examples:

(1) A taxon was described based on three specimens (S1–S3). S1 bears fruits, S2 bears flowers and S3 is sterile, while fruits and flowers are necessary for unambiguous identification. If S1 and S2 are destroyed, and because S3 does not stand in conflict with the protologue (it specifically cannot due to the fact that it was cited there), there is no option but to select S3 as the lectotype. By selection of an epitype, the nomenclatural stability of the taxon can be provided. However, if a specimen bearing fruits is selected as the epitype, the specific characters of the flowers are not typified, and *vice versa* using a specimen bearing flowers.

(2) A dioecious plant was described as in (1). One specimen bears male flowers, one bears female flowers and one is sterile. Both flower-bearing specimens are destroyed, but both sexes are essential for identification. This as well can lead to the same consequences as in (1).

(3) A selected epitype later turns out to be ambiguous in a character or lacks characters essential for identification. In this case as well, under the current phrasing of Art. 9.20, a subsequent designation of a further epitype is not allowed.

Therefore, I propose to amend Art. 9.9 and 9.20 as follows.

(108) Add a sentence to Art. 9.9 (new text in bold):

"*9.9*. An epitype is a specimen or illustration selected to serve as an interpretative type when the holotype, lectotype, or previously designated neotype, or all original material associated with a validly published name, is demonstrably ambiguous and cannot be critically identified for purposes of the precise application of the name to a taxon. **More than one epitype may be designated if the identification of a taxon needs two or more characters that cannot be shown in a single specimen.** Designation of an epitype is not effected unless the holotype, lectotype, or neotype that the epitype supports is explicitly cited (see Art. 9.20)."

(109) Amend Art. 9.20 as follows (new text in bold):

"*9.20*. The author who first designates (Art. 7.10, 7.11, and F.5.4) an epitype must be followed; a different epitype may be designated only if the original epitype is lost or destroyed **or a previously designated epitype is ambiguous and an additional epitype needs to be designated for nomenclatural stability** (see also Art. 9.17). A lectotype or neotype supported by an epitype may be superseded in accordance with Art. 9.19 or, in the case of a neotype, in accordance with Art. 9.18. If it can be shown that an epitype and the type it supports differ taxonomically and that neither Art. 9.18 nor 9.19 applies, the name may be proposed for conservation with a conserved type (Art. 14.9; see also Art. 57)."

Ranking of the epitypes of a name could be provided in the second case, i.e. if the previous epitype was ambiguous. This ranking could be addressed by a Note under Art. 9.20. However, this cannot apply to situations where two epitypes need to be designated at the same time, because two different specimens are needed to show all characters necessary for identification.

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(110) Proposal to add a new Note to Article 9 to clarify the status of duplicates of types

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In response to our query, N.J. Turland (pers. comm. 2021) kindly informed us that duplicates of the holotype are isotypes irrespective of whether or not they were cited in the protologue or seen by the author(s) of the name, but this has not been explicitly spelled out in the *Code* (Turland & al. in Regnum Veg. 159. 2018). Therefore, for clear understanding, we are proposing a new Note not only on isotypes, but on isosyntypes, isolectotypes, isoneotypes and isoepitypes as well.

(110) Add a new Note to Art. 9:

"*Note n*. An isotype is any duplicate of the holotype irrespective of whether or not it is cited in the protologue or seen by the author(s) of the name. An isosyntype does not have to be seen by the author(s) of the name; if it is cited in the protologue, it is instead a syntype (Art. 9.6). Duplicates of lectotypes, neotypes, and epitypes are isolectotypes, isoneotypes, and isoepitypes, respectively, irrespective of whether or not they were cited or seen by the typifying author(s)."

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(111) Proposal to amend Article 20.3, with adjustment to Article 60, to eliminate hyphens from all generic names

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(111) Amend Art. 20.3 and Art. 60 Note 6 (new text in bold, deleted text in strikethrough) and delete Art. 60.12:

"*20.3*. The name of a genus may not consist of two **or more** words, unless these words are joined by a hyphen**, which is in all cases treated as an error to be corrected by deletion of the hyphen** ~~(but see Art. 60.12 for names of fossil-genera)~~."

[Art. 60] "*Note 6*. Art. 60.11 refers only to epithets (in combinations), not to names of genera (~~for names of fossil-genera~~ see Art. ~~60.12~~ **20.3**) or taxa at higher ranks~~; a non-fossil generic name published with a hyphen can be changed only by conservation (Art. 14.11; see also Art. 20.3; but see Art. H.6.2)~~."

"~~*60.12*. The use of a hyphen in the name of a fossil-genus is in all cases treated as an error to be corrected by deletion of the hyphen.~~"

According to Art. 60.12 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) "The use of a hyphen in the name of a fossil-genus is in all cases treated as an error to be corrected by deletion of the hyphen." The mentioned rule is currently only applicable to fossil-genera, but to provide uniformity this rule must be applicable to all genera (both fossil and non-fossil) treated under the *Code*. This is proposed above to avoid confusion created by the usage of both hyphenated and non-hyphenated generic names for the same taxon.

If this proposal is accepted, previously validly published, hyphenated generic names would be treated as correct after deletion of the hyphen irrespective of their derivation, and no conservation of such names to remove hyphens would be required, as was necessary for *Fitzroya* Hook.f. ('*Fitz-Roya*'), *Pseudelephantopus* Rohr ('*Pseudo-Elephantopus*'), *Saxegothaea* Lindl. ('*Saxe-Gothaea*') and *Trichomonas* Donné ('*Trico-monas*'). Furthermore, the hyphens would be eliminated from any unconserved generic names originally published with hyphens, such as *Neves-armondia* K. Schum., *Pseudo-fumaria* Medik., *Sebastiano-schaueria* Nees and *Solms-laubachia* Muschl. ex Diels, which would be corrected to *Nevesarmondia*, *Pseudofumaria*, *Sebastianoschaueria* and *Solmslaubachia*, respectively.

These proposals will not impact the hyphenation of epithets, which conforms to Art. 23 and Art. 60.11.

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(112–113) Proposals to amend Recommendations 20A.1 and 23A.3 to expand the diversity of new generic names and epithets

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Recommendation 20A.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) and its clauses (b) and (c) state "Authors forming generic names should comply with the following: […] *(b)* Avoid names not readily adaptable to the Latin language. *(c)* Not make names that are very long or difficult to pronounce in Latin." Similarly, Rec. 23A.3 and its clause (b) state: "In forming specific epithets, authors should comply also with the following: […] *(b)* Avoid epithets that are very long or difficult to pronounce in Latin." The clauses in Rec. 20A.1 are direct descendants of Art. 28 clauses (5) and (1) from the earliest version of the laws of botanical nomenclature (Candolle, Lois Nomencl. Bot. 1867; English translation in Amer. J. Sci. Arts, ser. 2, 46: 63–77. 1868), which recommended "Not to draw names from barbarous tongues, unless those names be frequently quoted in books of travel, and have an agreeable form that adapts itself readily to the Latin tongue, and to the tongues of civilized countries" and "Not to make names too long or difficult to pronounce." In turn, Rec. 23A.3 is a descendant of Candolle's (l.c.) Art. 36 clause (1): "Avoid very long names, as well as those that are difficult to articulate." Later, "in Latin" was added in Rec. 23B clause (b) of the Montreal *Code* (Lanjouw & al. in Regnum Veg. 23. 1961).

Judging whether a name is easy or difficult to adapt and pronounce in Latin is itself difficult considering that this classical language has no native speakers in any extant community. In addition, according to Rec. 60C.2 of the *Shenzhen Code*, "New epithets based on personal names that have a well-established latinized form should maintain the traditional use of that latinized form", with Rec. 60C Ex. 1 including "*brunonis* based on Bruno (Robert Brown)". However, this Recommendation has not been consistently applied, as most species named after someone with the family name Brown more commonly have an epithet with the root *brown-* rather than the root *brunon-*, which has rarely been used since the 19th century (Fig. 1).

Recent meta-analyses of species names have revealed that choices of eponyms in building species epithets have strong biases. Among the endemic vascular plants of New Caledonia that have eponymic names, only 7% are named after someone born in New Caledonia (Pillon in Biol. Conservation 253: 108934. 2021). Similarly,

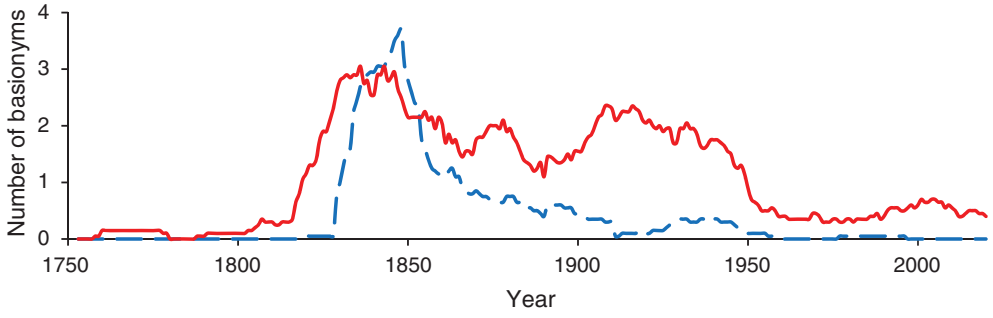

Fig. 1. Numbers of basionyms published per year with the root *brown-* (continuous line, red) or *brunon-* (dashed line, blue) through time. The graph displays a sliding average over the previous 20 years. Basionyms were taken from IPNI (https://www.ipni.org, accessed 3 Nov 2020).

the majority of the bird species described since the 1950s with eponymic names are tropical, but they are named after someone from the Global North (DuBay & al. in BioRxiv. https://doi.org/10.1101/2020.08.09.243238. 2020). Linnaeus initiated modern taxonomy and was shortly joined in his endeavour by a small group of principally European men. The names published by them reflected their interests and values. The range of people involved in taxonomy has gradually expanded over the last 250 years. It is time to go further and reflect the diversity of people who all have an interest in the scientific names of algae, fungi and plants. Taxonomy is at the heart of biodiversity research, and conservation science can greatly benefit from more inclusive approaches (Tallis & Lubchenco in Nature 515: 27–28. 2014). In New Zealand, the use of the indigenous languages te reo Māori and ta re Moriori has proved increasingly popular in constructing the scientific names of a wide range of organisms, including plants (Veale & al. in New Zealand J. Ecol. 43: 3388. 2019). Nevertheless, this practice represents only 4% of species names in New Zealand (Galbreath in New Zealand J. Ecol. 45: 3429. 2021), probably in part because the *Code* has discouraged this kind of practice for a long time.

As it is currently formulated in Rec. 20A.1 and 23A.3, the avoidance of names difficult to pronounce in Latin is a hindrance to increasing the use of vernacular names, eponyms from diverse origins, and words from indigenous languages in building epithets. It has also been applied inequitably, possibly with a greater tolerance to names derived from widespread languages (e.g. English) as illustrated with the *brown-*/*brunon-* example. The requirement of a Latin description or diagnosis for the valid publication of a name of a new non-fossil taxon was considered as a relict (Figueiredo & al. in Taxon 59: 617–620. 2010) and has now been removed from the *Code*. It is time to go further and remove the parts of Rec. 20A.1 and 23A.3 that recommend against forming names or epithets that are "not readily adaptable to the Latin language" or are "difficult to pronounce in Latin".

(112) In Rec. 20A.1 delete clause (b) and amend clause (c) as follows (deleted text in strikethrough):

"*20A.1*. Authors forming generic names should comply with the following:

[…]

~~*(b)* Avoid names not readily adaptable to the Latin language.~~

(c) Not make names that are very long~~ or difficult to pronounce in Latin~~."

(113) Amend Rec. 23A.3 clause (b) as follows (deleted text in strikethrough):

"*23A.3*. In forming specific epithets, authors should comply also with the following:

[…]

(b) Avoid epithets that are very long~~ or difficult to pronounce in Latin~~."

(114) Proposal to amend Article 23.2 and Recommendation 23A.3 to eliminate arbitrary formation of, and future use of hyphens in, specific epithets

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Article 23.2 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) states: "The epithet in the name of a species may be taken from any source whatever, and may even be composed arbitrarily." The word "arbitrarily" contradicts Rec. 23A.1–3 and creates confusion. The Recommendations of Rec. 23A are useful and practical to follow by any author while coining specific epithets. However, the phrase "may even be composed arbitrarily" of Art. 23.2, which can lead to the formation of specific epithets that are very long, multi-hyphenated or sometimes unpronounceable, makes these Recommendations appear useless. Two examples are *Cycas pschannae* R.C. Srivast. & L.J. Singh (in Int. J. Curr. Res. Biosci. Pl. Biol. 2(8): 35. 2015) and *Kobresia rcsrivastavae* Jana (in Indian J. Fundam. Appl. Life Sci. 2: 256. 2012). Similarly, Art. 23.1, stating "If an epithet consisted originally of two or more words, these are to be united or hyphenated", is implicitly in favour of formation of epithets composed of two or more words, which is also against Rec. 23A.3(d), which recommends to avoid formation of specific epithets with "two or more hyphenated words". One such example is *Henckelia collegii-sancti-thomasii* A. Joe & al. (in Phytotaxa 415: 248. 2019). Hence, to avoid such incidences in the future, it is proposed to amend Art. 23.2 by replacing the phrase "and may even be composed arbitrarily" with "may not be composed arbitrarily" and by incorporating Rec. 23A.3(d), converting it to a rule and then deleting the Recommendation. A new Example under Art. 23.2 can serve to clarify the meaning of "composed arbitrarily".

(114) Amend Art. 23.2 as follows (new text in bold, deleted text in strikethrough), add a new Example under it, and delete Rec. 23A.3(d):

"*23.2*. The epithet in the name of a species may be taken from any source whatever ~~and may even~~ **but may not** be composed arbitrarily (~~but~~ see **also** Art. 60.1). **In a name published on or after**

1 January 2026, the specific epithet may not be formed of two or more hyphenated words."

[Art. 23] "*Ex. n. Cycas pschannae* R. C. Srivast. & L. J. Singh (in Int. J. Curr. Res. Biosci. Pl. Biol. 2(8): 35. 2015) and *Kobresia rcsrivastavae* Jana (in Indian J. Fundam. Appl. Life Sci. 2: 256. 2012) have specific epithets unpronounceable in Latin, due to the presence of consecutive consonants at the beginning of the epithets. These epithets were formed from abbreviated names of scientists P. S. Channa and R. C. Srivastava, respectively. Such arbitrary formations of specific epithets are not permitted on or after 1 January 2026."

"*23A.3*. In forming specific epithets, authors should comply also with the following:

[…]

~~*(d)* Avoid those formed of two or more hyphenated words.~~"

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(115) Proposal to amend Article 23.5 and add a new Example to include specific epithets that consist of a noun and its accompanying adjective in the genitive case

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Article 23.5 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) specifies correctable errors in the gender of specific epithets (our emphasis in bold): "The specific epithet, when adjectival in form and not used as a noun, agrees with the gender of the generic name; **when the epithet is** a noun in apposition or **a genitive noun, it retains its own gender and termination irrespective of the gender of the generic name**. Epithets not conforming to this rule are to be corrected […]."

This Article, however, does not encompass all possible epithets that should be correctable. One such class of epithets includes those that are composed of a genitive noun with an accompanying adjective. In these epithets, the adjective should match the gender and the genitive case of the noun it modifies, but sometimes authors instead make the adjective match the gender and nominative case of the generic name. Because of this, we propose below one amendment to Art. 23.5 and a new Example.

(115) Amend Art. 23.5 as follows (new text in bold) and add an Example:

"*23.5*. The specific epithet, when adjectival in form and not used as a noun, agrees with the gender of the generic name; when the epithet is a noun in apposition or a genitive noun **or a noun and its accompanying adjective in the genitive case**, it retains its own gender and termination irrespective of the gender of the generic name. Epithets not conforming to this rule are to be corrected (see Art. 32.2) to the proper form of the termination (Latin or transcribed Greek) of the original author(s). In particular, the usage of the word element *-cola* as an adjective is a correctable error."

"*Ex. n*. Correctable errors in Latin epithets that consist of a noun and its accompanying adjective in the genitive case: *Agrostophyllum montis-jayani* Ormerod (in Orchadian 17: 379. 2013, *'montis-jayanum'*); *Loranthus cycnei-sinus* Blakely (in Proc. Linn. Soc. New South Wales 47: 392. 1922, *'Cycneus-Sinus'*); *Salicornia sinus-persici* Akhani (in Pakistan J. Bot. 40: 1638. 2008, *'sinus-persica'*)."

(116) Proposal to amend Recommendation 31B on precisely indicating the date of effective publication

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Article 31.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) states: "The date of effective publication is the date on which the printed matter or electronic material became available as defined in Art. 29 and 30. In the absence of proof establishing some other date, the one appearing in the printed matter or electronic material must be accepted as correct." In the case of printed matter that is not already published as electronic material, there is often a gap of time between the date that appears in the printed matter and the actual distribution of the printed matter. To eliminate this gap of time, we are proposing to amend Rec. 31B.1, also incorporating Rec. 31B.2 and thereby making Rec. 31B more concise.

(116) Amend Rec. 31B.1 as follows (new text in bold, deleted text in strikethrough) and delete Rec. 31B.2:

"*31B.1*. The date of effective publication should be clearly indicated as precisely as possible **(day, month, year)** within ~~a publication~~ **the printed matter or electronic material**. **In printed matter not already published as electronic material, the date should conform to Rec. 31A.1.** When a publication is issued in parts, this date should be indicated in each part."

"~~*31B.2*. In electronic material, the precise dates (year, month, and day) of effective publication should be included.~~"

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(117) Proposal to add a new paragraph to Recommendation 40A encouraging the publication of accessory types and type illustrations

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According to Art. 9.13 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), a name may be neotypified when no original material exists. Then Rec. 9B.1 points out that, in selecting a neotype, there is usually no guide except personal judgement as to what best fits the protologue.

It is stated in the Preface of the *Shenzhen Code* (p. xvi) that Art. 9.4 was amended to make it clear that original material includes illustrations published as part of the protologue. This replaces the rather awkward requirement, first introduced in the *Tokyo Code* (Greuter & al. in Regnum Veg. 131. 1994), to show that the validating description or diagnosis was based on certain specimens or illustrations in order for them to qualify as original material.

Some authors publish names of new species or infraspecific taxa with the holotype as the only original material, although this is not at all a good practice. In such cases, if the holotype is lost or destroyed, there remains no option but to neotypify the name. If a photograph of the holotype is published in the protologue, then it would be available for lectotypification, which is a better option than neotypification. Therefore, we are proposing the following new Recommendation.

(117) Add a new paragraph to Rec. 40A:

"*40A.7*. Authors should publish the name of a new species or infraspecific taxon not only with a holotype but also with isotype(s) and/or paratype(s). The isotype(s) and paratype(s) should preferably

be deposited in herbaria other than that in which the holotype is deposited. If it is not possible to preserve any specimens other than the holotype, a photograph of the holotype should be included in the protologue, so that if the holotype is lost or destroyed, the photograph will be available for designation as the lectotype."

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(118) Proposal to amend Article 41.5 and add an Example clarifying requirements for referring to a basionym or replaced synonym

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(118) Amend Art. 41.5 as follows (new text in bold, deleted text in strikethrough) and add a new Example:

"*41.5*. On or after 1 January 1953, a new combination, name at new rank, or replacement name is not validly published unless its basionym or replaced synonym is clearly indicated and a full and direct reference given to its author and place of valid publication, with page or plate reference and date (but see Art. 41.6 ~~and 41.8~~). **Valid publication is not achieved by reference to a new combination based on the actual basionym or replaced synonym (but see Art. 41.8), unless that new combination is the illegitimate name being replaced by a replacement name.** On or after 1 January 2007, a new combination, name at new rank, or replacement name is not validly published unless its basionym or replaced synonym is cited."

"*Ex. 16bis*. The intended replacement name *"Hemionitis atreyu"* was not validly published by Christenhusz (in Christenhusz & al., Global Fl. 4: 10. 2018) because that author made no reference to the replaced synonym, *Pteris acrostica* Balb. (Elenco: 98. 1801), instead citing "*Cheilanthes acrostica* Tod., Giorn. Sci. Nat. Econ. Palermo 1: 215. 1866", which is in fact a new combination, *C. acrostica* (Balb.) Tod., based on *P. acrostica*, which Todaro explicitly cited as the basionym."

The proposed amendments to Art. 41 of the *Code* (Turland & al. in Regnum Veg. 159. 2018) were initiated due to the nomenclatural case of "*Hemionitis atreyu*" Christenh. proposed as a replacement name (Christenhusz, l.c.). Mosyakin (in Phytotaxa 373: 164–168. 2018) initially considered it not to be a validly published name because Christenhusz did not cite the earliest replaced synonym, *Pteris acrostica,* and its author and place of valid publication, but cited instead a new combination, *Cheilanthes acrostica*, based on *P. acrostica*. Mosyakin (l.c.) also noted that in fact a new combination, *H. acrostica* (Balb.) Mosyakin (l.c. 2018: 165), not a replacement name, was required.

However, in IPNI (https://www.ipni.org; accessed 30 Oct 2018 and 2 Mar 2021) the name *Hemionitis atreyu* was treated as an illegitimate name: "nom. illeg. nom. superfl., the epithet *acrostica* was available for use and should have been taken up as *H. acrosticha* Noronha is a nom. inval. nom. nud." The following remark was also provided: "Although Christenh. cited a combination and not the earliest homotypic synonym, since it is a replaced synonym (not a basionym) the replacement name is nevertheless validly published" (updated nomenclatural notes made on 2018-10-26 16:25:24.0, by H.L. Lindon, as indicated in IPNI).

Indeed, there seems to be no rule in the current *Shenzhen Code* to preclude a replaced synonym being a new combination. Accordingly, the IPNI interpretation of the situation seems to be correct and therefore *Hemionitis atreyu* is a validly published but illegitimate name (see a correction by Mosyakin in Phytotaxa 405: 276–277. 2019).

If we accept that interpretation, a full and direct reference to *any* new combination based on the actual replaced synonym (i.e. without a basionym) would be sufficient for valid publication of a replacement name on or after 1 January 1953. *Hemionitis atreyu* could have been validated by a full and direct reference to any of the new combinations based on *Pteris acrostica*: *Cheilanthes acrostica*, *Allosorus acrosticus* (Balb.) Christenh., *Oeosporangium acrosticum* (Balb.) L. Sáez & P. Aymerich, etc. (see full synonymy in Mosyakin, l.c. 2018: 165).

This interpretation, however, is against what one could presume to be the intent or meaning of Art. 41.5 requiring, for valid publication of a replacement name on or after 1 January 1953, the clear indication of the actual replaced synonym, i.e. either the earliest replaced synonym – but not new combinations based on it (but see Art. 41.8) – or the actual illegitimate name in need of replacement, and a full and direct reference to its author(s) and place of valid publication, by analogy with corresponding requirements for valid publication of a new combination or name at new rank, which requires clear indication of and reference to its basionym, which does not itself have a basionym (see Art. 6.9). It would be only logical to apply the same requirements to new combinations, names at new rank and replacement names.

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(119–122) Proposals to amend Articles 51 and 56 and Division III, to allow the rejection of culturally offensive and inappropriate names

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Taxonomy, like any science, is embedded in culture. This can be both productive (science is an important expression of culture) and counterproductive (when science promotes or perpetuates problematic cultural norms). It is a fact of life that cultures change; at times, the sciences that are embedded within cultures need to change in concert.

Three areas where important cultural changes are occurring at present are: (1) a rapidly growing awareness of the importance of dealing with present and past institutional racial injustice, including in the botanical sciences (see, e.g., Williams & al. in Taxon 70: 219–222. 2021); (2) a growing recognition that some culturally prominent historical figures acted in ways that are now regarded as deeply inappropriate (usually by being egregiously damaging to members of other races and cultures); and (3) a growing awareness that some racially derogatory terms that were common and acceptable in the past are now clearly unacceptable.

While cultural contexts in the past allowed (or, more usually, actively supported) these actions, behaviours or terms, there is a widespread modern consensus that they are now inappropriate or worse. Ongoing public debates about the appropriateness or otherwise of honouring some historical figures through public statues, named buildings and other honorifics, and changes in our understanding of the appropriateness of some racially derogatory words, attest to these developments.

A strength of taxonomy and taxonomic nomenclature is that they change over time. Another strength is that they are deeply rooted in history, with stability and priority as important principles. These two aspects are clearly in tension, and an important challenge for our discipline has been managing this tension and navigating a middle path between instability on the one hand and stasis on the other. Good examples are the gradual acceptance of mechanisms for overriding, in some circumstances, the principle of priority through conservation, and the changes that culminated in the *Melbourne Code* (McNeill & al. in Regnum Veg. 154. 2012) to allow electronic publication and no longer mandate Latin descriptions or diagnoses.

There is currently no provision under the *Code* that allows names that are insulting, offensive or otherwise deeply culturally inappropriate to be rejected in favour of more suitable names. Criticism has arisen around the continued use of such names (e.g. Gillman & Wright in Commun. Biol. 3: 609. 2020; Knapp & al. in Taxon 69: 1409–1410. 2020). One example is the continued use of the epithet *caffra*, which as Knapp & al. (l.c.) point out is used in c. 150 names (many of them African) and is a latinization of a word that is so deeply offensive that its use is illegal in South Africa.

Another example is epithets honouring George Hibbert (e.g. *Hibbertia* Andrews, *Erica hibbertia* Andrews), a prominent English slave-trader and slave-owner who very actively and visibly led British Parliamentary resistance to abolition. That he was a wealthy patron of botany (his wealth derived largely from slavery) cannot overshadow his attitudes, which even at the time were widely considered offensive. We believe that continuing to honour Hibbert is deeply insensitive to many people, not least those with backgrounds directly affected by slavery and the activities of Hibbert and people like him.

The proposals presented here provide a mechanism to deal with egregious examples such as these. We propose (1) that Art. 51.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) be amended to give more clarity to its intent, (2) that a new Art. 51.2 be inserted to provide a mechanism to reject names that are culturally offensive, (3) that Art. 56.1 be amended to allow proposals to reject names on the basis of Art. 51.2, (4) that a new Permanent Nomenclature Committee be constituted under Division III to govern the application of our proposed Art. 51.2, and (5) that consequent editorial

amendments be made to Art. 56.2, 56.3 and Div. III Prov. 7.10 to accommodate the new Committee.

(119) Amend Art. 51.1 as follows (new text in bold, deleted text in strikethrough):

"*51.1*. A legitimate name must not be rejected merely because it, or its epithet, is ~~inappropriate or disagreeable~~ **not fitting for the taxon**, or because another is ~~preferable~~ **better suited** or better known (but see Art. **51.2**, 56.1, and F.7.1), or because it has lost its original meaning."

The Examples cited for Art 51.1 clearly indicate that its intent is to prevent rejection of names that are ill-suited for a taxon, such as ones chosen based on a factual error. None of the Examples covers the issue of culturally offensive names. Nevertheless, Art. 51.1, taken literally outside the context of its Examples, would be likely to effectively preclude any proposal to reject names on the basis that they are offensive, no matter how egregious. Our proposal thus clarifies the original intent of Art. 51.1.

(120) Add a new Article 51.2:

"*51.2*. A legitimate name may be rejected under Art. 56.1 because it, or its epithet, is culturally offensive or inappropriate, because it *(a)* is derogatory or insulting to a person or group of people, *(b)* is named in honour of a person that the taxonomic community agrees should not be honoured, or *(c)* otherwise causes deep offense."

(121) Amend Art. 56.1 as follows (new text in bold):

"*56.1*. Any name that would cause a disadvantageous nomenclatural change (Art. 14.1) **or that is regarded as culturally offensive or inappropriate (Art. 51.2)** may be proposed for rejection. A name thus rejected, or its basionym if it has one, is placed on a list of nomina utique rejicienda (suppressed names, App. V). Along with each listed name, all names for which it is the basionym are similarly rejected, and none is to be used (see Rec. 50E.2)."

Note that the new Art. 51.2 and the amendment to Art. 56.1, as proposed, do no more than establish the grounds and mechanism for the rejection of culturally offensive or inappropriate names. We propose that the actual rejection of such names be handled by a new Permanent Nomenclature Committee established under Div. III.

(122) Amend Div. III Prov. 7.1 as follows (new text in bold, deleted text in strikethrough):

"7.1. There are ~~nine~~ **ten** Permanent Nomenclature Committees, including ~~five~~ **six** specialist committees (clauses (e)–(~~i~~**j**)):

[…]

***(j)* Nomenclature Committee on Culturally Offensive or Inappropriate Names**."

Consequent editorial amendments:

In Art. 56.2 change "specialist committees for the various taxonomic groups" to "appropriate specialist committee".

In Art. 56.3 change "specialist committee for the taxonomic group concerned" to "appropriate specialist committee".

In Div. III Prov. 7.3 and 7.10 change "five specialist committees" to "six specialist committees".

We propose that a new Permanent Nomenclature Committee be established for the purpose of governing the rejection of culturally offensive or inappropriate names, rather than tasking such decisions to the existing specialist committees (the Nomenclature Committee for Vascular Plants etc.), for three reasons. Firstly, these committees already face substantial workloads dealing with proposals to conserve, protect or reject names, proposals to suppress works, and requests for binding decisions based on the current *Code*, and it would be inadvisable to increase these workloads further. Secondly, the skills required by members of the existing specialist committees are unlikely to overlap substantially with the skills required by members of the proposed new Committee. Thirdly, issues likely to arise, and the processes of forming a decision, with respect to culturally offensive or inappropriate names are likely to be similar whether the name under question is the name of a vascular plant, bryophyte, fungus, alga etc., and hence a single Committee to deal with all such matters is appropriate.

As with the other Permanent Nomenclature Committees, the proposed Nomenclature Committee on Culturally Offensive or Inappropriate Names would operate under the membership provisions of Div. III Prov. 7. Members would be elected by an International Botanical Congress, and the Committee would have the power to elect officers as desired, fill vacancies, and establish temporary subcommittees in consultation with the General Committee (Prov. 7.2). The Secretary of the Committee would be an ex-officio member of the General Committee (Prov. 7.3), while the Rapporteur-général, Vice-rapporteur, and Secretary of the General Committee would be non-voting ex-officio members of the Committee (Prov. 7.7). It would be expected, though we believe does not need to be mandated, that at least one member of the Committee would have expertise in vascular plants, bryophytes, fungi, algae and fossils (Prov. 7.4), and Prov. 7 Rec. 1 would apply, i.e. membership should, so far as is practicable, be geographically and gender balanced. Thus, in all respects other than expected expertise, the proposed Committee would operate in a manner familiar to the botanical and nomenclatural community.

The proposed Nomenclature Committee on Culturally Offensive or Inappropriate Names will give effect to, and regulate, our proposed Art. 51.2 in the same manner that the current Nomenclature Committees, among other duties, give effect to and regulate the provisions under the *Code* for the rejection of names under Art. 56.

A note on the "slippery slope" argument

We expect that a common response to this proposal will be the invocation of the "slippery slope": that is, where will this all end? The "slippery slope" is often used in the form of a *reductio ad absurdum*, to argue that this proposal if accepted will quickly lead to minor infractions of cultural norms being used to "suppress" many names, and that the system we propose will be abused.

We counter that our proposal is self-limited by creating the new Permanent Nomenclature Committee discussed above and maintaining all other provisions of Div. III. Proposals to reject names that are culturally offensive or inappropriate will need to be published in *Taxon*, as is currently the case for similar proposals under other Articles of the *Code*, with full reasoning, argument, context and justification. Proposals will be received by the General Committee and referred to the proposed Nomenclature Committee on Culturally Offensive or Inappropriate Names (Prov. 7.9). That Committee will make a recommendation to the General Committee, based on a qualified majority (60%) of members (Prov. 7.14), upon which the General Committee may approve or overturn the recommendation (Prov. 7.15), again with a qualified majority. The General Committee will in turn make its own recommendation, which will be subject to the decision of a later International Botanical Congress (Prov. 7.15), which may reject it (Prov. 5.1(e, f)). We believe that these provisions, and the expertise and experience of members of all the relevant

Committees, will quickly establish a precedent that only clearly egregious examples of culturally offensive or inappropriate names will be rejected, with a high degree of consensus, and misuse of the system for trivial rejections will be very limited.

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(123–125) Proposals on the retroactivity of conservation

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The Shenzhen Congress accepted an addition to the *Code*, detailing when conservation takes effect. As now phrased, Art. 14.15 seems to suggest that conservation does not apply retroactively.

There appears to be no doubt that conserved spelling needs to apply retroactively. An example is *Cajanus cajan* (L.) Huth (1893). The generic name was published with the original spelling '*Cajan*', and '*Cajan cajan*' cannot be validly published (Art. 23.4). Because *Cajanus* Adans. (1763) is conserved with that spelling, there is no problem with the species name as long as conserved spelling applies retroactively; otherwise the combination could not be published before 1910, when conservation took effect.

Conserved gender is governed by the same provision as conserved spelling and is best treated similarly.

Whether legitimacy of a conserved name should be retroactive appears more controversial. Apparently some feel that retroactive legitimacy would cause problems with superfluity under Art. 52. Adding a suitable provision to Art. 52 should prevent any adverse effect. A clear example of the desirability of retroactive legitimacy is *Rosa virginiana* Mill. (1768), a later homonym, duly conserved, taking effect in 2011. Limiting retroactivity of legitimacy would mean that between 1768 and 2011 this would remain an illegitimate name that may not be used (Art. 6.6). In other words, all the taxonomic (and other) literature between 1768 and 2011 that uses this name would be wrong. Preamble 5 starts "The object of the rules is to put the nomenclature of the past into order […]." Limiting retroactivity of conserved legitimacy is not putting the nomenclature of the past into order, but giving a name of the past a kick and putting up a sign "out of order". This would be a fundamental failure in the basic nomenclatural mission to provide names to be used by taxonomy; names depending on taxonomic position ("a particular circumscription, position, and rank") but not determined by time (pre- or post-conservation). In addition, an illegitimate *R. virginiana* (pre-2011) could not be "a name that ought to have been adopted" in the sense of Art. 52. Thus, pre-2011 replacement names (such as *Rosa lucida* Ehrh., 1784) could not be illegitimate.

Such a limitation would affect not only conserved names that were illegitimate when published, but also all pre-conservation-date combinations with these names. For example, conservation of the later homonym *Sorghum* Moench (1794) became effective in 1964, so that between 1794 and 1964 all species names (including *S. bicolor*) would have been combinations with an illegitimate generic name (cf. Art. 55.1) and thus not correct. All literature using these would be wrong; a separation between taxonomic reality and nomenclatural reality. In 1964, many of these would become correct names, all at once; an inexplicable instability. Furthermore, because prior to 1964 no combination in *Sorghum* could be correct (to be "adopted"), no pre-1964 combination under *Sorghum* could be illegitimate by the inclusion of the type of an earlier name.

The above accords with the analysis made by Wiersema & al. (in Taxon 65: 645. 2016) for binding decisions. In their case of *Eriastrum* (l.c.: 644), there is no problem if legitimacy applies retroactively. Any potential problems they discuss for basionyms (l.c.: 643–644) disappear if legitimacy is accepted as applying retroactively.

(123) Add a new rule, somewhere in Art. 52:

"*52.n*. For the purpose of Art. 52.1, in determining if a name ought to have been adopted, or of which the epithet ought to have been adopted, the effects of conservation, protection, or sanctioning, even if otherwise retroactive, are to be disregarded, unless this conservation, protection, or sanctioning took effect (Art. 14.15) prior to the publication of the name being evaluated for superfluity."

If it is felt that retroactivity of conserved legitimacy may cause problems for Art. 52.1, it should be possible to expressly limit retroactivity of conserved legitimacy, only for the purpose of Art. 52.1, very parsimoniously. Article 52.2 already expressly limits retroactivity of conserved types, for the purpose of Art. 52.1 (as does Art. 48.2, for the purpose of Art. 48.1).

(124) Add a sentence at the end of Art. 14.15:

"*14.15*. […] Conservation of spelling and gender (Art. 14.11), once it takes effect, applies retroactively, as does legitimacy of conserved names (Art. 14.1) (but see Art. 52.n)."

If this is accepted, it may be a good idea to add a Note to Art. 6.5 along the lines of "No name can become illegitimate by the later typification or later conservation of another name" or in Art. 14 (somewhere): "Conservation of a name cannot cause another name to become illegitimate." Also, it would seem that there is no need to expressly limit the

retroactivity of other aspects of conservation or rejection (or later typifications). Should there be places where retroactivity could cause problems, it seems better to adopt solutions, locally, rather than fail in the basic mission to provide stability of names.

(125) Add a new Art. 14.16 (or add a sentence at the end of Art. 14.15):

"*14.16*. Once it has taken effect, conservation applies retroactively (but see Art. 48.2(c), 52.2(b), and 52.n)."

This is the more inclusive alternative to Prop. 124. As a general principle, exceptions, in this case to Prin. VI, are best kept as limited as possible. It seems obvious that a conserved type needs to apply retroactively. Consider an original type belonging to a different taxon, duly replaced by a conserved type. Any taxonomist reviewing past taxonomic decisions would automatically do so with the later and appropriate type as the anchoring point of the name. The idea that the original type be used to review decisions prior to the conservation date, and the conserved type after that date, seems far-fetched. This is no different from any case where a type is superseded by a later type (Art. 9.15, 9.18–20, 10.2 and 10.5).

Acknowledgement

John H. Wiersema is thanked for useful discussion prior to the first draft of these proposals and acknowledged for contributing the *Cajanus cajan* example.

(126) Proposal to add a new Article 61.6 to permanently and retroactively eliminate epithets with the root *caf[e]r-* or *caff[e]r-* from the nomenclature of algae, fungi and plants

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Article 51.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) states that a legitimate name must not be rejected merely because it, or its epithet, is inappropriate or disagreeable. However, at present there are epithets used in validly published names, mostly dating from the 18th and 19th centuries, that are highly offensive because a derivative of them is a racial slur that goes well beyond being merely "inappropriate or disagreeable" (see, e.g., Knapp & al. in Taxon 69: 1409. 2020). We propose that the continued use of these epithets in the nomenclature of organisms covered by the *Code* must be eliminated permanently and retroactively.

The epithets in question have the root *caf[f][e]r-* and derive from an Arabic word meaning "infidel" that was used in the toponym of a region in southern Africa and for its inhabitants. Although, when initially published, the epithets may not have been intended to offend, in present-day society they have taken on a decidedly negative connotation because the noun from which they derive is a racial slur in languages such as English, Afrikaans, Spanish and Portuguese. Aversion to using these epithets arguably applies more to plant scientists and other users of scientific plant names from Africa or of African heritage, but increasingly also to a larger user community. The same term exists in several vernacular names, for example for a species of lime, *Citrus hystrix* DC., and for *Erythrina caffra* Thunb. In widely used lists of common names these and other such insulting names have been replaced by alternative names such as Makrut lime and Cape coraltree, respectively.

Therefore, because presently the epithets derived from the Arabic word meaning "infidel" are highly offensive, they are to be eliminated from use in the nomenclature of organisms covered by the *Code*. These epithets are *cafer* / *caffer*, *cafferiana*, *cafra* / *caffra*, *caffraria*, *caffrorum* and *caffrum*. Eradicating them can be easiest achieved by treating them as orthographical variants that are to be corrected by removing the letter *c* and the second *f*, if applicable, i.e. by changing them to, respectively, *afer*, *aferiana*, *afra*, *afraria*, *afrorum* and *afrum*, with retention of author and place of publication. Epithets such as *afra* and *afrum* are already in use in scientific plant names, for example in *Portulacaria afra* Jacq., the well-known *spekboom*, and refer to the material described as having the continent of Africa as geographical origin. Where such an action will create a later homonym, the correct name is determined by Art. 11.4.

The removal of the letter *c* from the offensive epithets has been mooted before, for example by Dendrophilus (in Dendron 31: 61. 1993), albeit not through a proposal to amend the *Code*.

As far as could be determined, the aforementioned epithets occur in 218 validly published names of vascular plants and bryophytes (see suppl. Appendix S1), while 13 names of algae (see AlgaeBase, https://www.algaebase.org/) and 70 names of fungi (see MycoBank, https://www.mycobank.org/) are similarly affected. For vascular plants and bryophytes, 56 of these names are accepted and in use, 155 are synonyms and 7 are unplaced. A change in the epithets, as proposed here, creates four cases of homonymy. Two of these cases

refer to synonyms, one refers to an unplaced name and only one affects an accepted name. The latter is *Plantago cafra* Decne. (1852), which would become an illegitimate later homonym when changed to *P. afra*, because of the pre-existence of *P. afra* L. (1762) (see Example 4, below).

It is time for the nomenclature of algae, fungi and plants to get to grips with what has been perceived, at least by some, as its colonial past and deliberately, completely and irreversibly eliminate the use of such offending epithets from scientific plant names.

(126) Add a new Article 61.6 and two Examples:

"*61.6*. Epithets with the root *caf[f][e]r-,* such as *cafra, caffra, cafrorum*, and *cafrum*, are not permitted in the nomenclature of organisms covered by this *Code*. Where these epithets were used in validly published names, they are to be treated as orthographical variants that are to be replaced by epithets with the root *af[e]r-*, such as *afra, afrorum,* and *afrum,* respectively. If this results in a later homonym, the correct name is determined by Art. 11.4."

"*Ex. 4*. When the epithet *'cafra'* in *Plantago 'cafra'* Decne. (in Candolle, Prodr. 13(1): 719. 1852) is replaced by *afra, P. afra* Decne. (l.c.), i.e. with retention of author attribution and date and place of publication, is a later homonym of *P. afra* L. (Sp. Pl., ed. 2: 168. 1762) and therefore illegitimate. Under Art. 11.4 the name that has to be adopted is *P. capillaris* E. Mey. ex Decne. (in Candolle, Prodr. 13(1): 719. 1852), which is widely treated as a heterotypic synonym of *P. cafra*."

"*Ex. 5. Portulaca 'caffra'* Thunb. (Prodr. Pl. Cap.: [85]. 1800) is to be treated as having been published as *P. afra* Thunb. (l.c.), i.e. with retention of author attribution and date and place of publication. When treated as a species of *Talinum* Adans., the name is *T. afrum* [with one *f*] (Thunb.) Eckl. & Zeyh. (Enum. Pl. Afric. Austral.: 282. 1836)."

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(127–135) Proposals to add new Provisions and Recommendations to Division III of the *International Code of Nomenclature for algae, fungi, and plants* related to virtual participation in the Nomenclature Section

Special-purpose Committee on Virtual Participation in the Nomenclature Section

Members of the Special-purpose Committe: Leslie R. Landrum (Secretary),[1] Renée Fortunato (Convener),[2] Mary Barkworth,[3] Ilse Breitwieser,[4] Sebsebe Demissew,[5] Ali A. Dönmez,[6] Suchandra Dutta,[7] Alina Freire-Fierro,[8] Young-Dong Kim,[9] Blanca León,[10] Gerry Moore,[11] Sergei L. Mosyakin,[12] Sang-Hun Oh,[13] Carlos Parra-O.,[14] Jefferson Prado,[15] Lourdes Rico Arce,[16] Alexander N. Sennikov[17] & Gideon F. Smith[18]

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A Special-purpose Committee on Virtual Participation in the Nomenclature Section (NS) was established at the XIX International Botanical Congress in Shenzhen, China in 2017 (Wilson in Taxon 68: 160–162. 2019). The mandate of this Special-purpose Committee is "to investigate the possibility of and mechanisms for virtual participation and voting in the Nomenclature Section of an International Botanical Congress via the internet". After discussing the concepts of virtual participation and voting, we have arrived at various suggestions, which are discussed in the accompanying report of the Committee (Landrum & al. in Taxon 70: 1399–1401. 2021).

We realize that virtual or online participation in the NS would be a significant change to the *International Code of nomenclature for algae, fungi, and plants* (*Code*, Turland & al. in Regnum Veg. 159. 2018) and can only be accepted as a change after its feasibility has been proven. Therefore, we are proposing that a trial be conducted at the NS of the next International Botanical Congress. Nevertheless, we are formally proposing additions to Div. III of the *Code* that can be considered near the end of the NS if the trial proves successful.

(127) Add a new Provision to Div. III Prov. 4:

"*4.new1*. Interested individuals or groups are to be able to observe the Nomenclature Section of an International Botanical Congress online on the World Wide Web. The Organizing Committee of the International Botanical Congress in consultation with the Bureau of Nomenclature are together responsible for ensuring that this is implemented."

(128) Add a new Provision to Div. III Prov. 4:

"*4.new2*. Individuals or groups without voting rights observing the Nomenclature Section online on the World Wide Web will not be charged for this service, or a small fee will be set at the discretion of

the Organizing Committee of the International Botanical Congress in consultation with the Bureau of Nomenclature."

(129) Add a new Provision to Div. III Prov. 4:

"*4.new3*. Registered members of the Nomenclature Section (with voting rights) attending online on the World Wide Web (online members) will pay fees similar to those that they would pay if they attended in person."

(130) Add a new Provision to Div. III Prov. 4:

"*4.new4*. Individuals desiring to be online members of the Nomenclature Section will register their intention to participate in advance of the Nomenclature Section, by a date to be determined by the Organizing Committee of the International Botanical Congress in consultation with the Bureau of Nomenclature."

(131) Add a new Provision to Div. III Prov. 5:

"*5.new1*. Online members of the Nomenclature Section may accumulate and cast institutional votes just as in-person members (see Prov. 5.9(b))."

(132) Add a new Recommendation to Div. III Prov. 5:

"*Recommendation 1*. The Nomenclature Section should take place in a country and place where broadcasting the Nomenclature Section on the web is possible and allowed."

(133) Add a new Recommendation to Div. III Prov. 5:

"*Recommendation 2*. Local groups of non-voting observers, and members (online and in-person), of the Nomenclature Section are encouraged to meet together before and during the Section to facilitate discussion of proposals, including the results of the preliminary guiding vote (see Prov. 2.5)."

(134) Add a new Recommendation to Div. III Prov. 5:

"*Recommendation 3*. When proposals or amendments to proposals are introduced during the Nomenclature Section without having been published beforehand, voting on them should be delayed, to alert members (online and in-person) who may not be present for the whole Section."

(135) Add a new Recommendation to Div. III Prov. 5:

"*Recommendation 4*. Written recognition for participation in the Nomenclature Section should be provided to members (online and in-person) by the Organizing Committee of the International Botanical Congress."

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NOMENCLATURE COMMUNICATIONS

(136–137) Proposals to clarify the definition of "illustration"

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The current definition of "illustration" in the *Code* (Art. 6.1 footnote, Turland & al. in Regnum Veg. 159. 2018) originated in a proposal to the Melbourne Congress (Perry in Taxon 59: 1909. 2010) that accompanied a proposal to make clear that illustrations in the protologue were original material; the definition was designed to ensure that only illustrations exhibiting the features of the taxon being named would qualify as original material. As the Rapporteurs put it in their Comments (McNeill & Turland in Taxon 60: 247–248. 2011) "*Prop. A* is an acceptable clarification of the meaning of illustration as generally used in the *Code*, ruling out habitat photographs and the like."

However, although that was the intent, even a very general view of the habitat is likely to show some feature of the taxon being illustrated, even if not in sufficient detail to be useful for purposes of identification. Accordingly, we propose to explicitly exclude habitat photographs. In addition, the current wording refers to the illustration of "an organism", which might be thought to imply a single, whole organism. Because the definition relates primarily to illustrations eligible as types, we consider it clearer to adapt the wording of Art. 8.2 that defines a specimen and replace "an organism" with "a species or infraspecific taxon". There are, however, two very exceptional circumstances in which the type of a generic name may be an illustration without indication of a species name; for this reason we propose appropriate cross-references.

(136) Amend the footnote to Art. 6.1 as follows (new text in bold, deleted text in strikethrough):

"Here and elsewhere in this *Code*, the term "illustration" designates a work of art or a photograph depicting a feature or features of ~~an organism~~ **a species or infraspecific taxon (see also Art. 10.4 and 43.2)**, e.g. a drawing, a picture of a herbarium specimen, or a scanning electron micrograph, **but not a habitat photograph**."

We have identified one use of "illustration" in the *Code* that is not intended to be restricted in the manner set out in the footnote to Art. 6.1 – whether in its current form or in our proposed rewording. This is in the definition of "protologue" in the footnote to Art. 6.13. To resolve this we make the following proposal:

(137) Amend the footnote to Art. 6.13 as follows (new text in bold):

"Protologue (from Greek πρώτος, protos, first; λόγος, logos, discourse): everything associated with a name at its valid publication, e.g. description, diagnosis, illustrations, **habitat photographs (see Art. 6.1 footnote),** references, synonymy, geographical data, citation of specimens, discussion, and comments."

(138–141) Proposals regarding types and supersession (amendments to Articles 7.2–7.4, 8.1, and 10.9, and a new Note after Article 9.19)

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Article 7.2 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) states that the type of a name of a taxon is permanently attached to the name. This is generally correct, but overlooks superseded types, as well as those destroyed, lost, or missing.

(138) Amend the first sentence of Art. 7.2 as follows (new text in bold):

"*7.2*. A nomenclatural type (typus) is that element to which the name of a taxon is permanently attached **(unless it is superseded, destroyed, lost, or missing)**, whether as the correct name or as a synonym."

While Art. 7.3–7.5 all deal with automatic typifications, Art. 7.5 is the only one that uses the term "automatically". Interestingly, that provision is not fully automatic, because the automatic typification applies "unless a different type was designated or definitely indicated in the protologue". In contrast, both Art. 7.3 and 7.4 are fully automatic without exceptions. To avoid any potential confusion or even a conflict with rules in Art. 9 providing for a holotype or lectotype, it seems preferable to state that they apply automatically as well. The same issue arises in Art. 10.9 and 10.10: in both Articles typification is automatic, but it is stated to be so only in Art. 10.10. Unlike the similar provision in Art. 10.1, Art. 10.9 does not expressly state that the generic name is "considered the full equivalent of its type".

(139) Amend Art. 7.3, 7.4, and 10.9 as follows (new text in bold):

"*7.3*. A new combination or a name at new rank (Art. 6.10) is typified **automatically** by the type of the basionym even though it may have been applied erroneously to a taxon now considered not to include that type (but see Art. 48.1)."

"*7.4*. A replacement name (Art. 6.11) is typified **automatically** by the type of the replaced synonym even though it may have been applied erroneously to a taxon now considered not to include that type (but see Art. 41 Note 3 and 48.1)."

"*10.9*. The type of a name of a family or of any subdivision of a family is **automatically** the same as that of the generic name from which it is formed (see Art. 18.1). For purposes of designation or citation of a type, the generic name alone suffices**, i.e. it is considered as the full equivalent of its type**. The type of a name of a family or subfamily not formed from a generic name is the same as that of the corresponding alternative name (Art. 18.5 and 19.8)."

Make a conforming amendment to the definition of "automatic typification" in the Glossary.

Article 8.1 states that the "type (holotype, lectotype, or neotype) of a name of a species" is a specimen or illustration. The Article does not mention epitypes or conserved types, even though it appears that all of the rules in Art. 8 apply to them as well.

(140) Amend Art. 8.1 as follows (new text in bold, deleted text in strikethrough):

"*8.1*. The type (~~holotype, lectotype, or neotype~~ **see Art. 7.2**) of a name of a species or infraspecific taxon is **a holotype (Art. 9.1), lectotype (Art. 9.3), neotype (Art. 9.8), or conserved type (Art. 14.9), any of which may be supported by an epitype (Art. 9.9). Such a type is** either a single specimen conserved in one herbarium or other collection or institution, or a published or unpublished illustration (but see Art. 8.5; see also Art. 40.4, 40.5, and Art. 40 Ex. 6)."

Make a conforming amendment to the definition of "nomenclatural type" in the Glossary.

Article 9.19 states that a type can be superseded if one of three conditions is met. However, it does not state how to effect the supersession, or that the earlier designated type ceases to be the type. A Note to this effect would be useful.

(141) Add a new Note after Art. 9.19:

"*Note n*. Supersession is automatic if the holotype is found to exist. In all other cases, it is effected by designating a new lectotype, if appropriate original material is available, or a neotype. Upon supersession, the earlier designated element ceases to be the type."

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(142–148) Proposals to improve the definition, utility, and curation of (type) specimens of fossil algae, fungi, and plants

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The *Code* has developed mainly from botanical practices relating to specimens of non-fossil macroscopic algae, fungi, and plants. Challenges can therefore arise in integrating palaeobotanical including palaeopalynological practices (Gravendyck & al. in Palynology 45: 717–743. 2021). For fossil-taxa, challenges in typification derive from the definitions of **specimen** (Art. 8.2; see below) and **duplicate** (Art. 8.3 footnote; see below), which, in the current version of the *Code* (Turland & al. in Regnum Veg. 159. 2018), depend on the definition of **gathering** (Art. 8.2 footnote; see below). Due to the nature of the materials that are studied in palaeobotany, and the complexities of the taxonomy of fossils, it is especially difficult to apply the terms specimen, duplicate, and gathering as defined in the *Code* without additional interpretation and potential misinterpretations (Gravendyck & al., l.c.).

Palaeobotanists, and even practitioners working with non-fossil macroscopic algae, fungi, or plants, might question some aspects of the definition of a specimen. The current edition of the *Code* states that "a specimen is a gathering, or part of a gathering" and that a specimen "may consist of a single organism, parts of one or several organisms, or of multiple small organisms" (Art. 8.2). A literal interpretation of this statement would require the individuals to be "small" when a specimen consists of multiple whole organisms, with no size specifications when a specimen consists of a single organism or multiple parts of one or more organisms. Additionally, the current wording, if interpreted literally, does not allow one part of one organism to constitute a specimen (the word "parts" in the above quote being plural). This wording could be problematic, for example, in the case of coccoliths, which may individually serve as types yet are only a small part of the coccolithophore organism (e.g. Mutterlose & al. in Paläontol. Z. 79: 113–133. 2005; Monteiro & al. in Sci. Advances 2: e1501822. 2016).

The concept of duplicates is rarely if ever used in palaeobotany and palaeopalynology. Occurrence patterns for fossil-taxa involve complications such as rarity and morphological variability of specimens, imperfect preservation, and absence of other organs or life-cycle stages of the taxon; these factors can result in uncertainty as to whether all specimens collected at a particular locality and stratum represent the same taxon. Regarding micropalaeontology and palaeopalynology, an added taphonomic complication is that specimens within a sample usually have very different spatial and temporal origins. Therefore, most palaeobotanists would be reluctant to regard those specimens as "duplicates", in the sense that the term is used in neobotany, and consequently they would rarely use the concept of isotypes.

In the *Code*, the concept of duplicates is tied to the concept of a gathering, which is defined as "a collection **presumed to be of a single taxon** made by the same collector(s) at the same time from a single locality. The possibility of a mixed gathering is always to be considered, especially when designating a type" (Art. 8.2 footnote, emphasis added here). In neobotany, a gathering is intended to include specimens of just a single taxon, but occasionally something else is included inadvertently, resulting in a mixed gathering. This is not the intent in palaeobotany and palaeopalynology, where a rock or sediment sample collected for mesofossils or palynomorphs is expected to include multiple taxa deposited over many centuries or millennia and influenced by taphonomic processes often including long-distance transport. Therefore, these samples are not single gatherings because the sample is not presumed to contain just a single taxon (Gravendyck & al., l.c.). Even with macrofossil collections, a rock slab containing multiple types of fossil leaves, for example, would not fit this definition of a gathering. The sample could be regarded as analogous to the material of multiple taxa collected by a neobotanist at a locality and later sorted into gatherings corresponding to different taxa. The neobotanist would probably divide some of those gatherings into duplicate specimens, whereas the palaeobotanist would treat each individual of a fossil-taxon as a separate gathering; otherwise a mixed gathering would result.

To address these issues and better accommodate the needs of palaeobotany, and especially micropalaeobotany and palaeopalynology, we propose the following amendments to the *Code*.

(142) Amend Art. 8.2 as follows (new text in bold, deleted text in strikethrough):

"*8.2*. For the purpose of typification a specimen is a gathering[1], or part of a gathering, of a single species or infraspecific taxon, disregarding admixtures (see Art. 9.14). It may consist of a single ~~organism, parts of one or several organisms, or of multiple small organisms~~ **part, multiple parts, or the whole of one or more individual organisms**. A specimen is usually mounted on a single herbarium sheet or in an equivalent preparation, such as a box, packet, jar, or microscope slide **(for fossil-taxa see Art. 8.n)**."

(143) Add a sentence to the footnote to Art. 8.2 (new text in bold):

"[footnote][1] Here and elsewhere in this *Code*, the term "gathering" is used for a collection presumed to be of a single taxon made by the same collector(s) at the same time from a single locality. The possibility of a mixed gathering is always to be considered, especially when designating a type. **For most fossils, a collection of a sample of sediment or rock is not presumed to be of a single fossil-taxon, but is a set of gatherings, each gathering consisting of an individual of a fossil-taxon.**"

(144) Add a sentence to the footnote to Art. 8.3 (new text in bold):

"[footnote][1] Here and elsewhere in this *Code*, the word "duplicate" is given its usual meaning in curatorial practice. A duplicate is part of a single gathering of a single species or infraspecific taxon. **For most fossils, a single gathering consists of an individual of a fossil-taxon, and hence there are no duplicates.**"

(145) Add a new paragraph to Art. 8 with a Note and two Examples:

"*8.n*. For the purpose of typification of names of fossil-taxa, a specimen is an individual of a fossil-species or infraspecific fossil-taxon selected from a sample of sediment or rock or subsample or preparation thereof. A specimen is usually contained on or in a slab of rock, box, vial, or micropalaeontology slide, or mounted on a scanning electron microscope stub or microscope slide. Each specimen is treated as a separate gathering. A sample (or subsample or preparation thereof) may contain multiple individuals (i.e. specimens) of the same fossil-taxon as well as other fossil-taxa (see also Art. 40.n)."

"*Note n*. Macrofossils are often discovered by splitting rocks to reveal a fossil organ on both parts of the rock (or the entire fossil itself and a mould). These are usually referred to as "part" and "counterpart"; they are parts of the same specimen, not separate specimens, and often complementary to each other in their structural details. For the purpose of typification, both part and counterpart, where available, comprise the type specimen."

"*Ex. n1*. The specimen designated as the holotype of the fossil spore *Striatella jurassica* Mädler (in Fortschr. Geol. Rheinl. Westfalen 12: 192. 1964) was mounted on a microscope slide as a strew mount together with other individuals of the same and other taxa. The material on the slide represents a subsample of the residue, which in turn is a subsample of a single rock sample from the Thurau 1 core from the Lower Jurassic of Germany. The holotype is indicated by microscope coordinates (21:117.7) and a collection inventory number (TK 3154) on the slide as well as in the protologue. Additionally, four surrounding dots were added later to indicate the location of this specimen. This indication was translated into a more widely used England Finder reference (N19/4). Besides this holotype, the slide also contains the holotype of *Ephedripites tortuosus* Mädler (l.c.: 194. 1964), TK3159. Other palynomorphs on the same slide conforming to the circumscription of *S. jurassica*, but not explicitly cited in the protologue, comprise other parts of the original material, i.e. they are independent uncited specimens (see photograph of this example in Gravendyck & al. in Palynology 45: 727, fig. 5Ab. 2021)."

"*Ex. n2*. The fossil-species *Diplotropis claibornensis* Herendeen & Dilcher (in Syst. Bot. 15: 527, fig. 1 and 2. 1990) was described based on a fossil that consists of part and counterpart. Both part and counterpart comprise the specimen that was designated as the holotype."

(146) Add a new paragraph to Rec. 8A:

"*8A.n1*. If a specimen is prepared on a microscope slide, it is strongly recommended that its location be indicated by means of England Finder reference (Graticules Ltd. in J. Sci. Instrum. 39: 250. 1962; Riding in Palynology 45(S1): 92–93. 2021) or equivalent unambiguous reference (e.g. single-grain mounts or permanent ink circling; see Art. 8 Ex. n1)."

(147) Add a new paragraph to Rec. 8A:

"*8A.n2*. In the case of palaeopalynology, it is recommended that at least a subsample of rock or sediment or residue from which the type was selected be deposited in the public collection along with the type, thereby permitting future preparations that could interpret or replace degraded type material."

(148) Add new paragraph to Art. 40:

"*40.n*. For the name of a new fossil-species or infraspecific fossil-taxon published on or after 1 January 2026, the protologue must clearly indicate where the holotype specimen (see Art. 8.n) is located within the rock, sediment, or preparation."

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(149) Proposal to add an Example under Article 8 Note 1 to show that an apparent collecting number does not necessarily denote the same gathering

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According to Art. 8 Note 1 of the *Code* (Turland & al. in Regnum Veg. 159. 2018), field numbers, collecting numbers, accession numbers, or specimen identifiers alone do not necessarily denote different gatherings. However, in the past, the same number was occasionally assigned by the collectors to the same taxon gathered at different times, and this should not be confused with a collecting number. This information is unknown to many and is also not mentioned in the *Code*. Therefore, we propose to include a new Example under Art. 8 Note 1.

(149) Add a new Example under Art. 8 Note 1 (which could be amended editorially to state "the same or different gatherings"):

"*Ex. n*. The specimens of *"Pantling 215"* in BM, BR, K, L, P, and W, collected from Senchal, India in July 1892 by Robert Pantling, are types of *Goodyera hemsleyana* King & Pantl. (in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64: 342. 1896) and belong to the same gathering. However, the specimens of *"Pantling 215"* in AMES and L, also collected from Senchal by Pantling, belong to a different gathering of the same species made in July 1898 after publication of the name. The number 215 represents the species number rather than the collecting number of Pantling."

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(150) Proposal to add a Recommendation on type specimens of taxa with microscopic distinguishing characters

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The type specimens of names applying to taxa for which microscopic characters are major distinguishing features (e.g. members of the *Poaceae*) can be difficult to study without sometimes destructive handling. This can be a serious problem when the holotype specimen is the only material representing a particular taxon. When such new taxa are described, in order to make the study of the type specimens easier, and to avoid the need for subsequent destructive handling, the authors should provide accurate drawings or microphotographs of the important distinguishing characters or paste dissected parts onto the specimens.

Currently, there is no Recommendation in the *Code* (Turland & al. in Regnum Veg. 159. 2018) that addresses this issue. It is therefore proposed that the following new Recommendation be added to Rec. 8A.

(150) Add a new paragraph to Rec. 8A:

"*8A.n*. Authors describing new taxa for which distinguishing characters are not clearly visible to the naked eye should provide accurate drawings or microphotographs of those characters or paste dissected parts onto the type specimens."

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(151) Proposal to add the concept of "typotype" to the *Code*

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"Typotype" has become increasingly used in taxonomic botany (e.g. Stearn, Introd. to Sp. Pl. and Cognate Bot. Works of Carl Linnaeus: 128–130. 1957; Jonsell & Jarvis in Nordic J. Bot. 14: 145–164. 1994; Jarvis, Order Out of Chaos: 22–24, 32, 61. 2007; Reveal & Jarvis in Taxon 58: 977–984. 2009). The term refers to a specimen from which a type illustration was prepared. Presently, no other term refers to this concept in the *Code* (Turland & al. in Regnum Veg. 159. 2018). According to a footnote in Stearn (l.c.: 129), the term was first proposed by a "Mr. J. E. Dandy", although Stearn did not mention where, when, or how Dandy made the proposal. To be clear, a typotype, unless it is original material, has no nomenclatural standing, but it refers to a useful concept in taxonomic botany. In the event that a holotype, lectotype, or previously designated neotype illustration is demonstrably ambiguous and cannot be critically identified for purposes of the precise application of the name, its typotype can be designated as an epitype if the taxonomic identity of the material is unambiguous (Art. 9.9). The use of typotype is now well established in the taxonomic literature (see above examples). We propose that typotype be added to the *Code* in a new Article and its definition included in the Glossary. We believe that this new Article should appear just after the current Art. 9.9 to promote good practice for epitype selection (for more about epitype selection, see Lendemer in Taxon 69: 849–850. 2020). Also, we present a new Example to illustrate when the term typotype is applied.

(151) Add a new Article with a new Example after Art. 9.9 and a new entry to the Glossary:

"*9.9bis*. A typotype is a specimen from which a type illustration was prepared. It need not be part of the original material as defined by Art. 9.4, and it may be selected as an epitype (Art. 9.9) to support the type illustration."

"*Ex. n*. In the protologue of *Aristolochia arborescens* L. (Sp. Pl.: 960. 1753), Linnaeus cited a single illustration, "*Aristolochia polyrrhizos*, *auriculatis foliis*, *Virginiana*" (in Plukenet, Phytographia: t. 78, fig. 1. 1691), which is original material and was selected as the lectotype by Reveal & Jarvis (in Taxon 58: 978. 2009). The illustration was drawn from a specimen housed in the Sloane Herbarium in BM (Herb. Sloane 95: 105). The specimen is a typotype because it was used to prepare the illustration, but it is not part of the original material because it was not available to Linnaeus."

In the Glossary:

"**typotype.** A specimen from which a type illustration was prepared. It need not be part of the original material as defined by Art. 9.4, and it may be selected to serve as an epitype (Art. 9.9) to support the type illustration."

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(152–153) Proposals to remove an unintended restriction on the typification of genera and subdivisions of genera

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Article 10.2 contains the curious phrase "the holotype or lectotype of one or more previously or simultaneously published species name(s)", mirrored in Art. 10.3 by "the holotype or lectotype of a previously or simultaneously published species name". To understand

how strange this phrase is, imagine a case of a genus newly erected before 1958. At publication, this hypothetical new genus to be composed of, say, five existing species (all recognized previously). Of the five species names, one to have a lectotype and each of the other four to have a neotype; these types already designated earlier (or designated at that time: this should not make a difference). No type to be indicated in the protologue. As currently phrased, Art. 10.2 prescribes that only the one lectotype can become the type of the generic name. Why? This could concern a species of which the inclusion was doubtful (an atypical species), while the inclusion of the other four species could be very solid (four typical species). Later exclusion of the doubtful species would force a (foreseeable and needless) name change.

The phrase originated with Subcommittee 3A on Lectotypification (in Taxon 41: 768–769. 1992), which, in their Prop. 198–200, dealt with Art. 10.2, 10.3 (introduced then) and (what is now) Art. 40.3. Apparently, the Subcommittee intended to draw a parallel between *(1)* the typification of names of species and infraspecific taxa, and *(2)* the "[t]ypification of supraspecific names", with holotypes, lectotypes, and syntypes at the level of genera and subdivisions of genera. In their "rationale" 2 (l.c.: 768) they spoke of a "type of a name of species […] eligible for lectotypification in the supraspecific ranks". Presumably they intended the "holotype" for the case with "one […] definitely included species" and the "lectotype" for the case with "more definitely included species", and did not intend to say anything about various kinds of types of species names. Certainly, this part of the report by the Subcommittee did not even mention neotypes of species names, let alone hint at a reason to exclude them.

This analysis is supported by the phrasing of Art. 10.2. The second sentence applies only if no neotype is included in the protologue, while the first sentence does not specify what happens if the protologue does include a neotype. In other words, the two halves of Art. 10.2 do not add up to one whole.

(152) In Art. 10.2, 10.3, and 40.3 replace "the holotype or lectotype" by "the type" or "the type(s)" as appropriate.

Sometimes readers fail to realize that there are only three kinds of types (Art. 8.1), but hopefully "the type" is unambiguous here, because it is used in context (the type of the name of a species). A clarifying addition after "the type" of "(see Art. 8.1)" should not be necessary, but in view of the confusing phrasing up till now such an addition (somewhere) may still be worth taking into consideration. Perhaps add "(the holotype or previously or simultaneously designated lecto- or neotype)" in Art. 10.3? Such an addition to Art. 40.3 should also include conserved types because Art. 10.2 and 10.3, in this respect, are restricted to names published before 1958 (when species conservation did not exist), whereas Art. 40.3 is not.

(153) Amend the first sentence of Art. 40.3 as follows (new text in bold, deleted text in strikethrough):

"*40.3*. For the name of a new genus or subdivision of a genus, reference (direct or indirect) to a single species name, or citation of ~~the holotype or lectotype of~~ a single **type of a** previously or simultaneously published species name, even if that element is not explicitly designated as type, is acceptable as indication of the type (see also Art. 10.8; but see Art. 40.6)."

Here, the word "single" is not well placed. A name can have only one type, but a type can be shared by any number of names (homotypic names). A reader might take the current text to mean that if there is an element included that is the type of a single species name, and also an element that is the type of more than one species name, the requirements of Art. 40.1 are met (and that the former is the type of the higher-ranking name). Alternatively, reinforce the word "element" that occurs further on in the same sentence: "[…] or citation of ~~the holotype or lectotype of~~ a single **element that is the type of a** previously or simultaneously published species name […]."

(154) Proposal to clarify the meaning of "based on" in Article 14.4

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In order to improve the status definitions in Art. 6, Art. 6.11 was modified from the *Melbourne Code* (McNeill & al. in Regnum Veg. 154. 2012) to the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018). However, the improved wording of Art. 6.11 did not require the statement that a replacement name is "based on" an earlier name, which had appeared in the Melbourne version of Art. 6.11 and which continues to be explicitly stated in Art. 6.10 defining a new combination. Because Art. 14.4 states that a conserved name is conserved against "all combinations based on the rejected names", this change means that it is no longer obvious that a conserved species name is conserved against a replacement name of which the replaced synonym is rejected. However, because a replacement name is indeed based on its replaced synonym, the rule in Art. 14.4 still applies but would benefit from rewording.

To avoid any doubt, we propose the following amendment:

(154) Amend the last sentence of Art. 14.4 as follows (new text in bold):

"*14.4*. […] A conserved name of a species is conserved against all names listed as rejected, and against all **new** combinations **and replacement names** based on the rejected names."

(155) Proposal to disallow descriptive names for subdivisions of families

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As pointed out by Davies & Brummitt (in Taxon 35: 883–884. 1986), the *Code* specifies only for the ranks of subfamily, tribe, or subtribe that names must be formed from a generic name (Art. 19.1 and 19.3). For other ranks of subdivisions of families, the *Code*, as now phrased, allows names that are not formed from a generic name: descriptive names. Davies & Brummitt mentioned the names *Diandrae*, *Monandrae*, *Convolutae*, and *Duplicatae* for groups in the *Orchidaceae*.

However, Art. 10.9 (dealing with types of names of families and subdivisions of families) assumes that all names of families and subdivisions of families are formed from a generic name, excepting only nine family names (Art. 18.5) and one subfamily name (Art. 19.8). Therefore, Art. 10.9 and Art. 19 are in conflict. There appear to be three options to reconcile Art. 10.9 and Art. 19: *(1)* allow descriptive names of subdivisions of families to be untypified (as those in Art. 16.1); this would require making an exception to Art. 7.1 (and Art. 10.9); *(2)* alter Art. 10.9 to prescribe how descriptive names of subdivisions of families are to be typified; or *(3)* reconsider the proposal of Davies & Brummitt (l.c.: 884) to the Berlin Congress, in updated form. This last option seems simplest and least disruptive.

At the Berlin Congress, the proposal of Davies & Brummitt was rejected; several attendees arguing that it would limit the use of informal names and clade names (in Englera 9: 71. 1989). Given that informal names and clade names are outside the remit of the *Code*, this seems an argument that should not be given undue weight (or any).

(155) Amend Art. 19.1 and 19.3 as follows (new text in bold, deleted text in strikethrough):

"*19.1*. The name of a sub**division of a** family is a plural adjective used as a noun; it is formed in the same manner as the name of a family (Art. 18.1) but by adding ~~the~~ **an appropriate** termination **(see Art. 19.3)** ~~*-oideae*~~ instead of *-aceae*."

"*19.3*. The ~~name of a tribe or subtribe is formed in the same manner as the name of a subfamily (Art. 19.1), except that the~~ termination is ***-oideae* for a subfamily,** *-eae* for a tribe, and *-inae* (but not *-virinae*) for a subtribe."

This would disallow the descriptive names of subdivisions of families, mentioned by Davies & Brummitt. These descriptive names would hereby cease to be validly published (Art. 32.1), and would no longer be formal names (they can still be used as informal names, if so desired). There is the slight difficulty that Art. 19 specifies terminations at only three ranks, so that "**the** appropriate termination" would be too much, whereas "**an** appropriate termination" is not as specific as would be possible in the case of those three ranks. A further option would be to join Art. 19.3 to 19.1.

(156–158) Proposals to amend Articles 23 and 24 to cover the use of adverbs

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The *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) says nothing about the use of an adverb as a specific or infraspecific epithet, but it would appear to be covered by Art. 23.1 ("a word in apposition"). Because it is not an adjective, an adverb should be treated as a word in apposition and therefore would not change its form according to the gender of the generic name.

The epithet in the name *Caladenia postea* Hopper & A.P. Br. (in Nuytsia 14: 268. 2001) is from the adverb *postea*, afterwards, referring to the flowering time compared with related taxa. The ending appears to agree with the gender of the generic name, but this is coincidental. Should the species ever be moved to a genus of masculine or neuter gender, the spelling of the epithet would remain the same.

The final epithet in the name *Ptilotus polakii* subsp. *juxta* Lally (in Nuytsia 19: 61. 2009), although published as *'juxtus'*, is from the adverb *juxta*, next to, close by. This is an adverb and hence the ending may not be changed. The spelling is correctable to *juxta*.

It would be useful to include mention of the use of an adverb in the *Code*.

(156) Amend the first sentence of Art. 23.1 as follows (new text in bold):

"*23.1*. The name of a species is a binary combination consisting of the name of the genus followed by a single specific epithet in the form of an adjective, a noun in the genitive, **an adverb,** or a word in apposition (see also Art. 23.6)."

(157) Amend the first sentence of Art. 23.5 as follows (new text in bold) and add a new Example:

"*23.5*. The specific epithet, when adjectival in form and not used as a noun, agrees with the gender of the generic name; when the epithet is a noun in apposition or a genitive noun, it retains its own gender and termination irrespective of the gender of the generic name**; when the epithet is an adverb, it retains its spelling irrespective of the gender of the generic name**."

"*Ex. 7bis*. Names with an adverb for an epithet: *Acrostichum deorsum* H. Karst., *Brachyotum seorsum* Wurdack, *Caladenia postea* Hopper & A. P. Br., *Phaca unde* Rydb., *Rubus satis* L. H. Bailey."

(158) Amend Art. 24.2 as follows (new text in bold):

"*24.2*. Infraspecific epithets are formed like specific epithets and, when adjectival in form and not used as nouns **or adverbs**, they agree grammatically with the generic name (see Art. 23.5 and 32.2)."

(159) Proposal to add a new Note and Example in Article 30 concerning retracted electronic publications

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Several Articles are included in the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) to regulate the effective publication of electronic material, which must be in Portable Document Format (PDF) in an online publication with an International Standard Serial Number (ISSN) or an International Standard Book Number (ISBN). These rules appear in Art. 29 and 30. However, one important aspect is not covered by these rules: how to proceed when effectively published electronic material is retracted? Does it then cease to be effectively published, rendering any included nomenclatural novelties no longer validly published? We consider that, despite the retraction, effectively published electronic material remains effectively published. Electronic material should be comparable to printed matter. Effectively published printed matter does not cease to be effectively published if the publisher issues a retraction. Put simply, effective publication is not reversible.

To clarify this situation, we are proposing a new Note and Example to be added to Art. 30. These would probably be best placed after Art. 30.4, which rules that the content of a particular electronic publication must not be altered after it is effectively published and that any such alterations are not themselves effectively published.

(159) Add a new Note and Example in Art. 30:

"*Note n*. Electronic material that has been effectively published remains effectively published even if retracted by its publisher."

"*Ex. n*. *Bauhinia saksuwaniae* Mattapha & al. was effectively published in a paper first placed online on 11 December 2013 as a PDF document accessible through the website of the *Nordic Journal of Botany* (ISSN 1756-1051, online, https://doi.org/10.1111/j.1756-1051.2013.00102.x). That paper was later declared as "retracted" by the publisher and has not appeared in the printed version of the journal (ISSN 0107-055X, print). Despite the retraction, the paper remains effectively published under Art. 29 and 30 and the species name remains validly published."

(160) Proposal to convert Recommendation 40A.5 to a new Article dealing with deposition of type specimens for valid publication of names of new taxa

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According to Art. 40.7 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), valid publication of names of new species or infraspecific taxa after 1 January 1990 requires specification of the herbarium, collection, or institution where the type is conserved. Some authors follow this Article while publishing the name of a new taxon, but fail to deposit the type material in the specified herbarium. For example, recently Bhattacharjee & al. (in Bot. Lett., published online 15 November 2021, https://doi.org/10.1080/23818107.2021.2000889) mentioned with regard to the type of *Gastrochilus corymbosus* A.P. Das & S. Chanda (in J. Econ. Taxon. Bot. 12: 401. 1989): "holotype cited as being at CAL, but actually not deposited there and could not be traced anywhere …". The present authors have confirmed with the curator at CAL that the specimen cannot be found there and is not listed in the accessions register. While this particular incident preceded 1 January 1990, some authors still fail to deposit the type, either deliberately or inadvertently.

Recommendation 40A.5 of the *Code* ("Specification of the herbarium, collection, or institution of deposition should be followed by any available number permanently and unambiguously identifying the holotype specimen.") could deal with such situations if converted to a new Article under Art. 40. Because receiving such a number from the institution of deposition can sometimes take a long time, delaying publication, we propose to reword the converted Rec. 40A.5 by replacing "the holotype specimen" with "at least one of the holotype, isotype, or paratype specimens". Therefore, authors in the future will not only have to follow Art. 40.7, but practise the rule in reality by providing, for valid publication, a permanent number (e.g. accession number, barcode, or QR code) in the protologue for at least one of the type specimens, which will unambiguously identify that specimen.

(160) Convert Rec. 40A.5 to a new Article after Art. 40.7, reword it as follows, and move Rec. 40A Ex. 1 (wording unchanged) to follow the new Article:

"*40.7bis*. For the name of a new species or infraspecific taxon published on or after 1 January 2026 of which the type is a specimen, any available number permanently and unambiguously identifying at least one of the holotype, isotype, or paratype specimens in addition to its herbarium, collection, or institution of deposition must be specified (see also Art 40.7)."

"*Ex. n*. The type of *Sladenia integrifolia* Y. M. Shui & W. H. Chen (in Novon 12: 539. 2002) was designated as "*Mo Ming-Zhong, Mao Rong-Hua & Yu Zhi-Yong 05* (holotype, KUN 0735701; isotypes, MO, PE)", where KUN No. 0735701 is the unique identifier of the holotype sheet in the herbarium of the Kunming Institute of Botany (KUN)."

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(161) Proposal to expand the functions of the General Committee to include the appointment of Special-purpose Committees between International Botanical and Mycological Congresses

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A mechanism available to a Nomenclature Section (NS) or Fungal Nomenclature Session (FNS) to obtain a better understanding of the effects of proposals to amend the *International Code of Nomenclature for algae, fungi, and plants* that are deemed to be controversial but potentially useful or too complex to resolve at the NS/FNS, is to vote to establish a Special-purpose Committee (SPC) that then has the mandate and multi-year period leading up to the next International Botanical Congress (IBC) or International Mycological Congress (IMC), as appropriate, to address the matter assigned to it (see Div. III Prov. 4.3(d) of the *Shenzhen Code*, Turland & al. in Regnum Veg. 159. 2018; see also Smith & al. in Taxon 68: 1082. 2019). The period between IBCs is typically six years—less in the case of IMCs—but the period required for an SPC to reach a decision could be multiples of six, in the case of IBCs, depending on the complexity of the matter addressed. As noted by Smith & Figueiredo (in Taxon 71: 4. 2022), controversial matters with a bearing on the nomenclature of algae, fungi, and plants might require being addressed with greater urgency than every six, or more, years.

During intercongress periods, the General Committee (GC), one of the Permanent Nomenclature Committees, is active in that it, inter alia, receives proposals to conserve, protect, or reject names, proposals to suppress works, and requests for decisions and for referring these proposals or requests to the specialist committee(s) concerned (Div. III Prov. 7.9). The GC itself, however, has to be authorized by an NS/FNS to appoint SPCs (Div. III Prov. 4.3(d)).

This proposal is aimed at expanding the mandate of the GC to enable it to appoint SPCs between IBCs/IMCs when urgent matters arise. Provisions for the eventual receipt of the reports of SPCs appointed during an intercongress period remain unchanged (Div. III Prov. 4.3(g)) and are the same as for SPCs appointed by an NS/FNS.

(161) Add a new phrase at the end of the final sentence of Div. III Prov. 7.9 (new text in bold, deleted text in strikethrough):

"*7.9*. […] The General Committee may also communicate an international standard format in addition to, or as a successor to, Portable Document Format (PDF) for effective publication of electronic material (Art. 29.3)**,** ~~and~~ is empowered to ratify a list of institutional votes drawn up by the Committee on Institutional Votes (see Prov. 3.1)**, and is authorized to appoint, as needed, Special-purpose Committees between International Botanical or Mycological Congresses**."

(162) Proposal to add "first-step typification" and "second-step typification" to the Glossary

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According to Art. 9.17 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), a second-step typification can be applied to a lecto-, neo-, or epitypification. In our experience, the terms first-step and second-step lectotypification are becoming more and more frequent in the taxonomic literature. The terms are implicitly explained in the context of Art. 9.17 and Ex. 14 but are absent from the Glossary. Because these terms are becoming more common, they should be explained in the Glossary. Accordingly, we propose the following.

(162) Add two new entries to the Glossary:

"**first-step typification.** See ***second-step typification***."

"**second-step typification.** Designating a single specimen as the lectotype, neotype, or epitype for a name where a single gathering but more than one specimen was originally (in the first-step typification) designated as lectotype or neotype, or epitype (Art. 9.17 and Ex. 14)."

NOMENCLATURE COMMUNICATIONS

The procedures and timetable for proposals to amend the *International Code of Nomenclature for algae, fungi, and plants*, including instructions for authors of proposals, were published by Turland & Wiersema (in Taxon 68: 1372–1373. 2020, https://doi.org/10.1002/tax.12173). *Taxon* has been open for submission of proposals to amend the *Code* since 13 March 2020 and will close on 31 March 2023 (extended from 31 March 2022 when the next International Botanical Congress was moved from 2023 to 2024). Later submissions, until 30 June 2023, may be accepted at the Rapporteurs' discretion if no significant review, editing, or revision is necessary. No submissions will be accepted after 30 June 2023.

(163–164) Proposals to amend Article 8 Ex. 3 and to add a new Note to Article 38, with comments on "types" represented by two or several gatherings

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The "*Echinocereus sanpedroensis*" Example (now Art. 8 Ex. 3 of the *Shenzhen Code*: Turland & al. in Regnum Veg. 159. 2018; originally Art. 8 Ex. 1 of the *Saint Louis Code*: Greuter & al. in Regnum Veg. 138. 2000) has a rather interesting and turbulent history. It was originally proposed following the discussion by the Special Committee on Lectotypification set up by the XV International Botanical Congress in Yokohama, Japan, in August 1993.

Barrie (in Taxon 47: 883. 1998), in the report of the Special Committee on Lectotypification, provided the following proposed original version of the *Echinocereus sanpedroensis* Example: "*Ex. 1.* The holotype of *Echinocereus sanpedroensis* Raudonat & Rischer (in Echinocereenfreund 8(4): 88–97. 1995) consists of a complete plant with roots, a detached branch, an entire flower, a flower cut in halves, and two fruits, taken from the same cultivated individual at different times and preserved, in alcohol, in a single jar." The original intention of that Example was to illustrate the acceptability of types represented by "material collected from an individual plant at different times" that "may be defined as a single specimen if mounted as a single preparation or as multiple preparations labelled as being part of the same specimen" (Barrie, l.c.).

The risks of "the option of types consisting of material collected at different dates from the same individual plant" was discussed by Greuter & Hawksworth (in Taxon 48: 76–77. 1999). As a result, the *Echinocereus sanpedroensis* Example (then Art. 8 Ex. 1) first appeared in the *Saint Louis Code* (Greuter & al., l.c.) with the wording and meaning quite different from the originally intended ones, illustrating not the validity but, *vice versa*, the invalidity of that name because its supposed type consisted of more than one gathering.

There were later proposals to amend the *Echinocereus sanpedroensis* Example (Niederle in Taxon 65: 409. 2016; Sennikov in Taxon 65: 647. 2016). The proposal by Sennikov (l.c.) was referred to the Editorial Committee and accepted in a slightly different wording, while the proposal by Niederle (l.c.) was rejected (see also Turland & Wiersema in Taxon 66: 224–225, 250. 2017), resulting in the current wording of that Example in the *Shenzhen Code*.

However, it looks as though nobody has noticed that the *Echinocereus sanpedroensis* Example, both in its original wording and as it stands now in the *Shenzhen Code*, is in fact incorrect. The problem is that the protologue of *Echinocereus sanpedroensis* contains no information about several gatherings. The holotype is indicated in the protologue by the following texts: "Holotypus: Mexico, Edo Sonora. Rancho San Pedro, Ri. 263, cult. W. Rischer Mai 1995 (ZSS), AX 16502" and "Holotypus: In Vorbereitung zu dieser Erstbeschreibung wurde der Holotypus in der Städtischen Sukkulentensammlung Zürich, Schweiz (Schutzsammlung und Herbarium der I.O.S.) unter AX 16502 hinterlegt."

As we see, it is not evident from the protologue that the holotype is represented by several gatherings. Just imagine a hypothetical situation when the holotype (or a supposed or intended "holotype") specimen is lost or destroyed (or even never existed!) and we have no way of knowing that it was in fact represented by several gatherings—would that affect the validity of the name? Certainly, in such a situation the name would be considered validly published.

Since it is axiomatic in the *Code* that the valid publication of a name must be determined *from the protologue* (and, as in our case, *not* from any actual or presumably existent specimens associated with the protologue), we conclude that the name *Echinocereus sanpedroensis* was validly published. That also means that several recent "validations" of various names with their types supposedly represented by several gatherings were in fact unnecessary; for example, those of several species names in *Hyacinthaceae* (see Martínez-Azorín & Crespo in Taxon 63: 1327–1334. 2014), of *Juno parvula* Vved. (in Ovchinnikov, Fl. Tadzhiksk. S.S.R. 2: 425. 1963; see Boltenkov in Phytotaxa 252: 146. 2016), etc. We think that in such cases lectotypes should be designated from original material. Further details and discussion of such cases will be provided in a separate article (now in preparation).

Because of the arguments presented above we propose amendments to the *Echinocereus sanpedroensis* Example.

(163) Amend Art. 8 Ex. 3 as follows (new text in bold, deleted text in strikethrough):

"*Ex. 3*. **The protologue of** ~~"~~*Echinocereus sanpedroensis*~~"~~ ~~(~~Raudonat & W. Rischer **(**in Echinocereenfreund 8(4): 88–97. 1995) ~~was based on a "holotype" consisting of~~ **meets the requirements of Art. 38.1 for valid publication of the name, including indication of the type (Art. 40.1) as "Holotypus: Mexico, Edo Sonora, Rancho San Pedro, Ri. 263, cult. W. Rischer Mai 1995 (ZSS), AX 16502". That the designated type specimen comprises** a complete plant with roots, a detached branch, an entire flower, a flower cut in halves, and two fruits that, according to the label, were taken from the same cultivated individual at different times and preserved, in alcohol, in a single jar~~. Because this material was collected at more than one time, it belongs to more than one gathering and cannot be accepted as a type. Raudonat & Rischer's name is not validly published under Art. 40.2.~~**, and must, therefore, represent more than one gathering, does not affect the status of the name, as there was no indication of more than one gathering in the protologue in which all the requirements for valid publication were fully met.**"

Although we believe that the *Code* is quite clear in requiring, for valid publication of a name, only that the explicit provisions of the *Code* be met, we think, given the examples we have encountered of some authors presuming otherwise, that a Note be added after Art. 38.1, along the following lines:

(164) Add a new Note after Art. 38.1:

"*Note 1bis*. Provided the protologue meets all the requirements for valid publication (i.e. Art. 32–45, F4, F5, and H.9), the name of a new taxon is validly published even if the provision of inaccurate or inadequate information in the protologue is later discovered, e.g. failure to deposit the type in the herbarium, collection, or institution specified, or that the type represents more than one gathering."

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(165) Proposal to amend Article 9.2 to allow correction of errors in the designation of lectotypes and neotypes as well as holotypes

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Article 9.2 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) states: "If a designation of holotype made in the protologue of the name of a taxon is later found to contain errors (e.g. in locality, date, collector, collecting number, herbarium code, specimen identifier, or citation of an illustration), these errors are to be corrected provided that the intent of the original author(s) is not changed. However, omissions of required information under Art. 40.6–40.8 are not correctable." In addition to the seven types of errors listed in Art. 9.2, indication of the wrong herbarium was found in the designation of a type specimen in the protologue of the name of a taxon. Other related errors have been found in the designations of lectotypes or neotypes as well. Therefore, we propose to clarify Art. 9 and herewith provide new Examples.

(165) Move Art. 9.2 to after Art. 9.23 and amend it as follows (new text in bold, deleted text in strikethrough) and add new Examples:

"*9.n*. If a designation of holotype**, lectotype, neotype, or epitype** made in the ~~protologue~~ **publication containing the type designation** of the name of a taxon is later found to contain errors (e.g. in locality, date, collector, collecting number, ~~herbarium code~~ **herbarium or collection or institution or its abbreviation**, specimen identifier, or citation of an illustration), these errors are to be corrected provided that the intent of the original author(s) is not changed **(see also Art. F.5.8)**. However, omissions of required information under Art. **7.11, 9.21–9.23,** 40.6–40.8**, and F.5.4** are not correctable."

"*Ex. n1*. The name *Cremanthodium campanulatum* var. *flavidum* S. W. Liu & T. N. Ho (in Acta Phytotax. Sin. 39: 558. 2001) was validly published with the holotype designated as "*Rock 17919* (holotype, here designated, GH)", but no specimen with this collecting number exists in GH. However, a specimen of *J. F. Rock 17919* with the author's written label exists in A and matches all other details in the protologue. Therefore, the erroneous herbarium in the designation of holotype is to be corrected."

"*Ex. n2*. The name *Capparis trichocarpa* B. S. Sun (in Acta Phytotax. Sin. 9: 113. 1964) was validly published with a gathering "*C. W. Wang 73796*" in PE designated as the type, but in the herbarium PE there are two duplicates of this gathering. Li & al. (in Bull. Bot. Res., Harbin 28: 265. 2008) designated one of these specimens as the lectotype: "China. Yunnan: Fo-hai (= Menghai), alt. 1520 m, March 1936, *C. W. Wang 73796* (lectotype, PE Herb. Bar Code

No. 00029137, designated here, PE!; isolectotype, PE!)". However, the collection date on the label of the lectotype specimen is May 1936. Therefore, the erroneous date in the designation of lectotype is to be corrected."

"*Ex. n3*. The name *Camellia drupifera* Lour. (Fl. Cochinch.: 411. 1790) lacks original material. Ming & Bartholomew (in Wu & al., Fl. China 12: 411. 2007) designated a single specimen as the neotype: "China. Guangxi: Liucheng Xian, Satang Forest Station in cultivation, Jul 1956, *Huang Tso-Chieh [Huang Zuo-Jie] 2042* (neotype designated here, PE) based on the holotype of *C. vietnamensis* T. C. Huang ex Hu (Acta Phytotax. Sin. 10: 138. 1965)". However, no specimen with this collecting number exists in PE. A specimen collected by Huang Zuo-Jie with the collecting number 2043, annotated with "*Camellia vietnamensis* Hu et Huang" and "type" by Hu on 26 April 1963, was found in PE and matches all other details in the type designation. Therefore, the erroneous collecting number in the designation of neotype is to be corrected."

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(166) Proposal to add a new Note and two new Examples after Article 9.12 to clarify which type specimens change or retain their status upon designation of a lectotype

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Each of the type categories has a different term due to its intrinsically different definition (Art. 9 of the *Shenzhen Code*: Turland & al. in Regnum Veg. 159. 2018). Isotypes, syntypes, and paratypes are categories of types that can have their categories and terms changed by a retroactive nomenclatural act, i.e. if one of them is designated as the lectotype (see Art. 9.12). Curiously, the *Code* is silent on the matter of the term(s) that should be used for the remaining type specimen(s) that are not designated as the lectotype. This lack of an explicit indication is detrimental to research because it leaves taxonomists unable to trace a previous nomenclatural change of the type category of certain specimens. We propose that type specimen(s) other than the lectotype should retain their former category and term after a lectotypification event, except duplicates of the lectotype, i.e. isolectotypes. To clarify this in the *Code*, we propose a new explanatory Note along with two new Examples, as follows.

(166) Insert a new Note and two new Examples after Art. 9.12 as follows:

"*Note n*. Upon designation of a lectotype, the remaining type specimens among the original material retain their former category of type (except duplicates of the lectotype, i.e. isolectotypes). They should be cited as "remaining syntype(s)", "remaining isosyntype(s)", or "remaining paratype(s)"."

"*Ex. n. Cleistes castaneoides* Hoehne (in Arq. Bot. Estado São Paulo 1: 42. 1939) was published with two syntypes, *Hoehne s.n.* in SP accession No. 28697 and *Luederwaldt s.n.* in SP accession No. 28995. Meneguzzo & Van den Berg (in Willdenowia 50: 140. 2020) designated *Hoehne s.n.* as the lectotype of the name, and the other type specimen, *Luederwaldt s.n.*, is categorized as a remaining syntype."

"*Ex. n. Vanilla organensis* Rolfe (in J. Linn. Soc., Bot. 32: 452. 1896) was described based on the syntype gatherings *Gardner 632, Miers s.n., Glaziou 11620*, and *Glaziou 14320*. Soto Arenas & Cribb (in Lankesteriana 9: 385. 2010) designated *Gardner 632* in K-L as the lectotype. Duplicates of this gathering deposited in GH, NY, and US are isolectotypes. All the specimens of the remaining gatherings in several other herbaria are categorized as remaining syntypes."

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(167) Proposal to add a new paragraph to Recommendation 9B on designation of a neotype from the locality of a replaced type

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A neotype of a name, when selected from the locality of a replaced type, is most likely to be similar to that type material both phenotypically and genotypically. We are therefore proposing the following new Recommendation.

(167) Add a new paragraph to Rec. 9B:

"*9B.n*. Authors designating a neotype should indicate why they have selected a neotype from elsewhere, if the neotype is not from the locality of a replaced type."

This Recommendation, if followed, would help to restrict hasty designation of a neotype without trying to thoroughly search for specimens from the locality of a replaced type.

Acknowledgements

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(168–169) Proposals on type indications that do not typify (yet, or any more)

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Once upon a time it was possible to designate a "type species" as the type of the name of a genus or subdivision of a genus. At the Sydney Congress (1981) and the Berlin Congress (1987), it was decided that the type of the name of a genus or subdivision of a genus (actually, the type of the name of a taxon at any rank, except descriptive names above the rank of family) would from then on be a specimen or illustration. Designating or indicating the name of a species became the "full equivalent" of designating or indicating the type of the name of that species. In practice, this is unproblematic (as long as everybody follows tradition).

From a technical perspective this is inadequate: the indicated species name may not have a type (yet). After all, there is no reason that any particular existing name of a species needs to have a type (or that there needs to be original material at all). Indicating an untypified species name is not the indication of a particular specimen or illustration. It is not designation of a type: the requirements of Art. 7.11 are not met. In other words, such an indication does not result in the name of the genus or subdivision of a genus having a specimen or illustration as its type.

That a name is "the full equivalent of its type" (for purposes of designation or citation) can only be meaningful when that type does exist. Still, within the context of the *Code* it is clear that indicating the name of a species for purposes of typification should have some kind of status (as in the "must be followed" of Art. 10.5), even when this does not actually provide a type for the name of a genus or subdivision of a genus; see Art. 10 Ex. 1. In anticipation of the future typification of the name of the species, such an indication should prevent a choice for another name of a species to indicate the type. As currently phrased, nothing in the *Code* appears to give any status to this indication by an untypified name of a species (the requirements of Art. 7.11 are not met, so Art. 10.5 does not apply here).

By the way: for a discussion on the desirability of continuing to allow for the future the introduction of such "names of new genera or subdivisions of a genus lacking a *Code*-compliant type" see Prop. 331 to the Shenzhen Congress (Kirk & Yao in Taxon 65: 910. 2016) and the discussion on it, as Art. 40 Prop. G, at the Nomenclature Section (Lindon & al. in PhytoKeys 150: 146–148. 2020), leading to Rec. 40A.3.

(168) Add a new paragraph to follow Art. 10.1 or 10.7, supported by an Example:

"*10.1bis*. For purposes of choosing, designating, selecting, or conserving a type of a name of a genus or subdivision of a genus (Art. 10.2, 10.5–10.7 and 14.9) or inclusion, or exclusion, of the type of a name of a genus or subdivision of a genus (Art. 22, 48 and 52), a species name that does not have a type is to be treated (until a type is designated for it) as if it does have a type."

"*Ex. n*. The protologue of *Decarinium* Raf. (Neogenyton: 1. 1825) indicated *Croton glandulosus* L. as the type. Because only in 1920 was a specimen selected as the lectotype of *C. glandulosus*, until 1920 there was no specimen or illustration that was the type of *Decarinium* (because Art. 8.1 allows only a specimen or illustration as the type of a name of a species and Art. 10.1 requires that the type of a name of a genus must be the type of a name of a species, except as provided for in Art. 10.4, this means that *Decarinium* had no type until 1920). Nevertheless, when the protologue of *Geiseleria* Klotzsch (in Arch. Naturgesch. 7: 254. 1841) included *C. glandulosus* in the circumscription of the new genus, this is to be treated for the purposes of Art. 52.1 as inclusion of the type of *Decarinium*, and *Geiseleria* is illegitimate (see Art. 58 Ex. 4)."

The simplest way to deal with a problem is to rule it out of existence, provided this can be done without causing new problems. An obvious first step towards avoiding side-effects is to limit action to the areas where the problem causes unwanted results. The two areas where "untypified type species" may present problems are in establishing a type (of a name of a genus or subdivision of a genus) (see above) and where inclusion or exclusion of a type is of importance. Additionally, it might be considered to present the two provisions now included in Art. 10.1 separately (that is, split Art. 10.1). Also adjust the wording of Art. 10 Ex. 1.

(169) Add a new paragraph after Art. 10.1 or 10.7, supported by a Note:

"*10.1ter*. If a change is made to the typification of the name of a species that for purposes of designation or citation of the type of a name of a genus or subdivision of a genus is considered as the full equivalent of its type (Art. 10.1), as provided in this *Code* (Art. 9 and 14.9), the typification of that name of a genus or subdivision of a genus automatically changes accordingly."

"*Note n*. Art. 10.1ter governs not only a new (first-time) or different type (replacement type, superseding type, conserved type) of the species name, but the whole of how a name is typified. Typification also includes selecting part of a specimen (Art. 9.14), narrowing a gathering to a specimen (Art. 9.17), designating a supporting epitype (Art. 9.9) or a change in the supporting epitype (Art. 9.20)."

Again, this issue is unproblematic in practice, but from a technical perspective it is not adequately provided for. If the type of the "type species" is destroyed or lost, the consequence is that the name of the genus or subdivision of a genus becomes untypified and needs to be retypified. How? Choose another "type species"? Or, more generally, what if the type of the "type species" changes? Going by tradition, it seems clear that any change in the typification of the "type species" should be mirrored in the typification of the relevant name of a genus or subdivision of a genus. The proposed provision more or less parallels Art. 9.14–9.19 but at the higher level.

(170–174) Proposal to revise Article 10.2, and some further implications

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Article 10.2 is rather long and rambling, and not easily readable. Furthermore, upon close reading, its relationship with Art. 40 is not well handled. Article 40 is fairly complicated in its approach to types: Art. 40.1 uses "indicated" in a wide sense, which includes "designated". The first sentence of Art. 40.3 more or less defines the "indication of the type" of names of genera, or subdivisions of genera, other than by designation. Namely, as "reference (direct or indirect) to a single species name, or citation of the holotype or lectotype of a single previously or simultaneously published species name" at valid publication (that is, in the protologue). Turning to Art. 10.2, some questions can be raised.

(1) When does this indicated type (that is, indicated other than by designation) actually become the type? Article 10.2(a) mentions this indicated type as an exception, which prevents the choosing of a type, but does not state what happens in other respects. Is "indication" by itself enough to establish a type?

(2) The first part of the first sentence of Art. 10.2 refers to the type "of one […] previously or simultaneously published species name […]", but then invokes Art. 40.3, which rules that if a single type "of a single previously or simultaneously published species name" is included in the protologue, this is already regarded as "indication of the type". So in effect this component is present twice in Art. 10.2, the one instance cancelling the other, which is not only pointless but unwanted, because it makes Art. 10.2 harder to read.

(3) Article 10.2 includes the phrase "unless *(a)* the type was indicated […] or designated by the author of the name". Article

46 defines who is the author of a name, and clearly there is no requirement that the author of a name needs to have written the entire protologue. So, why would it not be possible for one or more of the other authors of the protologue (that is, other than the author of the name) to designate, or otherwise indicate, a type? And why should this not count?

(4) Article 10.1 necessarily should apply to all names of genera, and subdivisions of genera, but why should Art. 10.2 do so? The typification of names based on a basionym and of replacement names is governed elsewhere, namely in Art. 7.3–7.5.

(170) Rearrange and rephrase Art. 10.2 so that it reads:

"*10.2*. The type of a name of a genus or of a subdivision of a genus, published as the name of a new taxon (Art. 6.9), is to be established as follows:

(a) The type is established if it is designated in the protologue, otherwise indicated (Art. 40.3) in the protologue, or determined by Art. 10.8.

(b) If the type was not established under *(a)*, it is to be chosen (but see Art. 10.5–10.7) from among the types of previously or simultaneously published species names definitely included (see Art. 10.3) in the protologue. For a sanctioned name (Art. F.3), the choice of type may also be made from among the types of species names definitely included in the sanctioning treatment.

(c) If the type was not established under *(a)* and cannot be established under *(b)*, it is to be chosen otherwise, but the choice is to be superseded if it can be demonstrated that the selected type is not conspecific with any of the material associated with either the protologue or the sanctioning treatment."

This borrows from Prop. 084 (Wisnev in Taxon 70: 908–909. 2021) in that it makes sense to put the equivalents of holotype-lectotype-neotype in just that order. Article 40.1 uses "indicated" in a wide sense, which includes "designated", so is less appropriate here. Given that Art. 40.3 more or less defines "indication of the type" (other than by designation) for names of genera, or subdivisions of genera, and that this definition is already hard enough to keep in mind, it seems unnecessarily confusing to expand this definition here, ad hoc, by trying to force Art. 10.8 into this same concept as well. A further option would be to integrate Art. 10.8 here (as a separate clause following clause (a)).

(171) Amend Art. 48.2 and 52.2 as follows (new text in bold, deleted text in strikethrough):

"*48.2*. For the purpose of Art. 48.1, exclusion of a type means exclusion of *(a)* the holotype under Art. 9.1 or the ~~original~~ type **established** under Art. 10**.2(a)** or all syntypes under Art. 9.6 or all elements eligible as types under Art. 10.2; […]."

"*52.2*. For the purpose of Art. 52.1, definite inclusion of the type of a name is effected by citation of *(a)* the holotype under Art. 9.1 or the ~~original~~ type **established** under Art. 10**.2(a)** or all syntypes under Art. 9.6 or all elements eligible as types under Art. 10.2; […]."

In both provisions, instead of "the ~~original~~ type **established** under Art. 10**.2(a)**" this could be "the ~~original~~ type **established at valid publication** under Art. 10".

The occurrences of "original type" in Art. 22.2, 48.2, and 52.2 go back to Prop. 218 to the Tokyo Congress (Greuter in Taxon 41: 783. 1992). Apparently the term intends to convey something like the "type of a name of genus, or subdivision of a genus, established in the original publication". However, it is not defined as such, and is not uniformly used throughout the *Code*. In line with normal English usage, the reader will rather expect the "original type" to be the type established originally, but replaced later: see Art. 6 Ex. 4 and Art. 48 Note 2. Also: "original type citation" (Art. 9 Ex. 3), "original type specimen" (Art. 9.15), and "original type elements" (Art. 14 Ex. 10). This is unnecessarily confusing.

(172) Add a cross-reference in clause (e) of Art. 52.2 (new text in bold):

"It is also effected *(e)* by citation of the name itself or any name homotypic at that time, unless the type is at the same time excluded **(as defined in Art. 48.2)** either explicitly or by implication."

It seems logical to make the criteria for excluding a type for the purposes of Art. 52.2(e) the same as those for excluding a type for the purposes of Art. 48. The latter criteria are the same as those for including a type for the purposes of Art. 52. This addition would effect a nice symmetry all round. Perhaps also include this in Art. 47.1?

(173) Amend Art. 48.2 and 52.2 as follows (new text in bold):

"*48.2*. For the purpose of Art. 48.1, exclusion of a type means exclusion**, for the name itself, or, if it has one, its basionym (Art. 7.3), or its replaced synonym (Art. 7.4 and 7.5),** of […]."

"*52.2*. For the purpose of Art. 52.1, definite inclusion of the type of a name is effected by citation**, for the name itself, or, if it has one, its basionym (Art. 7.3), or its replaced synonym (Art. 7.4 and 7.5),** of […]."

Article 48.2 and 52.2 specify what is intended by exclusion/inclusion of the type in Art. 48.1 and 52.1. Not specified is the relationship between the name in Art. 48.1 and 52.1 of which the type is excluded/included (in Art. 52.1 the name causing superfluity) and the one focused on in Art. 48.2 and 52.2. If Art. 48.1/52.1 deals with a name A, based on a basionym B, the "all elements eligible as types" of Art. 48.2/52.2 are the elements eligible as types for basionym B (not for name A) and are to be looked for in the protologue of basionym B (not in the protologue of name A). Similarly for the "all syntypes", and for replaced synonyms, etc.

(174) Rephrase the first sentence of Art. 22.2 so that it reads (new text in bold, deleted text in strikethrough):

"*22.2*. A name of a subdivision of a genus ~~that~~ **of which the protologue** includes the type**, previously or simultaneously established,** ~~(i.e. the original type~~ or all elements eligible as type**, for the name itself (Art. 10.2), or, if it has one, its basionym (Art. 7.3), or its replaced synonym (Art. 7.4 and 7.5),** ~~or the previously designated type)~~ of the adopted, legitimate name of the genus is not validly published unless its epithet repeats the generic name unaltered."

Valid publication is a matter of nomenclature, and should not depend on taxonomy: inclusion in the protologue is what counts here (for the rationale behind Art. 22.2 see Greuter in Taxon 41: 781–783. 1992). Article 22.2 contains the same flaw as noted in Prop. 173 for Art. 48.2 and 52.2. Another problem is that the phrase in parentheses, following "the type", is not a clarification of what is meant by "the type", but expands on this, adding "all elements eligible as type". Also, Art. 22.2 uses "original type" in an unhappy sense (see above). Similar considerations should also apply to Art. 26.2.

(175) Proposal to amend Article 14.1 to allow conservation of names of subdivisions of genera and of infraspecific taxa

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Article 14.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) currently precludes the conservation of a name of a subdivision of a genus or of an infraspecific taxon, except when it is the basionym or replaced synonym of another name requiring conservation. This situation can result in nomenclatural disharmony for these names in relation to other names conserved under Art. 14; for example, when a name of a genus is conserved with a certain spelling. A real case of this imbroglio happened when two independently published names at different ranks, a genus and one of its subdivisions, had contrasting Latin and Greek terminations (as shown in the proposed new Example below). Lacking possible orthographical conservation, the original termination of the name of the subdivision of the genus must be retained, no matter how confusable and dissonant its spelling is in relation to that of its genus. Likewise, well-known and currently used infraspecific names cannot be conserved against other competing but unused names. The most sensible course is to lift this limitation and allow conservation at these additional ranks whenever it is necessary to preserve nomenclatural stability, resolve spelling discrepancies, and facilitate nomenclature for its users. We therefore propose the following amendment to the Article.

(175) Amend Art. 14.1 as follows (new text in bold, deleted text in strikethrough) and add a new Example:

"*14.1*. In order to avoid disadvantageous nomenclatural changes entailed by the strict application of the rules, and especially of the principle of priority in starting from the dates given in Art. 13 and F.1, this *Code* provides, in App. II–IV, lists of names of families, genera, **subdivisions of genera,** ~~and~~ species**, and infraspecific taxa** that are conserved (nomina conservanda) (see Rec. 50E.1). Conserved names are legitimate even though initially they may have been illegitimate. ~~The name of a subdivision of a genus or of an infraspecific taxon may be conserved with a conserved type and listed in App. III and IV, respectively, when it is the basionym or replaced synonym of a name of a genus or species that could not continue to be used in its current sense without conservation.~~"

"*Ex. n*. Reichenbach (in Bot. Zeitung (Berlin) 10: 668. 1852) published *Zygopetalon* sect. *Zygosepalon* Rchb. f. Later, he published a new generic name *Zygosepalum* Rchb. f. (in Ned. Kruidk. Arch. 4: 330. 1859), its termination *-alum* likely agreeing with the contemporary spelling of *Zygopetalum* Hook. (in Bot. Mag. 54: ad t. 2748. 1827, as '*Zygopetalon*'). The orthographical variant *Zygopetalum*, originally '*Zygopetalon*', has since been conserved. By this conservation, '*Zygopetalon*' sect. *Zygosepalon* became *Zygopetalum* sect. *Zygosepalon*. Conservation of the name with the spelling *Zygopetalum* sect. '*Zygosepalum*' would restore the harmonious terminations of the generic name and sectional epithet."

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(176) Proposal to protect the places of publication of family names listed in Appendix IIB

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At the Saint Louis Congress of 1999, the footnote to Art. 14 Note 1 of the *Tokyo Code* (Greuter & al. in Regnum Veg. 131. 1994) was deleted, thereby removing the temporary protection against changes to Appendix IIB (conserved and rejected names of families of bryophytes and spermatophytes) when earlier places of valid publication of the listed names were known. This resulted in changes to the authors, places and dates of publication of 102 names in App. IIB in the *Saint Louis Code* (Greuter & al. in Regnum Veg. 138. 2000). At the Vienna Congress of 2005, a 1789 starting-point for suprageneric names in *Spermatophyta* and other groups was introduced (Art. 13.1(a) and (c)), resulting in the authors, places and dates of publication of 35 of the previous 102 names in App. IIB being changed in the *Vienna Code* (McNeill & al. in Regnum Veg. 146. 2006), in several cases back to what they had been in the *Tokyo Code*, plus changes to a further 70 names resulting from the report of the Special Committee on Suprageneric Names that was established by the Saint Louis Congress. For a detailed account of these changes, see Turland & Barrie (in Taxon 50: 897–903. 2001), Turland & Watson (in Taxon 54: 491–499. 2005) and McNeill & Turland (in Regnum Veg. 146: xii–xiii. 2006).

In most cases, these changes had no effect on the current usage and application of the names listed in App. IIB, because they are conserved against all earlier synonyms and homonyms and because family names are automatically typified (or have alternative names that are automatically typified) under Art. 10.9. In a few cases, however, the relative priority of competing names in App. IIB was changed.

Article 14.14 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) originated from a proposal to the Melbourne Congress of 2011 (Prop. 239, Turland in Taxon 59: 1915. 2010). This proposal sought to prevent any further changes to App. IIB (new additions excepted) by means of a new Article in Art. 14: "The authors together with the places and dates of publication cited for conserved names of families in App. IIB are treated as correct in all circumstances and consequently are not to be changed."

At the Nomenclature Section in Melbourne, Prop. 239 (as Art. 14 Prop. D) was accepted with amendments (see McNeill & al. in Taxon 60: 1512, 1517. 2011; Flann & al. in PhytoKeys 41: 69–78. 2014) so that the resulting *Melbourne Code* (McNeill & al. in Regnum Veg. 154. 2012) Art. 14.15 read "The places of publication cited for conserved names of families in App. IIB are treated as correct in all circumstances and consequently are not to be changed, except under the provisions of Art. 14.12, even when otherwise such a name would not be validly published or when it is a later isonym." The removal of authors and dates of publications from the original proposal was understandable. Author citation is determined by Art. 46 and errors would be correctable. Similarly, under Art. 31.1, the date of a particular publication would be correctable should new evidence emerge proving a different date. However, the phrase "except under the provisions of Art. 14.12" effectively cancelled the immediately preceding clause. On the one hand, places of publication were meant to be treated as correct if an earlier one was discovered, or even if it was found that the name was not validly published in the place listed (which would be highly unlikely), but on the other hand they could be changed under Art. 14.12, i.e. through a formal proposal to amend an entry in App. IIB.

In the reports of the Melbourne Nomenclature Section (McNeill & al., l.c. 2011; Flann & al., l.c.), it appears that the phrase "except under the provisions of Art. 14.12" was accepted as a friendly amendment not to Art. 14 Prop. D (Prop. 239), but to Art. 14 Prop. F (Prop. 241, Turland, l.c. 2010), which was discussed and rejected *after* Prop. D had been accepted. There is no record of any additional amendment to or vote on Prop. D. Whether or not this phrase should have entered the *Melbourne Code* is moot because that *Code*, as is customary, was ratified at the Nomenclature Section of the Shenzhen Congress in 2017 (Lindon & al. in PhytoKeys 150: 12. 2020).

Perhaps the phrase "except under the provisions of Art. 14.12" was intended to deter frivolous changes? Unfortunately it proved to be no such deterrent. Mori & al. (in Taxon 64: 641–642. 2015) proposed to change the author, place and date of publication of *Lecythidaceae* and were swiftly followed by Doweld (in Taxon 64: 1061–1062. 2015) with a competing proposal. The Nomenclature Committee for Vascular Plants (NCVP) accordingly recommended against Mori & al.'s proposal, but suspended action on Doweld's proposal pending further bibliographic research (Applequist in Taxon 65: 1158. 2016).

Sennikov (in Taxon 65: 633–634. 2016) proposed to change the authors, places and dates of publication of the names *Actinidiaceae*, *Lardizabalaceae*, *Melanthiaceae* and *Primulaceae*, to change the place and date of publication of *Eucommiaceae* and to change the author of *Theaceae*. All of these proposals except those for *Lecythidaceae* and *Theaceae* were accepted by the NCVP, the General Committee (GC) and the Shenzhen Congress of 2017, and the entries in App. IIB were changed accordingly (see Wiersema & al., Int. Code Nomencl. Algae, Fungi, and Plants: Appendices I–VII. 2018+ [continuously updated] https://naturalhistory2.si.edu/botany/codes-proposals/ [accessed 18 March 2022]).

As for the proposal on *Theaceae*, a change only to the author of a name is not covered by Art. 14.14, and the proposed change was anyway contrary to Art. 46. It should therefore never have been published, let alone occupy the time of two committees. The GC's report containing this result (Wilson in Taxon 71: 216. 2022) noted "The GC considers that the provisions of Art. 14.14 should be extended to avoid

such proposals to change the authorship of conserved family names." Article 14.14 currently provides no mechanism to change the author of a name unless the place of publication of a name is also changed.

The following proposal aims to protect the places of publication of names in App. IIB from any further changes by deleting the exception that allows changes to be proposed under Art. 14.12. This protection is needed because it is inevitable that earlier places of publication will continue to be unearthed, especially with more and more old literature becoming available online. Presumably further proposals will be submitted, occupying the time of the committees for no practical purpose and possibly even causing disruption (if relative priority of competing names was affected). The Editorial Committee would still be able to correct an author citation or a date of a publication, in accordance with Art. 46 and 31, in the unlikely event that such a correction was necessary.

(176) Add a cross-reference to the first sentence of Art. 14.12 (new text in bold) and amend Art. 14.14 as follows (deleted text in strikethrough):

"*14.12*. The lists of conserved names will remain permanently open for additions and changes **(but see Art. 14.14)**."

"*14.14*. The places of publication cited for conserved names of families in App. IIB are treated as correct in all circumstances and consequently are not to be changed~~, except under the provisions of Art. 14.12~~, even when otherwise such a name would not be validly published or when it is a later isonym."

(177) Proposal to amend Recommendation 23A.3 with the advice not to dedicate species to persons quite unconnected with botany, mycology, phycology, or natural science in general

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The Recommendation not to dedicate names of plants, algae, and fungi to "persons quite unconnected with botany, mycology, phycology, or natural science in general" (Rec. 20A.1(h)) in the current *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) refers only to genera. It would be logical, consistent, and reasonable to recommend for the names of species and infraspecific taxa what is already recommended for the names of genera. Names and epithets of species and infraspecific taxa commemorating persons not directly related to botany, mycology, phycology, or natural sciences in general (such as pop stars or political leaders: see, for example, the case of *Pedicularis milosevicii* Křivka & Holubec in Novon 24: 256–260. 2015) could thereby be discouraged in the future. Exceptions may include the cases when such public persons directly contributed to the specific research, or promoted natural science in general or biodiversity conservation (see the case of *Uvariopsis dicaprio* Cheek & Gosline; Gosline & al. in PeerJ 10: e12614. 2022).

No changes to Art. 24 of the *Shenzhen Code* governing the nomenclature of taxa below the rank of species (infraspecific taxa) are necessary because the existing Rec. 24A.1 states "Recommendations made for forming specific epithets (Rec. 23A) apply equally for infraspecific epithets."

The present proposal does not encourage any rejection or replacement of existing legitimate names (including names commemorating people, i.e. eponymous names) because they are considered by some people or groups of people to be inappropriate, disagreeable, culturally or otherwise offensive, or just not preferable (see comments in Mosyakin in Taxon 71: 249–255. 2022, and references therein). I also strongly believe that Art. 51.1 of the *Code*, stating that "A legitimate name must not be rejected merely because it, or its epithet, is inappropriate or disagreeable […]", should remain in full force.

(177) Add a new clause to Rec. 23A.3 as follows (new text in bold):

"*23A.3*. In forming specific epithets, authors should comply also with the following:

(a) Use Latin terminations insofar as possible.

[…]

(k) **Not dedicate species to persons quite unconnected with botany, mycology, phycology, or natural science in general, or the practitioners thereof.**"

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(178) Proposal to exclude electronic material with preliminary pagination from effective publication

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The integration of electronic publishing into effective publication for the purposes of botanical nomenclature in 2012 revolutionized the landscape of resources containing nomenclatural acts and novelties. Now Art. 30.2–30.3 of the *International Code of Nomenclature for algae, fungi, and plants* (*ICN*; Turland & al. in Regnum Veg. 159. 2018) describe the conditions of electronic publishing for the purpose of effective publication. In particular, Ex. 6 under Art. 30.3 considers electronic publication to be effective with a different pagination in online early publication (before inclusion in an issue) than in its later, final form, when the final page numbers have been added. When this provision was incorporated into the *ICN*, one might have thought that allowing authors and their publishers to electronically publish new names of taxa at the earliest date would help accelerate publication in relation to print alternatives. But the results of such publishing, especially for indexing centres and other citation of such earlier online publications with different pagination, were not fully appreciated.

The International Fossil Plant Names Index (IFPNI, http://ifpni.org/) was established in 2014, soon after the 2012 International Botanical Congress in Melbourne, as a global registry of scientific names of fossil organisms covered by the *ICN*. The main aim of the IFPNI was to be a new platform that provided an online, open-access, and community-generated registry of fossil plant nomenclature as a service to the global scientific community. In modern botany there was no previous comprehensive single index of fossil forms of algae, cyanobacteria and related prokaryotic microorganisms (interpreted in the past as algae), fungi and plants described since 31 December 1820 (starting point for the nomenclature of fossil plants) to the present. IFPNI has assigned LSIDs (Life Science Identifiers, permanent barcodes) to registered fossil plant names previously attributed to the plant kingdom, and also evaluated nomenclatural status of registered taxa.

Being involved in proactive and retrospective registrations of fossil plant names, IFPNI staff soon faced problems with online publications after 2012 having changing pagination. When registering a new fossil plant name appearing in online publications, for the purposes of precise citation it is essential (see Art. 41.5 and Note 1) to cite the exact page of the protologue on which a new name was effectively published. Nearly all existing indexing centres of names under the *ICN* (IFPNI, International Plant Names Index [IPNI], Index Nominum Algarum [INA], PhycoBank, Index Fungorum, MycoBank, etc.) provide page numbers for taxa in their registration records. It is necessary to emphasize that prior to 2012 we *always* had stable numbering of existing publications. Allowing online publishing for the purposes of effective publication resulted in unstable, changing page numbers in the protologues of new names. This required indexing centres to duplicate the registration of a new name: first, to register the preliminary pagination of the early versions of papers, and then (after some time) to re-check the same papers for new pagination that might be assigned by publishers to the final PDF (Portable Document Format) version. This required two paginations to be registered for the same name and to be used in future nomenclatural citations, as a user would eventually lack access to the ephemeral, short-lived version of the initial PDF. This creates undue complexity for all indexing centres as well as for the users of such papers.

The ephemeral status of the initial PDFs with or without preliminary pagination, which is replaced by PDFs with continuous pagination, indicates that they are unlikely to be preserved by publishers or authors, and to be available for the purposes of retrospective registration, either bibliographic or nomenclatural. In trying to find such earlier PDFs for *de visu* checking of their initial pagination to enter it into IFPNI records, IFPNI was not successful. For example, the paper by Pott: "The Upper Triassic flora of Svalbard", originally issued online on 23 October 2012 (declared by the publisher on its website), was later published in print in 2014 in *Acta Palaeontologica Polonica*, vol. 59, number 3, with a different pagination (709–740), with the publisher later commenting (pers. comm.) that the initial PDF, with preliminary pagination from 2012, was not preserved and only the 2014 PDF with final pagination is available (https://doi.org/10.4202/app.2012.0090). The paper's author did not have the initial PDF either. So how should a registration or indexing centre like IFPNI proceed with such an incomplete picture of exact publishing? No one could imagine that we will face this artificial problem in the 21st century.

Another awkward example comes from the recent practice of some publishers to not specify the volume/issue for newly published PDFs. Franco published a new fossil-species, *Maytenoxylon perforatum* in the journal *Historical Biology*. The initial PDF, available from the author, appeared on 10 April 2017 with a separate pagination (pp. 1–15), but with no volume or issue numbering. In such a case, the complete nomenclatural citation would be as follows:

Maytenoxylon perforatum M.J. Franco in Historical Biol., https://doi.org/10.1080/08912963.2017.1313840: 3. 10 Apr 2017.

But if the initial PDF was lost or forgotten, or no longer available or accessible from the publisher, the nomenclatural citation would be:

Maytenoxylon perforatum M.J. Franco in Historical Biol. 30(5): 648. 10 Apr 2017 ["4 July 2018"] (because the issue number and new pagination was assigned by the publisher more than one year later).

Note the difference! Which form of the nomenclatural citation is correct and proper for registration or indexing centres and for subsequent use? If the IFPNI registered the new fossil-species in 2017 upon its appearance on the publisher's website with only a DOI (Digital Object Identifier) and separate, preliminary pagination (pp. 1–15), and the publisher's subsequent incorporation of the article

into the volume with continuous pagination resulted in a new PDF with a new pagination, which replaced the original PDF published in 2017, why should the IFPNI editors go again to the publisher's website to do the extra work of edits to incorporate the changes more than a year after the publication of the nomenclatural novelty?

And who will give additional money for indexing centres to do this extra work?

And another question: are we prepared to represent new nomenclatural citations with a DOI (see first example above) having 45 letters/symbols/numbers?

These examples are representative of numerous cases. We found that initial PDFs having preliminary pagination (or sometimes none at all) have practically disappeared and now represent a new class of botanical literature, *electronic ephemera*, with the later version having different consecutive pagination assigned by publishers remaining available for downloading. If the publishers do not themselves archive the original PDFs, why should we search for them on the web or ask authors to provide them to the IFPNI registry to record the exact pagination in two forms (see the *Maytenoxylon* case above) because any serious researcher in nomenclature would like to compare the original version with the later version because they might be different? In such a case, the indexing centres become a sort of repository of the original PDFs (new electronic archives of *ephemerata*), because the indexing editors should have confirmed sources of the data they enter into the index, while the publishers and sometimes the authors lose the original PDFs.

In order to simplify and clarify the situation of what constitutes a precise page record for the purpose of exact nomenclatural citations, it is proposed to revise Art. 30 Note 1, Art. 30.3, and Ex. 5–7 by disallowing pagination changes to an electronic publication for the purposes of effective publication. Any changes in the final PDF, *including pagination*, would not be allowed. This would eliminate the need to treat ephemeral online editions as effectively published for nomenclatural purposes.

(178) Delete Art. 30 Note 1, amend Art. 30.3, and revise Ex. 5–7 accordingly (new text in bold, deleted text in strikethrough):

"~~*Note 1*. An electronic publication may be a final version even if details, e.g. volume, issue, article, or page numbers, are to be added or changed, provided that those details are not part of the content (see Art. 30.3).~~"

"*30.3*. Content of an electronic publication includes that which is visible on the page, e.g. text, tables, illustrations, ~~etc., but it excludes~~ volume, issue, article, and page numbers**, etc.**~~.~~**, but** it ~~also~~ excludes external sources accessed via a hyperlink or URL (Uniform Resource Locator)."

"*Ex. 5*. A paper describing the new genus *Partitatheca* and its four constituent species, accepted for the *Botanical Journal of the Linnean Society* (ISSN 0024-4074, print; ISSN 1095-8339, online), was placed online on 1 February 2012 as an "Early View" PDF document with preliminary pagination (1–29). This was **not** evidently the version considered final by the journal's publisher **although** ~~because~~, in the document itself, it was declared the "Version of Record" (an expression defined by the standard NISO-RP-8-2008). Later, in the otherwise identical electronic version published together with the printed version on 27 February 2012, the volume pagination (229–257) was added. A correct citation of the generic name is: *Partitatheca* D. Edwards & al. in Bot. J. Linn. Soc. 168 ~~(online)~~: ~~[2 of 29],~~ 230. ~~1~~ **27** Feb 2012~~, or just "… 168 (online): 230. 1 Feb 2012~~."

"*Ex. 6*. The new combination *Rhododendron aureodorsale* was made in a paper in *Nordic Journal of Botany* (ISSN 1756-1051, online; ISSN 0107-055X, print), first ~~effectively~~ published online on 13 March 2012 in "Early View", the "Online Version of Record published before inclusion in an issue", with a permanent Digital Object Identifier (DOI) but with preliminary pagination (1-EV to 3-EV). When the printed version was published on 20 April 2012, the pagination of the electronic version was changed to 184–186 and the date of the printed version was added**, so the earlier electronic version with preliminary pagination was not effectively published**. The combination can be cited as *Rhododendron aureodorsale* (W. P. Fang ex J. Q. Fu) Y. P. Ma & J. Nielsen in Nordic J. Bot. 30 ~~(online)~~: 184. ~~13 Mar~~ **20 Apr** 2012 (DOI: https://doi.org/10.1111/j.1756-1051.2011.01438.x)."

"*Ex. 7*. Two new *Echinops* species, including *E. antalyensis*, were described in *Annales Botanici Fennici* (ISSN 1797-2442, online; ISSN 0003-3847, print) in a paper ~~effectively~~ published in its definitive form on 13 March 2012 as an online PDF document, still with preliminary pagination ([1]–4) and the watermark "preprint". When the printed version was published on 26 April 2012, the online document was repaginated ([95]–98) and the watermark removed**, so the earlier electronic version with preliminary pagination was not effectively published**. A correct citation of the name is: *E. antalyensis* C. Vural in Ann. Bot. Fenn. 49 ~~(online)~~: 95. ~~13 Mar~~ **26 Apr** 2012."

(179) Proposal to add, after Article 38.5, a new Example showing generic and specific names simultaneously validly published through an illustration with analysis

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According to Art. 38.5 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) [bold emphasis added]: "The **names of a genus and a species may be validly published simultaneously** by provision of a single **description** (descriptio generico-specifica) or **diagnosis**, even though this may have been intended as only generic or specific, **if all of the following conditions are satisfied:** ***(a)*** **the genus is at that time monotypic** (see Art. 38.6); *(b)* no other names (at any rank) have previously been validly published based on the same type; **and** ***(c)*** **the names of the genus and species otherwise fulfil the requirements for valid publication.**" In addition, Art 38.7 provides: "For the purpose of Art. 38.5, **prior to 1 January 1908**, an **illustration with analysis** […] **is acceptable in place of a written description or diagnosis.**"

Although provision of an illustration with analysis, in place of a written description or diagnosis, can simultaneously validly publish the names of a monotypic genus and its single species, this logic is not obvious to most users of the *Code*. Therefore, the introduction of a new Example in the *Code* could help the interpretation of Art. 38.7.

The proposed Example mentions the monotypic genus *Torrentia* Vell. and *T. quinquenervis* Vell., which were validly published in 1831 through a unique plate with analysis (Vellozo, Fl. Flumin. Icon. 8: 149. 1831). Their respective descriptions only appeared some 50 years later (Vellozo in Arch. Mus. Nac. Rio de Janeiro 5: 348. 1881). In his plate of *T. quinquenervis*, Vellozo (l.c.) clearly provided an analysis (Art. 38.9), such as details of the bracts, the ray floret pappus, and the stigma. These details are indeed diagnostic to recognize the illustrated taxa (genus and species).

(179) Add a new Example after Art. 38.7:

"*Ex. n*. The generic name *Torrentia* Vell. (Fl. Flumin. Icon. 8: t. 149. 1831) and that of its only included species, *T. quinquenervis* Vell., were validly published in 1831 without description or diagnosis by a plate with analysis providing details of the bracts, the ray floret pappus, and the stigma. Written descriptions of these names were not published until 50 years later (Vellozo in Arch. Mus. Nac. Rio de Janeiro 5: 348. 1881)."

Torrentia Vell. vs. Terrentia Vell.

The genus *Torrentia* Vell. published in *Florae fluminensis* by Vellozo (l.c. 1831) was named after the Roman historian, Joannis Terrentii Lyncei. Although the unpublished plates kept in the Torre do Tombo (Lisbon), and in the National Library (Rio de Janeiro) are both titled "*Terrentia*", the name appeared with the original "*Terrentia*" altered to "*Torrentia*" in the published plate. Because this would affect the first syllable, "*Torrentia*" may not be corrected to "*Terrentia*" following Art. 60.3.

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(180–183) Proposals to amend Article 40.1 and Article 44.1 and to add a new Article 44.3 and a Note to facilitate the valid publication of names of "dinoflagellates"

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The purpose of these proposals is to facilitate valid publication of "dinoflagellate" names introduced on or after 1 January 1958 at the rank of genus or below. "Name" is defined in Art. 6.3 of the *International Code of Nomenclature for algae, fungi, and plants* (*ICN*; Turland & al. in Regnum Veg 159. 2018).

"Dinoflagellate" is a vernacular term used by phycologists, protozoologists and others for a distinctive group (Lin in Res. Microbiol. 162: 551. 2011; Hoppenrath in Mar. Biodivers. 47: 383–384. 2017) of ambiregnal, eukaryotic, mostly unicellular and flagellated organisms that, nomenclaturally, are either treated as algae (*Dinophyceae*) under the *ICN* or as animals (Dinoflagellata) under the *International Code of Zoological Nomenclature* (*ICZN*; Ride & al., Int. Code Zool. Nomencl., ed. 4. 1999). According to Hoppenrath (l.c.), the group includes 2000–2500 living species assigned to about 300 genera. Williams & al. (in Contr. Ser. Amer. Assoc. Stratigr. Palynologists 48: 1–1097, digital ed., ISSN 0160-8843. 2017) published an index to 667 generic and 4464 specific names of fossil dinoflagellates with information on synonymies, types, nomenclatural status, etc.

Currently, *ICN* Art. 40.1 requires that, on or after 1 January 1958, a nomenclatural type be indicated (see Art 40.2 and 40.3) for valid publication of a new name at generic rank or below; and for names introduced from 1 January 1958 through 31 December 2011, Art. 44.1 requires that a new taxon of non-fossil algae be accompanied by a Latin description or diagnosis or a reference to a previously and effectively published one. The *ICZN*, by contrast, has never required Latin descriptions or diagnoses and, although requiring "fixation" of a genus-group name published after 1930, has only required designation of nomenclatural types of species names since 1 January 2000. "Fixation" of a genus group name (*ICZN* Art. 13.3) is equivalent to indicating/designating a type species for a genus name under the *ICN* (Art. 10.1, 40.1, 40.3).

By itself, use of the term "dinoflagellate" in a publication does not provide evidence that a particular *Code* is being complied with or whether an organism is being treated as an alga or an animal. In the *ICN*, "dinoflagellate" is used in Art. 11 Ex. 30 and in Art. 45 Ex. 2 in the same way as the vernacular term "diatom" is used in Art. 1.2, 11.7, 11.8 and 13.3. The term "dinoflagellate" does not appear in the current *ICZN*. By contrast, the term "protist (protistans)", a vernacular term used for organisms (e.g. dinoflagellates) classified at one time in the Kingdom Protista (Corliss in Bull. Zool. Nomencl. 52: 11–17. 1995), appears in both the *ICN* (Pre. 8) and the *ICZN* (e.g. Art 1.1.1; Glossary). The dinoflagellates include both photosynthetic and non-photosynthetic taxa.

Elbrächter & al. (in Taxon 57: 1289–1303. 2008) noted (pp. 1290–1291) that names of species, genera, and other ranks of calcareous dinoflagellates have been described using either the *ICN* (*ICBN*) or the *ICZN*, but that a number of these names were not validly published, thereby "complicating attempts to clarify the systematics of calcareous dinoflagellates" and "providing further sources of nomenclatural and taxonomic confusion".

As another example, it was widely assumed in the scientific literature (Andersen in Taxon 70: 1125. 2021) that the non-fossil dinoflagellate genus "name" *Alexandrium* Halim (in Vie & Milieu, Sér. A, Biol. Mar. 11: 102. Mar 1960) and the "name" of the only included species, *A. minutum* Halim (l.c. Mar 1960), were available under the *ICZN* and therefore had a status equivalent to "validly published" under *ICN* Art. 45.1 even though both were published without Latin descriptions or diagnoses. This assumption is not altogether correct. *ICZN* Art. 1.1.1 provides that the *ICZN* applies to protistan taxa only "when workers treat them as animals for the purposes of nomenclature". This has been interpreted to mean that authors need to provide an indication that the organism is being treated as an animal (for example, placement of the genus in a zoological family with the termination "*-idae*"; an explicit statement that the organism is an animal). Halim (l.c. Mar 1960), however, did not indicate that he was describing an animal, place *Alexandrium* into a taxonomic family, refer to any nomenclatural *Code*, or provide any other internal evidence as to whether he considered *Alexandrium* and *A. minutum* to be algal or animal.

During deliberations of Prop. 2686 (Elbrächter & al. in Taxon 68: 589–590. 2019), the Nomenclature Committee for Algae (NCA; Andersen, l.c.) consulted Francisco Welter-Schultes, who is editing the 5th edition of the *ICZN*, about the above assumption in relation to the intended genus "name" *Alexandrium* and accepted his conclusion that "*Alexandrium*" Halim (l.c. Mar 1960) is not available as a generic name under *ICZN* Art. 1.1.1 or *ICZN* Art. 10.5. This conclusion was subsequently confirmed by Erna Aescht, an *ICZN* Commissioner specialized in protists, and provided to the NCA prior to voting.

Moreover, in a separate recently discovered study of a Nile bloom of phytoplankton in the Mediterranean, Halim (in J. Conseil Perman. Int. Explor. Mer 26(1): 57–67. Dec 1960) clearly regarded (p. 65, table 12) *Alexandrium minutum* as phytoplankton and therefore algal rather than animal. Unfortunately, Halim (l.c. Mar 1960) did not indicate this when he first introduced the genus and species names.

"*Alexandrium*" (Halim, l.c. Mar 1960), therefore, is not a validly published name under *ICN* Art. 45.1 and consequently has no nomenclatural status (Art. 12.1). Nevertheless, "*Alexandrium*" has been widely used/cited in thousands of scientific and non-scientific publications, in part because strains of some "species" (e.g. John & al. in Protist 165: 779–804. 2014) are among dinoflagellates that produce toxins causing illness or death in humans and marine fauna. A Google Scholar search (https://scholar.google.com/) on 17 January 2022 yielded c. 20,300 citations of the genus name during the period 1960–2021.

More broadly, Saldarriaga & Taylor (in Archibald & al., Handb. Protists, ed. 2: 630–631. 2017) noted that dinoflagellates occur in most aquatic environments, are among the most important primary producers in marine environments (see also Lin, l.c.: 551), manufacture some of the most potent biotoxins known, form endosymbiotic relationships essential for the survival of reef-building corals and many other marine animals, etc. Consequently it is essential for nomenclatural stability that scientific names of dinoflagellates, including *Alexandrium*, are validly published (available).

Therefore, there is a strong case for ensuring that "*Alexandrium*" Halim (March 1960) constitutes a validly published scientific name to avoid nomenclatural instability resulting from the wide use of a "name" without nomenclatural status. The same applies to specific and infraspecific "names" attributed to "*Alexandrium*" (Art. 35.1) and to other effectively published names of dinoflagellates (e.g. Elbrächter & al., l.c. 2008; Williams & al., l.c.) that have not met the requirements for valid publication under the *ICN*.

To achieve the necessary *Code* revisions, the following changes are proposed:

(180) Amend Art. 40.1 to exempt names of dinoflagellates as follows (new text in bold)

"*40.1*. Publication on or after 1 January 1958 of the name of a new taxon at the rank of genus or below **(dinoflagellates excepted)** is valid only when the type of the name is indicated (see Art. 7–10; but see Art. H.9 Note 1 for the names of certain hybrids **and Art. 44.3 for those of dinoflagellates**)."

(181) Amend Art. 44.1 to exempt names of dinoflagellates as follows (new text in bold):

"*44.1*. In order to be validly published, a name of a new taxon of non-fossil algae **(dinoflagellates excepted)** published between 1 January 1958 and 31 December 2011, inclusive, must be accompanied by a Latin description or diagnosis or by a reference (see Art. 38.13) to a previously and effectively published Latin description or diagnosis."

(182) Add a new Art. 44.3 to align the *ICN* requirement for nomenclatural type indication of dinoflagellate names with that of the *ICZN* (Art. 72.3):

"*44.3*. Publication on or after 1 January 2000 of the name of a new taxon of dinoflagellates at the rank of genus or below is valid only when the type of the name is indicated."

(183) Add a new Note to follow Art. 44.3:

"*Note 2*. Although dinoflagellates are excluded from Art. 40.1, the other provisions of Art. 40 still apply, including type indications."

Acceptance of these proposals would help ensure the valid publication of *Alexandrium* Halim (1960) and other names of dinoflagellates at the rank of genus or below that were effectively published between 1 January 1958 and 31 December 2011 and are currently in use without nomenclatural status because they are not validly published (Art. 12.1). As noted by Elbrächter & al. (l.c. 2008), however, "re-evaluating the valid publication of names at the species level remains a major future task".

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(184) Proposal to amend Article 41.5 to account for missing or preliminary page numbers

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Under Art. 41.5 of the *Code* (Turland & al. in Regnum Veg. 159. 2018), valid publication of a new combination, name at new rank, or replacement name requires a full and direct reference to the author and place of valid publication of the basionym or replaced synonym, with *page or plate reference* and date. However, some publications lack page numbers, and Rec. 41A.2 recommends how to reference names in such cases. Moreover, Art. 30 Note 1 explains that an electronic publication may be effectively published even if the page numbers are to be added or changed, provided that those preliminary details are not part of the content, and Art. 30.3 explicitly defines content as excluding page numbers. We consider that Art. 41.5 should be amended and augmented with an explanatory Note to account for such missing or preliminary page numbers, as follows.

(184) Amend Art. 41.5 as follows (new text in bold) and add a new Note:

"*41.5*. On or after 1 January 1953, a new combination, name at new rank, or replacement name is not validly published unless its

basionym or replaced synonym is clearly indicated and a full and direct reference given to its author and place of valid publication, with page or plate reference **(if present and even if preliminary)** and date (but see Art. 41.6 and 41.8). On or after 1 January 2007, a new combination, name at new rank, or replacement name is not validly published unless its basionym or replaced synonym is cited."

"*Note x.* For the purpose of Art. 41.5, preliminary page numbers in electronic publications may be cited provided that the content of the publication is not preliminary (see Art. 30 Note 1)."

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(185) Proposal to amend Article 48.2 to improve its parallel construction in relation to Article 52.2

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The current Art. 48.2 arose from proposal 291 to the Melbourne Congress by Gillian Perry (in Taxon 59: 1925. 2010):

"(291) Delete "original" in the first line of Art. 48.1 and add a new Art. 48.2:

"*48.2*. For the purpose of Art. 48.1, exclusion of a type means exclusion of *(a)* the holotype under Art. 9.1 or the original type under Art. 10 or all syntypes under Art. 9.4 or all elements eligible as types under Art. 10.2; or *(b)* a previously designated type under Art. 9.9–9.11 or 10.2; or *(c)* a previously conserved type under Art. 14.9."

Clearly the intent of Perry's proposal was to have a wording for this new Article dealing with "exclusion of a type" that exactly paralleled that of Art. 52.2(a–c), which dealt with "inclusion of a type". One could understand why she had omitted Art. 52.2(d), dealing with citation of illustrations, which did not seem relevant in this context. The proposed new Article was accepted at the Melbourne Nomenclature Section without amendment (Flann & al. in PhytoKeys 41: 198. 2014), but entered the *Melbourne Code* (McNeill & al. in Regnum Veg. 154. 2012) with an editorial adjustment adding a reference to Art. 52.2(e) ("It is also effected *(e)* by citation of the name itself or any name homotypic at that time, unless the type is at the same time excluded either explicitly or by implication."), which Perry had also omitted, as seen here (in **bold** font):

"*48.2*. For the purpose of Art. 48.1, exclusion of a type means exclusion of *(a)* the holotype under Art. 9.1 or the original type under Art. 10 or all syntypes under Art. 9.5 or all elements eligible as types under Art. 10.2; or *(b)* the type previously designated under Art. 9.11–9.13 or 10.2; or *(c)* the type previously conserved under Art. 14.9 **(see also Art. 52.2(e), applicable by analogy)**."

While the addition of this added reference had merit, particularly in interpreting older literature before the formalization of the type concept in the 20th century, it was editorially removed from the *Shenzhen Code* (Turland & al in Regnum Veg. 159. 2018). Since there had never been a formal mandate for its inclusion, it is the aim of this proposal to provide one through an amendment to Art. 48.2. It is also desirable to add a clarifying Note to Art. 48 that parallels Art. 52 Note 1, which states that inclusion of a name "with an expression of doubt" is not considered to be definite inclusion resulting in illegitimacy. If doubt about the inclusion or exclusion (of the type of a name) in Art. 52 is not to be taken as definite inclusion, thereby triggering the consequences of Art. 52.1, then, by the same token, doubt about inclusion or exclusion of a type in Art. 48 should not be taken as definite exclusion insofar as applying Art. 48.1.

(185) Amend Art. 48.2 as follows (new text in bold, deleted text in strikethrough) and add a new Note:

"*48.2*. For the purpose of Art. 48.1, **definite** exclusion of ~~a~~ **the** type **of a name** means exclusion of *(a)* the holotype under Art. 9.1 or the original type under Art. 10 or all syntypes under Art. 9.5 or all elements eligible as types under Art. 10.2; or *(b)* the type previously designated under Art. 9.11–9.13 or 10.2; or *(c)* the type previously conserved under Art. 14.9. **It is also effected *(d)* by explicit**

exclusion of the name itself or any name homotypic at that time, unless the type is at the same time included either explicitly or by implication."

"*Note n*. For the purpose of Art. 48.1, the inclusion of a name with an expression of doubt, or in a sense that excludes one or more of its potential type elements, is not in itself considered exclusion of its type."

Potential Examples for consideration by the Editorial Committee:

For the amended Art. 48.2:

"*Ex. n*. The name *Chusquea quila* was published by Kunth (Révis. Gramin.: 138. 1829) with reference to "*Arundo quila* Poir., excl. Syn.", which is an explicit exclusion of the apparent basionym *A. quila* Molina (Sag. Stor. Nat. Chili: 154, 155, 349. 1782), the only name cited as a synonym by Poiret (in Lamarck & al., Encycl. 6: 274. 1804). Therefore, *C. quila* Kunth is the name of a new taxon validated by Poiret's description."

For the new Note:

"*Ex. n*. The name *Meum segetum* was published by Gussone (Fl. Sicul. Prodr. 1: 346. 1827) with citation of "*Anethum segetum*. Lin. mant. 219?" in synonymy. Because Gussone's expression of doubt did not exclude the type of *A. segetum* L. (Mant. Pl.: 219. 1771), he published the new combination *M. segetum* (L.) Guss., not the name of a new taxon."

The current Art. 48 Ex. 2, which first entered the Sydney *Code* (Voss & al. in Regnum Veg. 111. 1983), was formerly sound in its interpretation of the illegitimacy of *Arum campanulatum* Roxb., but is no longer so owing to changes in the language of the current Art. 52 that first appeared in what was Art. 63 of the Berlin *Code* (Greuter & al. in Regnum Veg. 118. 1988). The Example has therefore been restructured for consideration as a second Example under the new Note, as follows:

"*Ex. 2*. The name *Amorphophallus campanulatus* was published by Decaisne (in Nouv. Ann. Mus. Hist. Nat. 3: 366. 1834) with citation of *Arum campanulatum* Roxb. (Pl. Coromandel 3: 68. 1820) in synonymy, but with exclusion of certain elements included by Roxburgh ("Excl. syn. Hort. malab. nec non t. 112. Herb. Amb. V."). Because Decaisne did not explicitly exclude the type of *A. campanulatum*, which in 1834 had no holotype, syntypes, lectotype or conserved type, he published the new combination *Amorphophallus campanulatus* (Roxb.) Decne., not the name of a new taxon."

[Current wording: "*Ex. 2*. The name *Amorphophallus campanulatus* Decne. (in Nouv. Ann. Mus. Hist. Nat. 3: 366. 1834) was apparently based on the illegitimate *Arum campanulatum* Roxb. (Hort. Bengal.: 65. 1819). However, the type of the latter was explicitly excluded by Decaisne, and his name is therefore a legitimate name of a new species, to be attributed solely to him."]

Acknowledgements

We thank Ian M. Turner and P. Pablo Ferrer Gallego for bringing to our attention the issues surrounding the names *Amorphophallus campanulatus* and *Meum segetum*, respectively, as well as Nicholas J. Turland for editorial assistance.

(186–187) Proposals to add a new provision in Article 60 to establish that epithets formed from abbreviations of personal names are considered to be composed arbitrarily and the termination of such epithets is not subject to standardization, and to clarify Article 60.14

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Article 60.8 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) requires standardization of the termination of specific or infraspecific epithets derived from personal names. However, it is not clear whether or not standardization in the termination of epithets derived from abbreviations of personal names is required. We therefore propose to establish that it is not required and, to clarify this situation, insert a qualification in Art. 60.8 followed by a new paragraph, a new Note and three new Examples.

It should be emphasized that the proposal we are making deals with abbreviated personal names from which epithets are derived; the epithets themselves are unlikely to indicate any abbreviation, unlike the situation covered in Art. 60.14 to which our proposed new Note refers. In order to make the application of Art. 60.14 clearer, we are making a second proposal to clarify its wording, but the two proposals can be considered quite independently (see below).

(186) Insert in Art. 60.8 a qualification on epithets derived from abbreviations of personal names (new text in bold), and add a new Article, a new Note, and three new Examples:

"*60.8*. The termination of specific or infraspecific epithets derived from personal names that are not already in Greek or Latin and do not possess a well-established latinized form (see Rec. 60C.1) is as follows **(but see Art. 60.8bis for epithets derived from abbreviation of personal names)**:"

"*60.8bis*. An epithet, or in the case of a compound epithet its final portion, formed from abbreviation of one or more personal names is considered to have been composed arbitrarily (Art. 23.2) and is not subject to modification, e.g. under the provisions of Art. 60.8."

"*Note 4bis*. If the epithet itself is indicated as being abbreviated, Art. 60.14 applies."

"*Ex. 26bis. Silene karekirii* Bocquet (in Candollea 22: 10. 1967), published as a replacement name for *Lychnis sordida* Kar. & Kir. (in Bull. Soc. Imp. Naturalistes Moscou 15: 170. 1842), is an arbitrarily formed epithet constructed by abbreviating the names of Karelin and Kirilov, authors of the replaced synonym, and the epithet is not to be corrected to '*karekiriorum*' or '*karelinikiriloviorum*'."

"*Ex. 26ter. Lepanthes carvii* Archila (Lepanthes Guatemala: 99. 2001) was said to be "dedicated to the family of Carlos Villela especially LIC Jorge A Carlos who directed the photography in this investigation". As a composite epithet apparently made up of "Car" from the Carlos family and the "V" from Villela, it is considered to be composed arbitrarily and is not to be modified in any way."

"*Ex. 26quater. Telipogon* '*crisariasae*' Baquero & Iturralde (in Phytotaxa 564: 249. 2022), commemorating María Cristina Arias (female), in which the final portion of a compound epithet is not formed from an abbreviation, is correctable to *Telipogon crisariasiae* (see Art. 60.8(b))."

The present Art. 60.14 first appeared in the *Melbourne Code* (McNeill & al. in Regnum Veg. 154. 2012) as a result of an amendment from the floor to a proposal (124) by Paul van Rijckevorsel (in Taxon 59: 656. 2010) on the deletion of a period (full stop) in a name; his basic proposal was accepted and now forms the second sentence of Art. 60.13. However, the Editorial Committee for the *Melbourne Code* decided that the amendment should be a separate provision and that is now Art. 60.14.

The amendment, to add "Abbreviated names and epithets are to be expanded in conformity with botanical tradition" was proposed by Werner Greuter who explained that what was really important and should be in the *Code* was that the many abbreviations that had a period in the name when published, including some Linnaean ones, not be considered not validly published because there was a period in the name or epithet, but that they be expanded as had always been done (Flann & al. in PhytoKeys 41: 245. 2014).

The explanation for the amendment that has become Art. 60.14 makes it clear that what must be expanded in conformity with nomenclatural tradition is not any name or epithet that might be thought to be abbreviated, but those that give indication of abbreviation, e.g. by the use of a period (full stop) or other symbol. For this reason, we propose that Art. 60.14 be amended to reflect this.

(187) Amend Art. 60.14 to read (new text in bold, deleted text in strikethrough):

"60.14. ~~Abbreviated names and~~ **Names or** epithets **indicated as abbreviated** are to be expanded in conformity with nomenclatural tradition (see also Art. 23 *Ex. 23 and Rec. 60C.4(d))."

It might be thought that this is already covered by the provision in Art. 60.13 by which a full stop (period) in an epithet is treated as an error to be corrected by expansion or, when nomenclatural tradition does not support expansion (Art. 60.14), deletion of the full stop. However, as other indications of abbreviation are possible and as this provision provides a link to a voted example, we are not proposing a merger with Art. 60.13, although it is something that a future Editorial Committee might want to consider.

(188–191) Four proposals to clarify the rules on gender

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The present rules in the *Code* on the gender of generic names have their origin in Art. 76 of the Berlin *Code* (Greuter & al. in Regnum Veg. 118. 1988), resulting from a proposal by a Special Committee on Orthography to replace the previous recommendations on the appropriate gender for such names (Demoulin & Nicolson in Taxon 35: 794–803. 1986).

This revision introduced the concept of "botanical tradition", the first sentence of the new Art. 76.1 reading: "A generic name retains the gender assigned by its author, unless this is contrary to botanical tradition", whereas the previous recommendation was that a Greek or Latin word adopted as a generic name should retain its gender (Rec. 75A.1 of the Sydney *Code*, Voss & al. in Regnum Veg. 111. 1983). The second sentence of the Committee's proposal, changed editorially to a Note, explained that "Botanical tradition usually maintains the classical gender of a Greek or Latin word, when this was well established." The remaining provisions of Art. 76 of the Berlin *Code* were essentially derived from the previous recommendations and also form the basis of Art. 62.2–62.4 of the current *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018). It is clear that they were to a large extent intended to exemplify "botanical tradition" and to note where it departed from classical practice (e.g. "names ending in *-anthos* (or *-anthus*), *-chilos* (*-chilus* or *-cheilos*)" being masculine rather than neuter, cf. Art. 62.2(c) of the current *Code*).

The present wording of Art. 62.1 is essentially that adopted in the *Tokyo Code* (Greuter & al. in Regnum Veg. 131. 1994), which was a restructuring by Paul Silva (in Taxon 42: 189–190. 1993) of the wording in the Berlin *Code*. As a by-product of the change in the title of the *Code*, the phrase "botanical tradition" was replaced in the *Melbourne Code* (McNeill & al. in Regnum Veg. 154. 2012), by "nomenclatural tradition" without any intended change of meaning. As a result, the Article reads "*62.1*. A generic name retains the gender assigned by nomenclatural tradition, irrespective of classical usage or the author's original usage. A generic name without a nomenclatural tradition retains the gender assigned by its author (but see Art. 62.4)." Neither "botanical tradition" nor "nomenclatural tradition" is defined, but they are replacements of "botanical custom" used in Rec. 75A of the Sydney *Code* and all preceding editions of the *Code* and originating in Art. 72 of the *Cambridge Rules* (Briquet, Int. Rules, Bot. Nomencl., ed. 3. 1935).

By contrast, the other provisions of Art. 62 are very precise. Article 62.2 establishes that "compound generic names take the gender of the last word in the nominative case in the compound", Art. 62.3 that "arbitrarily formed generic names or vernacular names or adjectives used as generic names, of which the gender is not apparent, take the gender assigned to them by their authors", and Art. 62.4 the gender of names ending in *-anthes*, *-oides*, or *-odes* (f.) and of those ending in *-ites* (m.). Clearly Art. 62.1 sets out the general principle and so the vagueness associated with the lack of any definition of "nomenclatural tradition" is not unreasonable, whereas Art. 62.2–62.4 deal with the specifics. This proposal is designed to clarify that the specific rules in all of Art. 62 take precedence over the general principle of "nomenclatural tradition".

(188) Insert a parenthesis at the end of the first sentence of Art. 62.1 to read "(but see Art. 62.2–62.4)".

Although, as the discussion above indicates, this change is probably editorial, the issue has generated sufficient confusion as to make it desirable that it be proposed formally ahead of the Madrid Congress. Tillmann & Gottschling (in Taxon 67: 203. 2018) proposed to conserve the name *Amphidoma* F. Stein (*Dinophyceae*) as being of feminine gender because the ending, *-doma*, is derived from the Greek neuter noun δῶμα (a house or a chamber of a house), whereas all 10 adjectival species epithets of *Amphidoma* have usually, but not always, been accepted with a feminine ending, contrary to Art. 62.2. In its Report (Andersen in Taxon 69: 1099–1101. 2020), the Nomenclature Committee for Algae recommended rejection of the proposal, quoting Art. 62.1, and arguing that "because all epithets for *Amphidoma* have been treated as feminine, the gender has been established

by nomenclatural tradition. Thus, there is no need to assign a gender by conservation." Given this confusion, the primacy of the explicit rule in the *Code* must be made clear.

(189) Add a new qualifying sentence in Art. 62.2, so that it reads (new text in bold):

"*62.2*. Compound generic names take the gender of the last word in the nominative case in the compound (but see Art. 14.11). If the termination is altered, however, the gender is altered accordingly. **An exception is made for compounds, with endings other than those listed in (a), (b), or (c), that were classical Latin words and in which tradition has adopted the classical Latin gender of that word even although the gender of the last word differs in the original language (usually Greek). In such cases the classical Latin gender is adopted.**"

The following suggestions exemplify the addition to Art. 62.2:

"*Ex. 6bis*. The classical Latin feminine noun *polygala*, applied to the herb milkwort, was derived from the Greek word with the same meaning, πολύγᾰλον (*polygalon*), itself a compound of πολύ- (poly-), many, and γάλα (gala), milk, a neuter noun. Linnaeus (Sp. Pl.: 701–706. 1753) adopted the classical Latin feminine gender for *Polygala* and that is to be maintained."

"*Ex. 6ter*. The classical gender both of the Latin *onosma* and the original Greek ὄνοσμα (onosma) is neuter. Linnaeus (Sp. Pl., ed. 2: 196. 1762), in taking up the name for a new genus, treated *Onosma* as feminine; in this he was followed by some botanists but more adopted the classical neuter gender. Because the ending *-osma* is listed in Art. 62.2(b) as feminine, *Onosma* maintains its feminine gender."

(190) Make the following additions to Art. 62.2 (a) & (c) (new text in bold):

"*(a)* Compounds ending in *-botrys*, *-codon*, ***-dens*****,** *-myces*, *-odon*, *-panax*, *-pogon*, *-stemon*, and other masculine words, are masculine."

"*(c)* Compounds ending in *-ceras*, *-dendron*, ***-derma*****,** ***-doma*****,** *-nema*, ***-sperma*****,** *-stigma*, *-stoma*, and other neuter words, are neuter."

Because Art. 62 Ex. 7 notes that *Bidens* has been conserved with feminine gender, the addition of *-dens* in (a) will make it clear that generic names ending in *-dens*, other than *Bidens*, retain masculine gender.

Further, given that Greek is becoming increasingly unfamiliar, it is proposed to add to (c) *-derma* and *-sperma*, frequent word elements but ones that occasionally confuse those who tend to attribute feminine gender to all words ending in *-a*, and also *-doma*, not so frequently used, but that has had contrasting usages even in the same work and was the trigger for the present review of the rules on gender.

(191) Transfer the ending *-anthes* from Art. 62.4 to Art. 62.2(b).

The inclusion of *-anthes* in Art. 62.4 is the result of a proposal by Stearn (in Taxon 41: 786. 1992). While the proposal that names ending in *-anthes* should be feminine was approved without problem, the proposer, and later the Editorial Committee for the *Tokyo Code*, overlooked that it was inappropriate to include it in what was then Art. 76.4, now Art. 62.4. Prior to that, this Article, or its earlier equivalent Recommendations, was reserved for suffixes that were not derived from a word that could stand independently (i.e. ones such as *-oides* or *-ites*), whereas those that were derived from such a word were dealt with in the present Art. 62.2. The ending *-anthes*, like *-anthos* and *-anthus* (see Art. 62.2(c)), is derived from the Greek ἄνθος (anthos), blossom, flower, and so it is more appropriate to transfer *-anthes* to Art. 62.2(b), maintaining the feminine gender but making clear the difference between Art. 62.2 and Art. 62.4, which had been obscured by its inclusion in Art. 62.4.

Acknowledgements

As always, we are very grateful to Paul van Rijckevorsel for the facility provided by his "Overview of editions of the *Code*" (https://www.iapt-taxon.org/historic/index.htm) to locate rapidly when particular provisions of the *Code* were introduced or modified.

(192) Insert a new Chapter E in Division II on a Code of Ethics

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Issues of an ethical nature may arise from any scientific work. The principles of self-regulation based on ethical values and standards of scientific integrity do not always work. To solve such problems, we are proposing the addition of a new Chapter E in Division II to the *International Code of Nomenclature for algae, fungi, and plants* (*Shenzhen Code*; Turland & al. in Regnum Veg. 159. 2018) inspired by, and adapted from, the *International Code of Zoological Nomenclature* (Ride & al., Int. Code Zool. Nomencl., ed. 4. 1999) Code of Ethics (Appendix A: see at https://code.iczn.org/appendices/appendix-a-code-of-ethics/). We believe that this code should be applied not only by zoologists but by all scientists. Moreover, it is important to note that there have also been cases related to the botanical field: e.g. one of the early patronymic insults is *Sigesbeckia*, "the unpleasant small-flowered weed", named by Linnaeus for Johann G. Siegesbeck (McClellan in Historical Biol. 33: 354–370. 2019). In our opinion, such a code would be a good tool

to define proper ethical practice in nomenclatural research and to establish procedures of conduct in situations when a threat to scientific integrity could occur. Based on the above comments, we are proposing the following addition to the *Shenzhen Code*.

(192) Add a new Chapter E in Division II:

"*1*. Authors proposing new names should observe the following principles, which together constitute a Code of Ethics.

2. An author should not publish a new name if he or she has reason to believe that another person has already recognized the same taxon and intends to establish a name for it (or that the taxon is to be named in a posthumous work). An author in such a position should communicate with the other person (or their representatives) and only feel free to establish a new name if that person has failed to do so in a reasonable period (not less than a year).

3. An author should not publish a new replacement name (nomen novum) or other substitute name for a junior homonym when the author of the latter is alive; that author should be informed of the homonymy and be allowed a reasonable time (at least a year) in which to establish a substitute name.

4. No author should propose a name that, to his or her knowledge or reasonable belief, would be likely to give offence on any grounds.

5. Intemperate language should not be used in any discussion or writing which involves nomenclature, and all debates should be conducted in a courteous and friendly manner.

6. Editors and others responsible for the publication of scientific papers should avoid publishing any material which appears to them to contain a breach of the above principles.

7. The observation of these principles is a matter for the proper feelings and conscience of individual scientists, and none of the Permanent Nomenclature Committees (Div. III Prov. 7.1) is empowered to investigate or rule upon alleged breaches of them."

(193) Proposal to democratize aspects of the governance of the *International Code of Nomenclature for algae, fungi, and plants*

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The *International Code of Nomenclature for algae, fungi, and plants* (*Code*) specifies that the approval of the General Committee (GC) of certain proposals (for conservation or rejection of a name or for suppression of a publication) is "subject to the decision of a later International Botanical Congress" (Turland & al. in Regnum Veg. 159: Art. 14.15, 34.2, 56.3; see also Art. 38.4, 53.4. 2018). The governance mechanisms included in Division III of the *Code* were discussed by the Special Committee on By-laws for the Nomenclature Section (By-laws Committee) in the years prior to the Nomenclature Section (NS) held in July 2017 at the XIX International Botanical Congress (IBC) in Shenzhen, China. The By-laws Committee's discussions culminated in a proposal and report (Knapp & al. in Taxon 65: 661–664, 665–669. 2016) that substantially revised the governance of the *Code*.

One of the most contentious issues discussed by the By-laws Committee was at what level the NS would accept the recommendations of the GC. The By-laws Committee was deeply divided, with nine members supporting a supermajority (60%) to *accept* a GC recommendation and eight supporting a supermajority (60%) to *reject* a GC recommendation, and finally settled on a *simple majority* (more than 50%) to accept as a reasonable compromise. In addition, Knapp & al. (l.c.) proposed that: (1) when a report of the GC contains more than one recommendation, the NS may vote separately on an individual recommendation; (2) when a vote to approve a singled-out GC recommendation does not achieve the proposed *simple majority*, that GC recommendation is cancelled, and the matter is referred back to the GC. Thus, every recommendation of the specialist committees (Div. III Prov. 7.1) and the GC and every decision of the NS would require at least a *simple majority* in favour, and would be a democratic process.

The proposal to amend the *Code* by Knapp & al. (l.c.) was accepted by the NS with various amendments (Lindon & al. in PhytoKeys 150: 213–228. 2020) and ratified the following week by the closing plenary session of the IBC (Turland & al. in Regnum Veg. 159: x. 2018). One change that produced a less democratic outcome than was originally proposed is: a 60% majority of the NS is required *to reject* a portion or portions of the report of the GC, thus allowing the recommendation of the GC to stand even when a clear majority (50.1% to 59.9%) of the NS has voted against it.

We here propose that democracy be established by enabling a NS to approve a GC report, in total, or as (a) singled out provision(s), with a *simple majority.* This will help to foster confidence in the integrity of nomenclatural governance.

(193) Amend Div. III Prov. 5 by rewording the current Prov. 5.1, 5.2, and 5.4 as follows (new text in bold, deleted text in strikethrough):

"*5.1*. A qualified majority (at least 60%) of votes cast is required for the following decisions:

~~*(e)* rejecting a singled-out recommendation of the General Committee (see Prov. 5.3);~~

~~*(f)* rejecting one or more recommendations of the General Committee on conservation, protection, or rejection of names, suppression of works, or binding decisions.~~"

"*5.2*. A simple majority (more than 50%) of votes cast is required for all other decisions, including the following:

(g) accepting recommendations of the General Committee ~~not included in Prov. 5.1(e) or (f)~~;"

"*5.4*. When a vote to ~~reject~~ **accept** a General Committee recommendation ~~achieves~~ **does not achieve** the required majority (Prov. ~~5.1(e) or (f)~~ **5.2(g)**), that recommendation is cancelled and the matter is referred back to the General Committee. Retention or rejection of a name or suppression of a work is no longer authorized (Art. 14.15, 56.3, and 34.2)."

(194) Proposal to readdress the issue of whether or not the types of basionyms or replaced synonyms of conserved names with conserved types are themselves conserved

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Prior to the 2011 Melbourne Congress, the late esteemed nomenclaturalist Gillian Perry (in Taxon 59: 1915–1916. 2010) discovered a previously overlooked issue threatening the perceived homotypy of some 30 names with conserved types and their basionyms then listed in Appendices III and IV of the *Vienna Code* (McNeill & al. in Regnum Veg. 146. 2006). At that time, it may have simply been assumed that the basionym of a conserved name was automatically homotypic with the conserved name. But for this to remain true when the conserved name was explicitly conserved with a conserved type, the basionym would have to be explicitly conserved similarly. Because 28 of the 30 cases Perry (l.c.) mentioned involved basionyms that applied to subdivisions of genera (App. III) or infraspecific taxa (App. IV), which lacked any provision for their conservation under the *Vienna Code*, she submitted Proposal 243 to remedy this situation, which upon its approval in Melbourne gave rise to most of the final sentence of current Art. 14.1 ("The name of a subdivision of a genus or of an infraspecific taxon may be conserved with a conserved type and listed in App. III and IV, respectively, when it is the basionym **or replaced synonym** of a name of a genus or species that could not continue to be used in its current sense without conservation"; Turland & al. in Regnum Veg. 159. 2018). The bolded text was added to this Article with acceptance of Proposal 234 (Wiersema & al. in Taxon 65: 642–646. 2016) at the Shenzhen Congress.

Perry astutely recognized that while acceptance of her Proposal 243 would provide a future mechanism for ensuring correspondence between listed types of names with conserved types in App. III and IV and those of their basionyms, when these could then be explicitly conserved as such, it could not address the already existing incongruency of types resulting from strict application of then Art. 14, where the listed basionyms (at the same rank) had not been,

or (at a lower rank) could not have been, explicitly conserved. She therefore put forward "housekeeping" Proposal 245 (Perry, l.c.) in Melbourne:

"(245) If Proposal 243 is accepted then each of those names listed in Appendix III and Appendix IV of the *Vienna Code* as being the basionym of a conserved name with a conserved type, is to be treated as conserved on the same date and with the same type as the conserved name under which it is cited."

Her proposal was adopted, and has resulted in the following footnote in the introductions to App. III and IV (Wiersema & al., Int. Code Nomencl. Algae, Fungi, and Plants: Appendices I–VII. 2018+ [continuously updated] https://naturalhistory2.si.edu/botany/codes-proposals/ [accessed 8 October 2022]):

"[1] In accordance with a proposal (245) accepted by the Melbourne Congress in 2011, the basionym of a conserved name with an explicitly conserved type (typ. cons.) is to be treated as conserved on the same date and with the same type as the conserved name under which it is cited."

as well as treatment of the associated names in the manner she expressly recommended:

"***Stipa robusta*** (Vasey) Scribn. in U.S.D.A. Bull. (1895–1901) 5: 23. 19 Feb 1897 ≡ ***Stipa viridula*** var. ***robusta*** Vasey in Contr. U.S. Natl. Herb. 1: 56. 13 Jun 1890 [*Monocot.*: *Gram.*]."

While the thrust of this footnote in these Appendices is indeed desirable, and coincides with Perry's (l.c.) objectives, it is not entirely supported by the precise wording of her proposal, for two reasons elaborated below.

Firstly, its focus was only on existing entries in the *Vienna Code* App. III and IV, so it provided no mandate for the treatment of names in the Appendices of subsequent *Codes*. Unless the basionym of a name conserved with a conserved type had its type explicitly conserved as well, the homotypy between the two names would still not be preserved. Indeed, two such cases were approved at the Melbourne Congress:

Craterellus cinereus (Pers. : Fr.) Donk, Revis. Niederl. Homobasidiomyc.: 67. 7 Jul 1933 ≡ ***Cantharellus cinereus*** Pers. in Neues Mag. Bot. 1: 106. 1794 ('*Cantarellus*'): Fr., Syst. Mycol. 1: 320. 1821).

Psilocybe (Fr. : Fr.) P. Kumm., Führer Pilzk.: 21, 71. Jul–Aug 1871 ≡ ***Agaricus*** "trib." ***Psilocybe*** Fr., Syst. Mycol. 1: 11, 289. 1 Jan 1821 : Fr., ibid.

but only in the latter case was there any mention or consideration of the need to conserve the type of the basionym. Six more such proposals have since been approved, but only in two cases, shown here with the basionym indicated in bold font, was attention paid to conservation of the type of the basionym. A type conservation in two of the cases listed here was not even contemplated in the original proposal.

Cissampelopsis (DC.) Lem. ex Lindl., Veg. Kingd.: 713. Jan–Mai 1846 (*Cacalia* sect. *Cissampelopsis* DC., Prodr. 6: 331. Jan 1838).

Davallia repens (L. f.) Kuhn, Filic. Afr.: 27. Jan–Mar 1868 (*Adiantum repens* L. f., Suppl. Pl.: 446. Apr 1782). [The type was wrongly but effectively conserved under Art. 14.8 due to an original error in its App. IV listing.]

Flammula (Fr. : Fr.) P. Kumm., Führer Pilzk.: 22, 80. Jul–Aug 1871 ≡ ***Agaricus*** "trib." ***Flammula*** Fr., Syst. Mycol. 1: 11, 250. 1 Jan 1821 : Fr., ibid.

Hebeloma (Fr. : Fr.) P. Kumm., Führer Pilzk.: 80. Jul–Aug 1871 (*Agaricus* "trib." *Hebeloma* Fr., Syst. Mycol. 1: 10, 249. 1 Jan 1821 : Fr., ibid.

Malus domestica (Suckow) Borkh., Theor.-Prakt. Handb. Forstbot.: 1272. 1803 (*Pyrus malus* var. *domestica* Suckow, Anfangsgr. Bot. 2: 332. 1786). [The existence of a basionym was not appreciated in the original proposal, only coming to light during General Committee deliberations.]

Sphenozamites (Brongn.) Miq. in Tijdschr. Wis- Natuurk. Wetensch. Eerste Kl. Kon. Ned. Inst. Wetensch. 4: 210. 1851 ≡ ***Otozamites*** sect. ***Sphenozamites*** Brongn. in Orbigny, Dict. Univ. Hist. Nat. 13: 110. 30 Jun–7 Jul 1849.

An additional proposal is now under review, but also lacking any indication of the need to conserve the type of the basionym:

Typhula (Pers.) Fr., Observ. Mycol. 2: 296. Apr–Mai 1818, nom. sanct. (Fries, Syst. Mycol. 1: 494. 1821) (*Clavaria* subg. *Typhula* Pers., Syn. Meth. Fung. 1: XVIII. 1801).

Secondly, Perry's Proposal 245 made no provision for the treatment of replacement names with conserved types and those of their replaced synonyms. There is one such case in App. IV, the impetus for Proposal 234 to the Shenzhen Congress (Wiersema & al., l.c. 2016), that first entered the 2006 *Vienna Code* before conservation of infraspecific replaced synonyms was possible.

Cenomyce stellaris Opiz, Böh. Phan. Crypt. Gew.: 141. 1823 (*Lichen rangiferinus* var. *alpestris* L., Sp. Pl.: 1153. 1 Mai 1753).

So while it is now possible to conserve the type of the replaced synonym together with the replacement name, Perry's Proposal 245 did not retroactively cover this for a pre-existing Appendix listing. A proposal currently under review demonstrates how such a listing would appear.

Nicotiana benthamiana Domin in Biblioth. Bot. 89: 591. Dec 1929 ≡ ***N. suaveolens*** var. ***cordifolia*** Benth., Fl. Austral. 4: 470. 16 Dec 1868.

To ensure that, for all of the names listed above and for any other undetected past or future cases of this kind, the conserved types of listed names and their basionyms or replaced synonyms will be congruent, the following proposal is put forward to the Madrid Nomenclature Section:

(194) Each of the names listed in Appendix III and Appendix IV as being the basionym or replaced synonym of a conserved name with a conserved type is to be treated as conserved on the same date and with the same type as the conserved name under which it is cited.

NOMENCLATURE COMMUNICATIONS

Taxon closed for proposals to amend the *Code* on 31 March 2023. Late submissions received until 30 June 2023 may be accepted at the editors' discretion if no reviewing or major editing is necessary. From 1 July 2023, no further submissions will be accepted.

(195) Proposal to amend the Preamble by adding a "potentially sensitive content disclaimer and limitation of liability"

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Authors of several discussion articles (Gillman & Wright in Commun. Biol. 3: art. 609. 2020; Smith & Figueiredo in Taxon 71: 1–5. 2022; Wright & Gillman in Taxon 71: 6–10. 2022; Smith & al. in Taxon 71: 933–935. 2022; Thiele & al. in Taxon 71: 1151–1154. 2022) and formal proposals to amend the *Code* (Smith & Figueiredo in Taxon 70: 1395–1396. 2021; Hammer & Thiele in Taxon 70: 1392–1394. 2021) recently proposed to allow and endorse the rejection and/or replacement of scientific names of taxa that are considered to be "culturally offensive and inappropriate", or even some other names, those supposedly not offensive and inappropriate but, e.g., reflecting the "colonial or imperialist past". In my opinion, such proposals are mainly based on political, social, ethical and/or ethnocultural criteria, which are not currently considered as nomenclaturally decisive in the *International Code of Nomenclature for algae, fungi, and plants* ("*Code*": Turland & al. in Regnum Veg. 159. 2018) and other *Codes* of biological nomenclature. These ideas and proposals were extensively discussed (Knapp & al. in Taxon 69: 1409–1410. 2020; Gillman & Wright in Bionomina 25: 93–97. 2021; Smith & al., l.c.; Thiele & al., l.c.) and/or criticised in scientific journals (see Heenan & al. in New Zealand J. Bot. 59: 291–322. 2021; Palma & Heath in Bionomina 22: 32–38. 2021; McGlone & al. in New Zealand J. Bot. 60: 215–226. 2022; Mosyakin in Taxon 70: 1379–1380. 2021; in Taxon 71: 249–255. 2022; in Taxon 71: 1141–1150. 2022; in Taxon, https://doi.org/10.1002/tax.12837. 2022). It is also worth considering that in its official communication on similar issues the International Commission on Zoological Nomenclature (Ceríaco & al. in Zool. J. Linn. Soc. 197: 283–286. 2023) concluded that "renaming taxa on ethical grounds threatens nomenclatural stability and scientific communication".

I understand and respectfully acknowledge that some vulnerable or emotionally sensitive people or groups of people consider some names of organisms governed by the *Code* as "offensive and/or inappropriate". In such cases, a sensitive content disclaimer and a limitation of liability statement are desirable. In particular, I think that such an addition to the *Code* could be useful for safeguarding the authors and editors of the present *Code*, as well as all those who in good faith and for lawful purposes create, modify and/or use scientific names of organisms covered by this *Code*, against possible accusations and allegations. Similar content disclaimers are currently available in many publications and online resources, e.g. Wikipedia (General disclaimer: https://en.wikipedia.org/wiki/Wikipedia:General_disclaimer; Content disclaimer: https://en.wikipedia.org/wiki/Wikipedia:Content_disclaimer) and the Biodiversity Heritage Library (Acknowledgment of Harmful Content: https://about.biodiversitylibrary.org/about/harmful-content/). Further explanations and recommendations were provided by the International Federation of Library Associations and Institutions in their document of 2021 "Objectionable Third-Party Content: Library Responses" (https://repository.ifla.org/handle/123456789/1754). (All online resources accessed on 11 February 2023.)

(195) Amend the Preamble by adding the following text after Pre. 14:

"**Potentially sensitive content disclaimer and limitation of liability**

Scientific names of algae, fungi, and plants were created and modified over the centuries by many authors of various national, ethnic, cultural, religious, political, historical, and other backgrounds, identities, origins, and traditions. Such names reflect the rich but also complicated and sometimes controversial history of scientific explorations and biological nomenclature.

Anyone using the scientific names of taxa governed by this *Code* should be aware that this *Code* is not intended for judging, evaluating, changing, rejecting, or censoring such names because of ethical, cultural, religious, political, social, ideological, and/or other principles, criteria, and procedures, except for those explicitly prescribed in this *Code* (see Preamble 1, 12, Art. 51.1).

The authors and editors of this *Code* and anyone using scientific names of organisms in accordance with this *Code* in good faith and for lawful purposes shall not be held responsible for any discomfort, inconvenience, offense, mental and/or emotional distress, or other possible negative consequences potentially caused by some scientific names of taxa to any person or group of people who may consider such names objectionable, offensive, or inappropriate.

The use of scientific names of taxa in accordance with this *Code* in good faith and for lawful purposes should not be viewed as manifestation, support, or endorsement of any cultural, religious, political, social, racial, or other views, concepts, prejudices, and/or ideologies

that may be deemed objectionable, offensive, or inappropriate to some people or groups of people."

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I am grateful to Nicholas J. Turland (Botanischer Garten und Botanisches Museum Berlin, Freie Universität Berlin, Germany) and John H. Wiersema (Smithsonian Institution, Washington, D.C., U.S.A.) for their useful comments and editing.

(196–197) Proposals regarding unpublished materials (amendments to Article 6.1 and the footnote of Article 6.13)

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The *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) amended Art. 6.1 by adding the following sentence: "Except in specified cases (Art. 8.1, 9.4(a), 9.22, Rec. 9A.3, and Art. 40.7), text and illustrations must be effectively published to be taken into account for the purposes of this *Code*." The Synopsis of Proposals for the Shenzhen Congress was prescient when it noted under the proposal (Art. 6 Prop. A) that resulted in this addition "there remains the worry that other unwanted consequences might exist" (Turland & Wiersema in Taxon 66: 221. 2017). Indeed, these worries are more than hypothetical:

(1) The language fails to carve out an exception for an unpublished illustration as an epitype because Art. 9.9 is not specified as an exception under Art. 6.1. While there is an exception for Art. 8.1, that Article mentions only holotype, lectotype and neotype.

(2) Various unpublished illustrations have been conserved as types under Art. 14.9. Because that Article is not specified as an exception in Art. 6.1, it is not clear that these conserved types are permitted.

(3) Article 46.9 provides that "external evidence" can be used to attribute authorship in some cases. Recommendation 9A.1 and 9B.1 require "understanding" the author's practices and "critical knowledge". Presumably, unpublished text and illustrations can no longer be taken into account for these purposes.

Attempting to set forth all of the exceptions would require an exhaustive review of every provision in the *Shenzhen Code*, and consideration of whether each provision might in some way be implicated by the new rule in Art. 6.1. Future amendments may well require additional changes, and these may well be overlooked. For example, a recent proposal would amend the so-called usage test in Art. 9.1(b) to consider whether there is "evidence in the protologue or elsewhere" to establish that the original author of the name used only one element (Turland & al. in Taxon 69: 626–627. 2020). Due to Art. 6.1, this other evidence would be limited to published text.

(196) Amend Art. 6.1 as follows (new text in bold, deleted text in strikethrough):

"*6.1*. Effective publication is publication in accordance with Art. 29–31. Except in specified cases (Art. **6.1,** 8.1 **and any reference to a type in this *Code***, 9.4(a), **9.9, 9.19,** 9.22, Rec. **9A.1,** 9A.3, **9B.1,** ~~and~~ Art. **10.4,** 40.7**, and 46.9**) **or where the use of unpublished text or illustrations is explicitly or implicitly permitted**, text and illustrations[1] must be effectively published to be taken into account for the purposes of this *Code*."

To avoid possible confusion over the status of unpublished illustrations and text, the definition of protologue (Art. 6.13 footnote) should be clarified to include them. These materials may be useful for purposes of determining whether a type is superseded under Art. 9.19(c).

(197) Amend the definition of protologue in the footnote to Art. 6.13 (new text in bold, deleted text in strikethrough):

"[1] Protologue (from Greek πρώτος, protos, first; λόγος, logos, discourse): everything associated with a name ~~at~~ **as part of** its valid publication, e.g. description, diagnosis, ~~illustrations,~~ references, synonymy, geographical data, citation **or reference** of specimens, discussion, and comments. **It also includes all illustrations published, cited, or referenced in the publication (including unpublished illustrations).**"

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I thank Nicholas J. Turland and John H. Wiersema for their comments and suggestions, which improved these proposals.

(198–199) Proposals to disallow doubtful equivalents of "designated here" under Article 7.11 and to recommend that permissible equivalents be in the Latin alphabet

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Under Art. 7.11 of the *Code* (Turland & al. in Regnum Veg. 159. 2018), designation of a type on or after 1 January 2001 is achieved only "if the typification statement includes the phrase "designated here" (hic designatus) or an equivalent".

Sometimes it is easy to determine what is an equivalent of "designated here". For example, the citation of "Lectotype (selected here): *Sauropus trinervius* Wall. ex Müll.Arg." (van Welzen in Blumea 48: 331. 2003) is definitely an equivalent of "designated here". However, not everyone might accept the use of "Lectotype (suggested here)" and "Lectotype (proposed here)" in the same publication (van Welzen, l.c.: 340) or "Neotype nov." or "lectotype nov." (Bruggeman-Nannenga in Acta Mus. Siles. Sci. Nat. 68: 25, 28. 2019) as an equivalent of "designated here".

In order to eliminate this ambiguity, we are proposing to amend Art. 7.11. A new Recommendation in Rec. 7A is also proposed because most users of the *Code* are still more familiar with the Latin alphabet.

(198) Add the following sentence to Art. 7.11 (new text in bold):

"*7.11*. For purposes of priority (Art. 9.19, 9.20, and 10.5), designation of a type is achieved only if the type is definitely accepted as such by the typifying author, if the type element is clearly indicated by direct citation including the term "type" (typus) or an equivalent, and, on or after 1 January 2001, if the typification statement includes the phrase "designated here" (hic designatus) or an equivalent. **On or after 1 January 2026, only the phrase "designated here" or "here designated" (hic designatus) or its exact translation into another modern language is permitted.**"

(199) Add a new paragraph to Rec. 7A:

"*7A.2*. The phrase "designated here" or the equivalents permitted by Art. 7.11 should be written in the Latin alphabet."

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(200) Proposal to amend the definition of the word "duplicate" in the footnote to Article 8.3

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Under the present wording of the *International Code of Nomenclature for algae, fungi, and plants* (Turland & al. in Regnum Veg. 159. 2018; see footnote 1 to Art. 8.3, and Glossary), a duplicate is defined as (any?) "part of a single gathering of a single species or infraspecific taxon". That definition, if interpreted *verbatim*, may have important implications for nomenclature. For example, a separately preserved special pollen/spore sample or preparation such as a slide or other pollen/spore sample deposited in a pollen reference collection (see, e.g., https://globalpollenproject.org/Reference; Bezusko & Tsymbalyuk in Shiyan, Index Herbariorum Ucrainicum: 138–141. 2011), if taken from a type specimen such as a holotype, lectotype or neotype, may or even should be considered as an isotype,

isolectotype or isoneotype, respectively. If the type specimen(s) is/are lost or destroyed, such a microscopic special preparation could be considered as an original specimen eligible for typification. However, it is evident that such special samples of microscopic or just very small parts (e.g. pollen/spore samples or preparations, small fragments or parts taken for DNA extraction, anatomical, micromorphological or biochemical studies, etc.) separated from a non-microscopic specimen, even if such samples or parts have a label duplicated from the label of that specimen, serve specific purposes and in most cases cannot represent all or at least the main diagnostic morphological characters of that specimen. Because of that, we propose the following amendment to the footnote in Art. 8.3.

(200) Amend the footnote to Art. 8.3 as follows (new text in bold):

"[1] Here and elsewhere in this *Code*, the word "duplicate" is given its usual meaning in curatorial practice. A duplicate is part of a single gathering of a single species or infraspecific taxon. **However, separately preserved samples or preparations of pollen, spores, and/or other microscopic or small parts taken from herbarium or other specimens of non-microscopic organisms for specific purposes (e.g. for DNA extraction, anatomical, micromorphological, or biochemical studies) are not considered duplicates.**"

No changes to the Glossary are needed because the definition of the word "duplicate" in the Glossary refers to the footnote to Art. 8.3. The proposed amendment does not affect the nomenclatural interpretation of parts taken from specimens of microscopic organisms (e.g. duplicates of samples of microscopic algae preserved in jars, etc.).

Acknowledgements

We are grateful to Nicholas J. Turland (Botanischer Garten und Botanisches Museum Berlin, Freie Universität Berlin, Germany) and John H. Wiersema (Smithsonian Institution, Washington, D.C., U.S.A.) for their comments and edits.

(201–202) Proposals regarding the definition of original material (Article 9.4)

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From a conceptual standpoint, the definition of "original material" in Art. 9.4 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) is straightforward. Yet the actual language is more difficult than necessary and can be simplified without any material substantive changes.

Cited illustrations are part of the protologue (Art. 9 Note 7) and, as implied by Art. 9 Ex. 11, it is widely accepted that cited illustrations are always original material. However, while cited specimens are always original material under Art. 9.4(c), a cited illustration is original material only if the author has access to it, which may not always be the case. While it is certainly possible that an author cited an illustration in an earlier publication without having access to the illustration, this possibility seems to be ignored. It is preferable to state that all cited illustrations are original material.

Because all cited specimens are original material, this proposal also makes it clear that they do not need to meet the requirements of Art. 9.4(a).

(201) Amend Art. 9.4 as follows (new text in bold):

"*9.4*. For the purposes of this *Code*, original material comprises the following elements: *(a)* those **uncited** specimens and **uncited** illustrations (both unpublished and published prior to publication of the protologue) that the author associated with the taxon, and that were available to the author prior to, or at the time of, preparation of the description, diagnosis, or illustration with analysis (Art. 38.7 and 38.8) validating the name; *(b)* any illustrations published as part of**, or cited in,** the protologue; *(c)* the holotype and those specimens which, even if not seen by the author of the description or diagnosis validating the name, were indicated as types (syntypes or paratypes) of the name at its valid publication; and *(d)* the isotypes or isosyntypes[1] of the name irrespective of whether such specimens were seen by either the author of the validating description or diagnosis or the author of the name (but see Art. 7.8, 7.9, and F.3.9)."

The next proposal is not intended to be substantive, and instead hopes to make Art. 9.4 both easier to read and more consistent with the other provisions of Art. 9. First, all isotypes, syntypes, paratypes and isosyntypes are original material. Because Art. 9.4 references those terms, it cannot be understood without also understanding the definitions of those terms in Art. 9.5–9.7. Once those terms are understood, it appears that some of the language in Art. 9.4 is unnecessary and may well be contradictory.

For example, Art. 9.4(c) includes as original material "those specimens which, even if not seen by the author of the description or diagnosis validating the name, were **indicated as types (syntypes or paratypes)** of the name at its valid publication" (emphasis added). The "indicated as types" phrase incorrectly implies that the failure to use the word "type", "syntype" or "paratype" in the protologue

precludes a specimen cited in the protologue from qualifying as original material, or that something in addition to mere citation is required to "indicate" the specimen as a type. It also incorrectly implies that syntypes and paratypes are types, which is contrary to the definition of that term in Art. 8.1.

Second, the various kinds of types listed in Art. 9.4(c) and (d) do not contain a restriction that they be seen by the author of the name or the author of the description or diagnosis. This language was added as part of the *Tokyo Code* (Greuter & al. in Regnum Veg. 131. 1994) because the prior Berlin *Code* (Greuter & al. in Regnum Veg. 118. 1988) implied that an author needed to see a specimen for it to be original material. A Note may be desirable to make this clear.

Third, the order of clauses (a)–(d) in Art. 9.4 is inconsistent with the order of Art. 9.12, which provides priority rules for purposes of designating a lectotype. This inconsistency requires readers to take more time than needed to understand the interaction of these two provisions. The proposal below reorders Art. 9.4 to generally (but not completely) conform with the order in Art. 9.12. In addition, because Art. 9.12 provides that isotypes have priority over syntypes and paratypes, the reference to isotypes is moved after holotypes.

Finally, the introductory clause "For purposes of this *Code*" appears unnecessary, if not confusing.

(202) Reorder and reword Art. 9.4 as follows and add a new Note:

"*9.4*. Original material comprises the following elements: *(a)* the holotype and its isotypes; *(b)* other specimens cited in the protologue of the name (i.e. syntypes and paratypes) and isosyntypes[1]; *(c)* any illustrations published as part of the protologue; and *(d)* those specimens and illustrations (both unpublished and published prior to publication of the protologue) that the author associated with the taxon, and that were available to the author prior to, or at the time of, preparation of the description, diagnosis, or illustration with analysis (Art. 38.7 and 38.8) validating the name (but see Art. 7.8, 7.9, and F.3.9)."

"*Note n*. Original material under Art. 9.4(a) or (b) need not be seen by either the author of the validating description or diagnosis or the author of the name."

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(203–205) Proposals to require initial lowercase letters for specific and infraspecific epithets, to permit tautonyms non-retroactively, and to use consistent language in Articles 20.1 and 23.2

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According to Art. 23.4 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), a specific epithet "may not exactly repeat the generic name". This rule may now be unnecessary. The once-held concern that tautonyms could cause confusion is inapplicable when specific epithets begin with lowercase letters. Promoting Rec. 60F.1 to the status of an Article would require completely lowercase epithets—a worthy revision—and would clear the path for tautonyms.

Historically, the tautonym prohibition appears to come from concerns that generic names and specific epithets could be confused when they share identical spelling *and* identical capitalization. The tautonym prohibition first appeared in Art. 55 of the Vienna *Rules* (Briquet, Règles Int. Nomencl. Bot. 1906), where two examples were provided, both with capitalized epithets: *Linaria Linaria* and *Raphanistrum Raphanistrum*. Referring to "*Linaria*", by itself, would be ambiguous as to whether the intended reference is to the generic name or the specific epithet. Notably, the Vienna *Rules* did not require lowercase epithets, but merely *recommended* (Rec. X) that epithets "begin with a small letter except those which are taken from names of persons" or "from generic names".

These provisions remain in place today, except that, as of 2006, Rec. 60F.1 no longer indicates that epithets derived from names of persons or genera may be capitalized (*Vienna Code*, McNeill & al. in Regnum Veg. 146. 2006).

The *Code* should take another step in this direction by promoting the content of Rec. 60F.1 to the relevant Articles, thereby *requiring* lowercase epithets. This would prevent ambiguity created by capitalized epithets, as the eye can immediately distinguish each rank. No nomenclatural instability would result because Rec. 60F.1 is merely typographical, Art. 60.1 and 60.2 remain in effect, and lowercase epithets are already customary. This revision also aligns with common sense because all species should be written alike.

With lowercase epithets mandatory, tautonyms would not foster ambiguity. "*Linaria linaria*" is unambiguous. Indeed, the zoological and prokaryote (bacteriological) *Codes* have permitted tautonyms and required lowercase epithets without issue for decades (Blanchard & al., Règles Int. Nomencl. Zool. 1905; Lapage & al., Int. Code Nomencl. Bact. 1975 rev. 1976; Ride & al., Int. Code Zool. Nomencl.,

ed. 4. 1999 & https://www.iczn.org/the-code/the-code-online/; Parker & al. in Int. J. Syst. Evol. Microbiol. 69(1A): S1–S111. 2019).

These revisions would simplify the *Code* by eliminating the prospective application of an unnecessary rule. Allowing tautonyms nonretroactively, as proposed, would have no impact on nomenclatural stability. Rather, it would eliminate complicated naming problems illustrated by Art. 23 Ex. 4 and would preserve original epithets.

(203) Amend Art. 23.2 and Art. 24.2 as follows (new text in bold), and delete Rec. 60F.1:

"*23.2*. The epithet in the name of a species may be taken from any source whatever, and may even be composed arbitrarily (but see Art. 60.1). **All specific epithets are to be written with an initial lower-case letter (see Art. 60.2).**"

"*24.2*. Infraspecific epithets are formed like specific epithets and, when adjectival in form and not used as nouns, they agree grammatically with the generic name (see Art. 23.5 and 32.2). **All infraspecific epithets are to be written with an initial lower-case letter (see Art. 60.2).**"

"~~*60F.1*. All specific and infraspecific epithets should be written with an initial lower-case letter.~~"

(204) Amend Art. 23.4 as follows (new text in bold, deleted text in strikethrough):

"*23.4*. **Any** ~~The~~ specific epithet, with or without the addition of a transcribed symbol, **published prior to 1 January 2026,** may not exactly repeat the generic name (a designation formed by such repetition is a tautonym)."

Articles 20.1 and 23.2 contain similar but not identical language stating that generic names and specific epithets, respectively, may be composed arbitrarily. The similar phrases in these Articles should be revised for consistency in word choice and internal cross-references. There is no reason for the language to differ, and any unintentional difference might be later misinterpreted as intentional and important, which in turn could contribute to confusion and nomenclatural instability.

Article 20.1 states, in the relevant part: "[The name of a genus] may be taken from any source whatever, and may even be composed in an absolutely arbitrary manner, but it must not end in *-virus*."

Article 23.2 states: "The epithet in the name of a species may be taken from any source whatever, and may even be composed arbitrarily (but see Art. 60.1)."

This proposal is to revise Art. 20.1 to mirror Art. 23.2 by adding the applicable cross-reference to Art. 60.1 and using the more concise language of Art. 23.2 ("composed arbitrarily" rather than "composed in an absolutely arbitrary manner").

(205) Amend Art. 20.1 as follows (new text in bold, deleted text in strikethrough):

"*20.1*. The name of a genus is a noun in the nominative singular, or a word treated as such, and is written with an initial capital letter (see Art. 60.2). It may be taken from any source whatever, and may even be composed **arbitrarily (but see Art. 60.1)** ~~in an absolutely arbitrary manner~~, but it must not end in *-virus*."

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(206) Proposal to guide the choice among grammatical forms in epithets with uncertain grammatical status

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Some epithets with the same spelling can sometimes be interpreted as falling into different grammatical categories, particularly both as adjectives (including participles) and nouns, according to their traditional use in botany. Examples of these include nouns that can be treated as adjectives (*colonus*, *hybrida*), compound epithets in which the last noun may be treated as adjectival (*-derma*, *-folium*, *-rhiza*, *-sperma*, *-spora*), or epithets in which endings are formed from certain verbs (*-fer*, *-ger*, *-fuga*, *-gena*). Authors publishing new names rarely explicitly indicate whether their epithets are intended as adjectives or nouns. As a result, other authors subsequently making combinations may inconsistently choose one form or the other, generating nomenclatural instability when their spellings differ. The situation is common enough to have motivated discussions in the past about how to treat these epithets, and even to be explicitly regulated by the *International Code of Zoological Nomenclature* (*ICZN*; Ride & al., Int. Code Zool. Nomencl., ed. 4. 1999 & https://www.iczn.org/the-code/the-code-online/). The provisions in Art. 31.2.2 of the *ICZN* rule that, in case of doubt, these epithets are to be treated as nouns in apposition.

However, this may not always be appropriate in botany. While some of these epithets are often used as nouns in apposition and others are commonly or preferably treated as adjectives (Nicolson in Taxon 35: 323–328. 1986), it is difficult to argue that the more common form is the only correct one following the nomenclatural tradition (e.g. although epithets ending in *-fer* and *-ger* are frequently adjectives, they may be nouns in apposition, see Clements, Greek and Latin in Biol. Nomencl. 1902, and Buchanan in Bull. Bact. Nomen. Tax. 6: 101–110. 1956). Since disparate choices have been made depending on the authors or tradition within taxonomic groups, a clear and objective way to ascertain the form that should be used is needed, both agreeing with botanical tradition and preserving nomenclatural stability. Otherwise, under the current provisions of the *Code*, these cases will always remain unclear or be the subject of debate.

A series of proposals for the last two International Botanical Congresses in Melbourne and Shenzhen (Niederle in Taxon 59: 984. 2010; 65: 415. 2016) partially addressed this issue. Unfortunately, Niederle's proposals were problematic for different reasons. The changes proposed in 2010 included adding to Art. 23.5 that word elements *-fuga* and *-gena* were always treated as nouns, while epithets ending in *-fer*, *-fera*, *-ferum*, *-ger*, *-gera*, *-gerum* were adjectival. Among the comments from the Nomenclature Section in Melbourne, the proposal was branded as "overly prescriptive and partly wrong" by Gereau (see Flann & al. in PhytoKeys 41: 98. 2014), noting that, for example, the word element *-fuga* can be declined as an adjective, as in *febrifugum*. I would also add that an epithet such as *nubigenus*, *-a*, *-um*, which was defined as "nonsense" by Niederle in 2016, could make perfect sense as a final epithet under, e.g., a genus of gasteroid fungi with powdery glebal mass, or of apotheciate *Pezizales*, "producing clouds" when the spores are released (a figurative use of epithets is not forbidden, and not even uncommon). The 2016 proposals were notoriously problematic because of the addition of the word "demonstrably" and the simultaneous removal of the last clause in Art. 23.5: "In particular, the usage of the word element *-cola* as an adjective is a correctable error", which concept was moved to a Note. These suggested changes raised an important problem, which was a potential acceptance of terminations like *-colus* or *-colum* as adjectives when "not demonstrably used as nouns". One could argue that an author deliberately using final epithets with terminations agreeing in gender with a generic name was indeed using them as adjectives (see, e.g., Nicolson, l.c.), but that would reverse a rule standing in the *Code* for more than two decades. Therefore, in Shenzhen, the proposals were rejected again and one of the comments from Hawksworth was precisely the opposition to reverse the decision on the ending *-cola* (see Lindon & al. in PhytoKeys 150: 111. 2020).

In my present proposal, I leave the choice to the first author who decided on one use or the other, considering that this would be the least disruptive option for regulating these cases. It also makes clear that this affects only epithets for which both forms are considered correct taking into account the *Code* as a whole, so it does not create a conflict with any other Article, Note or Example. If some word elements might require a more stringent regulation in the future, they could be added to Art. 23.5 after *-cola*. Likewise, cross-referenced Recommendations may be included when considered appropriate, e.g. the *Code* may recommend some epithets to be preferably treated either as adjectives or as nouns, so authors can take that into account when choosing one of the alternative grammatical forms for the first time. The new rule would be parallel to others in the *Code*, when the choice among two or more correct options is determined by a nomenclatural act by the first author who takes a decision; e.g. establishing priority among legitimate names or final epithets under Art. 11.5, or choosing a gender for generic names under Art. 62.3 when gender is not apparent and the original author did not make the choice. The alternative spellings that could be generated by alternative choices would not be orthographical variants, as clearly stated in Art. 61 Ex. 2, and are not covered elsewhere in the *Code*.

Some readers may be particularly concerned about the second Example I have chosen (*Erigeron florifer*, see below), because the outcome is exactly the opposite to the one from Niederle's proposals, where the epithet was interpreted as an adjective, whereas here it is a noun in apposition. However, I find it highly illustrative because it demonstrates that the epithet in *E. florifer* has been unambiguously treated as a noun in apposition at least from Gray in 1880 to Cronquist in 1950, while today it is not clear which form should be used. A quick Google search (27 October 2022) retrieved results in the same order of magnitude for both "*Townsendia florifer*" (2030 results) and "*Townsendia florifera*" (1100 results) (73 vs 11 results, respectively, in Google Scholar), and some digging into the results demonstrates that the accepted spelling varies from source to source, while it is true that there has been some drift towards accepting the adjectival form, even in some databases such as IPNI (https://www.ipni.org/). However, as explained above, this choice has no basis under the *Code*, it is contrary to its unambiguous usage until 1950, and it is not accepted in other databases (e.g. ITIS, https://www.itis.gov/). More concerning is that the alteration of *florifer* to *florifera* has implied listing the final epithet as *florifera* even under the masculine genera *Erigeron*, *Haplopappus* and *Stenotus* (e.g. in the Catalogue of Life, https://www.catalogueoflife.org/), as if it was a noun in apposition but with an altered spelling, something obviously wrong. These examples (which could be editorially shortened if needed) demonstrate that no nomenclatural stability has been reached yet.

(206) Add a new Article under Art. 23 (preferably after Art. 23.5) and one or more of the following Examples:

"*23.n*. When the final epithet of a name can be interpreted as belonging to two different grammatical categories (e.g. an adjective and a noun), both being correct under the rules, a subsequent author may choose (directly or indirectly) one of those categories, and the first such choice to be effectively published (Art. 29–31) is to be followed."

"*Ex. n1*. The final epithet in *Ruellia hybrida* Pursh (Fl. Amer. Sept. 2: 420. 1813) may be considered either as a noun in apposition or a feminine adjective, neither option being indicated in the protologue. When the final epithet was combined as *Dipteracanthus ciliosus* var. *hybridus* (Pursh) Nees (in Candolle, Prodr. 11: 123. 1847), Nees chose to treat it as an adjective, and his choice is to be followed."

"*Ex. n2*. The final epithet in *Erigeron florifer*, as so spelled by Hooker (Fl. Bor.-Amer. 2: 20. 1834), could be interpreted as a masculine adjective or a noun in apposition, because this information was not provided in the protologue. The final epithet was subsequently combined in *Haplopappus* (as '*Aplopappus*') by Hooker & Arnott (Bot. Beechey Voy.: 351. 1839) and in *Stenotus* by Torrey & Gray (Fl. N. Amer. 2: 238. 1842), but no choice of either form was performed there. The first choice was made by Gray (in Proc. Amer. Acad. Arts 16: 84. 1880), who published the combination *Townsendia florifer*, thus treating the final epithet as a noun in apposition. This choice was subsequently followed in, e.g., *T. florifer* var. *communis* M. E. Jones (in Proc. Calif. Acad. Sci., ser. 2, 5: 697. 1895) and

T. florifer var. *watsonii* (A. Gray) Cronquist (in Leafl. W. Bot. 6: 49. 1950, '*Watsoni*'). The epithet "*florifer*" is therefore treated as a noun in apposition and is not to be altered to the adjectival "*florifera*" or "*floriferum*" in combinations under feminine or neuter generic names."

"*Ex. n3*. When *Peziza lachnoderma* Berk. (in Hooker, Bot. Antarct. Voy., III, Fl. Tasman. 2: 274. 1859) was published, Berkeley did not indicate whether the final epithet was a noun in apposition or a feminine adjective, and both interpretations are possible. A combination made by Rehm (in Ber. Naturhist. Augsburg 26: 76. 1881), currently accepted in *Dasyscyphus*, did not effect a choice because, at that time, Rehm combined the final epithet under a feminine orthographical variant of the generic name, "*Dasyscypha*". The first choice was made by Kuntze (Revis. Gen. Pl. 3: 446. 1898), who effectively published the combination *Atractobolus lachnoderma* (Berk.) Kuntze under a masculine generic name, unambiguously using the final epithet as a noun in apposition, a choice that is to be followed."

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(207–216) Proposals on orthography: Epithets in apposition, and more

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Article 23.1 of the *Code* (Turland & al. in Regnum Veg. 159. 2018) rules that a specific epithet may have one of three forms: "an adjective, a noun in the genitive, or a word in apposition". Of these three, "a word in apposition" is likely to be the least clear to the modern reader, partly because of the declining familiarity with Latin among botanists, but also because they often do not stand out as being in this category.

Upon taking a closer look, epithets in apposition prove quite interesting. Firstly, there is a quite varied tradition of using a name (in the wide sense) in apposition as an epithet: *Achillea millefolium* and *Impatiens noli-tangere*: both pre-Linnaean generic names (see also Art. 23 Ex. 7 and Ex. 10 and Art. 60 Ex. 38); *Diospyros kaki*, *Zea mays* and *Mimosa saman*: all three vernacular names; *Pentaptera arjuna*, *Larix deodara* and *Cedrela mahagoni*: all three latinized vernacular names; *Bauhinia pes-caprae*: a translated vernacular name; *Senecio barba-johannis* and *Espeletia margarita*: both translated parts of a vernacular name; *Smilax china* and *Cyathea roroka*: both geographical features; *Sedum dulcinomen*: a translated geographical name; *Arisaema elephas*: an animal name; *Croton draco*: a mythological animal name; *Cyperus ajax*: a figure from classical mythology; and *Botrychium yaax-udakeit*: a figure from oral history. Not all of these represent best practice.

Then there are descriptive epithets (serving in an adjectival function), sometimes as single words: *Robinia frutex* and *Symplocos margarita*; also as diminutives of nouns: *Polyalthia asteriella* and *Epidendrum baculus*, not to be confused with diminutives of adjectives (such as *asperulus*, *-a*, *-um* or *hispidulus*, *-a*, *-um*); sometimes composed of words that can stand independently, in various permutations, with or without a hyphen, most commonly a noun plus a genitive (not necessarily in that order): *Agrostemma coeli-rosa*, *Oplismenus crus-pavonis* and *Epidendrum flos-aëris*; or sometimes as compounds, notably with *-cola*: *Boletus pinicola* and *Sphaeria salicicola*, but not limited to that: *Eupatorium callilepis*, *Samanea leucocalyx*, *Corydalis longicornu* and *Dendrobium strepsiceros*.

It seems a good idea to have the *Code* pay more attention to epithets in apposition, especially if they are compounds. The distinction between compound adjectival epithets (Art. 60.10) and compound epithets in apposition serving semantically (but not grammatically) as adjectives may not always be clear. Perhaps migration is even possible: botanical dictionaries indicate that *fructus* is always a noun, but in practice there are many epithets with an adjectival *-fructus*, *-a*, *-um* as a final component.

(207) Add a Note to Art. 23.1 supported by an Example:

"*Note. n*. An epithet in apposition need not match the generic name in gender or number but must be in the same case (the nominative case, Art. 20.1). If an epithet in apposition is composed from more than one word, this may be a compound (with a noun in final position, see Art. 60.10bis, Rec. 60G) that serves semantically as if it were an adjective, or it may be composed of words that can stand independently, in which case the additional word(s) relate(s) grammatically not to the generic name but to the noun in apposition; an additional word may be in the form of an adjective, a noun in the genitive, or a word in apposition."

"*Ex. n*. Examples of epithets in apposition. In the form of compounds: *Bactrodesmium betulicola*, *Calocedrus macrolepis*, *Borassus pinnatifrons*. Composed of words that usually stand independently: *Strychnos nux-blanda*: "nux" in the nominative, "blandus, -a, -um" an adjective to "nux"; *Planchonella dies-reginae*: "dies" in the

nominative, "regina" in the genitive; *Palaquium regina-montium*: "regina" in the nominative, "mons" in the genitive (plural). In *Arenaria mons-cragus*, both "mons" and "cragus" (a geographical name) are nouns in the nominative."

It is noteworthy that the *International Code of Zoological Nomenclature* (*ICZN*; https://www.iczn.org/the-code/the-code-online) is more explicit about the details of grammar involved with the "in apposition" in its Art. 31, specifying that a word in apposition must be in the nominative case, and explaining "compound noun (or noun phrase)".

(208) Add a new Recommendation to Art. 23 supported by an Example:

"*23A.2bis*/*23B.1*. In forming specific epithets, authors should avoid the use of a word in apposition when an accepted Latin adjective or noun in the genitive is available. An epithet in apposition should preferably be reserved for descriptive epithets that, by tradition, semantically serve as if adjectives (e.g. *aesculicola*, *brevicalyx*, *chrysolepis*, *crassipes*, *leucothrix*, *longifrons*, *microglochin*, *rhodoxylon*, *salicicola*) and to commemorate words that do not lend themselves well to latinization (especially vernacular names)."

"*Ex. n1*. Examples of nouns for which accepted Latin forms are available and that need not be used: *elephanti* (or *elephantis*), *elephantorum* (or *elephantum*), *elephantinus*, *-a*, *-um*, rather than *elephas*; *draconis*, *draconteus*, *-a*, *-um* rather than *draco*; *jovis* rather than *jupiter*; *macrostachyus*, *-a*, *-um* rather than *macrostachys*; *margaritaceus*, *-a*, *-um*, rather than *margarita*."

All in all, the use of words in apposition as epithets can be confusing. For example, there is a (very) minor tradition of using the name of a figure from classical mythology in the nominative. This fitted best in the somewhat confused nineteenth century but has not quite died out. Since these names have had genitives (and adjectival forms) since classical times, this is quite unnecessary. This particular usage could be argued to be already recommended against in Rec. 23A.1 (if a figure from classical mythology is taken to be a person), but the same principle applies more widely. On the other hand, there are words that are worth commemorating but would suffer by being latinized.

(209) Add a new Recommendation to Art. 23 or Art. 60 supported by an Example:

"*23B.2*/*60D.2*. When forming names for species of significant importance to indigenous people in its area of occurrence, authors should consider adopting a widely used vernacular name as an epithet (as a noun in apposition, Art. 23.1)."

"*Ex. n2*. Examples of vernacular names commemorated as epithets in apposition: *Tabernanthe iboga*, *Diospyros kaki*, *Agave karatto*, *Pistacia khinjuk*, *Dimocarpus longan*, *Zea mays*, *Amomum mioga*, *Mimosa saman*, *Enterolobium timboüva*."

As stated by Pre. 1, the purpose of a name is to supply a means of referring to a taxon, i.e. to provide a label, but labels are easier to memorize if they have meaning. Adopting a vernacular name that already has meaning (at least to the people who already knew the organism) can provide a shortcut. Using vernacular names as epithets has been part of formal botanical nomenclature from its first starting point, the *Species plantarum* (1753), with *Zea mays* as the most famous example. Recently, there is more attention for the importance of indigenous names (see, e.g., Knapp & al. in Taxon 69: 1409–1410. 2020), so an extra Recommendation may be appropriate.

(210) Add a new Recommendation to Art. 23 or Art. 60 supported by an Example:

"*23B.3*/*60D.3*. When adopting vernacular names as specific epithets, authors should consider using the vernacular name in its pure form (as a noun in apposition), with minimum transliteration, rather than in a latinized form (Rec. 23A.3(a) notwithstanding)."

"*Ex. n3*. The latinization of the epithet in *Cedrela mahagoni*, from "mahogany" (itself presumed to be derived from "m'oganwo"), has occasionally caused confusion."

If an indigenous/vernacular/common name is judged worth commemorating in an epithet, it should be worth doing this in a form that would be recognized by those who are using this name. It is not merely a matter of using the indigenous/vernacular/common name as an inspiration for an unusual-looking epithet.

Optimal placement of these proposed additions is somewhat unclear. If the latter three proposals were accepted it would seem logical to keep them together, but, because the Recommendations on forming epithets are spread over Art. 23 and Art. 60, various arrangements are possible (depending on what proposals are accepted).

(211) Add a new rule to Art. 60 supported by two Examples:

"*60.10bis*. The provisions of Art. 60.10 apply equally to epithets in apposition that are compounded by combining one or more Greek or Latin words with the noun *-cola* in final position (see Art. 23.5)."

"*Ex. 39bis*. The epithet meaning "inhabiting *Betula*" is *betulicola* (*Betul-*, connecting vowel *-i-*, and noun, in final position, *-cola*)."

"*Ex. 39ter*. The epithet in *Septoria* '*Castaneæcola*' Desm. (in Ann. Sci. Nat., Bot., ser. 3, 8: 26. 1847) is to be spelled *castaneicola*."

The *Saint Louis Code* (Greuter & al. in Regnum Veg. 138. 2000) saw the introduction in Art. 23.5 of the sentence "In particular, the usage of the word element *-cola* as an adjective is a correctable error", making all epithets ending in *-cola* nouns in apposition. Because Art. 60.10 is restricted to adjectival epithets, from then on (what is now) Art. 60.10 no longer applied to compounds with *-cola*. Deviant compounding forms do not occur in such epithets all that frequently, but there are dozens of different epithets, for example matching what appears to be all generic names of trees in which fungi are found, and some of these are heavily used. In practice, the deviant spellings are corrected, but nothing in the *Code* actually supports this.

(212) Add a new rule to Art. 60 supported by three Examples:

"*60.10ter*. The provisions of Art. 60.10 apply equally to epithets in apposition that semantically serve as if they were adjectives and that are compounded by combining one or more Greek or Latin words with a noun in final position (especially *-cola*, see Art. 23.5)."

[The same two Examples as in Prop. 211 above.]

"*Ex. n. Ilex* '*ardisiaefrons*' Reissek (in Martius, Fl. Bras. 11(1): 58. 1861) is to be spelled *I. ardisiifrons*."

This is the more inclusive alternative to Prop. 211, using the same Examples plus one extra. Of all epithets in apposition formed by compounding a generic name or a specific or infraspecific epithet with a noun in final position, the vast majority are compounded with *-cola* in final position. Nevertheless, there are also compounds with *-frons* (*adiantifrons*, *blechnifrons*, *calamifrons*, *laurifrons*, etc.); some of these use words in first declension: *inulifrons*, *knautiifrons*, *palmifrons*, *plagiogyriifrons*, *tiliifrons*. At least two were published with a genitive in first declension: "*ardisiaefrons*", "*urticæfrons*".

With other final nouns (*hebecalyx*, *lupinocalyx*, *physalidicalyx*, etc.), generic names in first declension may also occur (*alceicornu*, *nicandricalyx*); IPNI (https://www.ipni.org/) lists a "*polygalaecalyx*", with a genitive in first declension. Why not make these correctable?

(213) Rephrase Art. 60.11 so that it reads (new text in bold, deleted text in strikethrough):

"*60.11*. The use of a hyphen in a**n ~~compound~~** epithet is treated as an error to be corrected by deletion of the hyphen. A hyphen is permitted only when **an epithet is hyphenated according to Art. 23.1 or 23.3 (if the epithet consisted originally of two or more words, or a word and a symbol) or when the hyphen was present at the valid publication of the name or its basionym, if it has one. A hyphen is permitted only when** the epithet is formed of words that usually stand independently, or when the letters before and after the hyphen are the same~~ (see also Art. 23.1 and 23.3)~~."

The word "compound" is unnecessary here and only confusing: it differs from the use of this word in Art. 60.10 and Rec. 60G.1. Actually, the definition of "pseudocompound" in Rec. 60G.1 would fit the "when the epithet is formed of words that usually stand independently", so that "a pseudocompound epithet" might be more accurate, although no less confusing. The present phrasing could send a reader looking for a parallel provision on hyphens in non-compound epithets, which is nonsense, but this does add to the potential confusion. In addition, it seems useful to clarify that hyphens added later, after the original publication, are never allowed, except as by Art. 23.1 and 23.3.

(214) Add a Note to Art. 60, somewhere after 60.11, supported by an Example:

"*Note n*. In Art. 60.11, "words that usually stand independently" refers to usage in (botanical) Latin (see Prin. V), not in the language from which the words are derived."

"*Ex. n1*. In the epithet of *Nicandra johntyleriana* S. Leiva & Pereyra (in Arnaldoa 14: 46. 2007, '*john-tyleriana*'), "john" is not a Latin word and it cannot stand independently in that language. A hyphen is not permitted."

Proposal 049 (Prado & Moran in Taxon 69: 1392. 2020) proposes using "separately latinized" as a criterion to permit a hyphen in an epithet based on a personal name. If the elements each have a Latin termination, this is sufficient to permit a hyphen, but how to phrase this? Firstly, what exactly is "latinized"? In an epithet *maria-victoriae*, for a Maria-Victoria, is "*maria*" latinized? It is the exact given name, unaltered. In a geographical epithet like *montis-elgon* the non-final element is in Latin, but "*elgon*" is unmodified. In theory this could also happen in personal names because a noun in apposition is allowed. Would a noun in apposition in final position always prevent a hyphen? Watertight phrasing seems elusive. This Note seems safer.

(215) If Prop. 214 is accepted, add a voted Example to the Note:

"**Ex. n2*. In the epithet of *Peperomia santa-elisae* C. DC. (in Bull. Herb. Boissier, ser. 2, 7: 917. 1907), "santa" is not a Latin word but is accepted by tradition as a word that can stand independently in botanical Latin. A hyphen is permitted."

This is a point up for discussion; it appears to be something of a marginal case.

(216) Add a new rule to Art. 23 (or possibly to Art. 60) supported by three Examples:

"*23.5bis*. In a specific epithet composed of what originally were words that in (botanical) Latin usually stand independently (for a compound see Art. 60.10, 60.10bis/ter), whether separated by a hyphen or not, these words must relate correctly to each other with regard to Latin grammar. In particular, in an epithet derived from a geographical or personal name that consists of a noun in the genitive in non-final position and an adjective in final position, the adjective must be changed to the corresponding noun in the genitive. If the adjective itself is not derived from a name but from general Latin and a corresponding noun is not available in Latin, the adjective must be maintained but must agree (in gender, case and number) with the noun in the genitive."

"*Ex. n1*. Correctable errors in epithets derived from a personal or geographical name that at valid publication consisted of a noun in the genitive and an adjective: *Centaurea carolipaui* Fern. Casas & Susanna (in Fontqueria 1: 2. 1982, '*carolipauana*'), honouring Carlos Pau; *Calamintha caroli-henrici* Kit Tan & Sorger (in Pl. Syst. Evol. 155: 100. 1987, '*caroli-henricana*'), honouring Karl Heinz Rechinger; *Agrostophyllum montis-jayae* Ormerod (in Orchadian 17: 379. 2013, '*montis-jayanum*'), after Mt Jaya; *Dracontia montis-mortis* Karremans & Bogarín (in Syst. Bot. 38: 307. 2013, '*montis-mortense*'), after the Cerro de la Muerte."

"*Ex. n2*. In *Syzygium montis-veneti* Craven (in Blumea 66: 74. 2021, '*montis-venetus*'), after the Blue Mountain, '*venetus*' is the nominative case of an adjective that (correctly) agrees in gender with the noun in the genitive ("mons" is masculine), not with the generic name (which is neuter). The Latin adjective "venetus, -a, -um" (in the sense used here: "blue") has no corresponding Latin noun (the plural noun Veneti refers to a people): here, the adjective is to be maintained but adjusted to its genitive: '*veneti*'."

"*Ex. n3*. Not to be altered is the epithet in *Loranthus cycneus-sinus* Blakely (in Proc. Linn. Soc. New South Wales 47: 392. 1922, '*Cycneus-Sinus*') because this can be a correctly formed epithet in apposition (the fourth declension noun "sinus" has the same nominative form as the genitive). This form is not recommended, but there is no evidence that the epithet is incorrectly formed."

Authors forming epithets out of what were originally two or more words usually observe correct Latin grammar, but not always. Proposal 115 (Garland & Prado in Taxon 70: 1389. 2021) aims to address this, but the solution proposed would cause epithets like *carolipauana*, honouring Carlos Pau, being altered to *caroli-pauanae* (adjective in the genitive case), which violates Art. 60.8. The common form for an epithet honouring him is *caroli-paui* (or *carolipaui*), not *caroliana-pauana*. It is uncertain if it is possible to draw up a provision that would cover all possible errors. In the *Salicornia* '*sinus-persica*' of Prop. 115, both *sinus-persicus* and *sinus-persiae* appear viable options, depending on the case of *sinus*. The equivalent of what in zoology would be a First Reviser rule (*ICZN* Art. 24.2) seems called for.

(217) Proposal to amend Article 38.4 to allow binding decisions on whether a name was accepted by its author(s) in the original publication

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(217) Amend Art. 38.4 as follows (new text in bold):

"*38.4*. When it is doubtful whether a descriptive statement satisfies the requirement of Art. 38.1(a) for a "description or diagnosis" **or whether a name was accepted by its author in the original publication (Art. 36.1)**, a request for a decision may be submitted to the General Committee, which will refer it for examination to the specialist committee for the appropriate taxonomic group (see Div. III Prov. 2.2, 7.9, and 7.10). A Committee recommendation as to whether or not the name concerned is validly published may then be put forward to an International Botanical Congress and, if ratified, will become a binding decision with retroactive effect. These binding decisions are listed in App. VI."

The present proposal was first considered after discussing the curious nomenclatural case of the name or phrase "*Senecio tenuifolius*. Ucranicus. […]" mentioned by Besser (Enum. Pl.: 33. 1822; https://www.biodiversitylibrary.org/page/6089486) in the following statement and discussion regarding the (unnamed?) species No. 1082:

"(*arenarius. MB. in lit.* | (*tenuifolius*. Ucranicus | *Cat. h. Cremen. 1816. p. 129*. | Species haec mihi nondum clara. Possideo specimen siccum inscriptum „Folia subcarnosa, sicut tota planta incana. Affinis *S. erucaefolio*" ab ipso Auctore. Specimina nostri Senecionis ucranici cum illo communicata declarat pro *S. arenario*, ast nostri folia nec subcarnosa, nec similia specimini prius memorato ex Rossiae minoris arena mobili; neque similis *S. erucaefolia* ab Jll. *Steven* mecum communicato. Nostrum non esse. *S. tenuifolium* austriacum patet ex calyce (Confer. *Cat. H. Crem. l. c.*) Foliorum forma variabilis uti affinium."

Before 2015, that statement was not viewed as the validation of the species name "*Senecio ucranicus*". However, the name *Senecio ucranicus* Besser (l.c. 1822) is currently listed in the International Plant Names Index (IPNI: https://www.ipni.org/n/60470182-2 accessed 24 Jan 2023) as validly published, while the name *S. ucranicus* Hodálová (in Folia Geobot. 34: 334. 1999) is treated in IPNI as an illegitimate later homonym (https://www.ipni.org/n/1011450-1 accessed on same date). According to Kanchi Gandhi (pers. comm., email message of 18 May 2018 to Sergei Mosyakin), this decision was based on the opinion of Werner Greuter, who in his email message of 22 October 2015 to Kanchi Gandhi provided the following information: "Besser disagrees with MB's [Marschall von Bieberstein's] opinion that his Ukrainian plant (i.e. *S. tenuifolius* var. *affinis*, referred to as *S. tenuifolius* "*ucranicus*" by a slip of the pen) is the same as MB's *S. arenarius*; he [Besser] treats it as a taxonomically doubtful species ("species mihi nondum clara") for which he accepts the name *S. ucranicus* (mentioned in genitive in the text and easily overlooked because not in italics). There is scant descriptive matter in the 1822 text ("folia non subcarnosa"), but the reference to the 1816 footnote description [Besser, Cat. Hort. Cremeneci: 129. 1816] validates the name unquestionably."

However, Mosyakin (in Novosti Sist. Vyssh. Rast. 48: 126–130. 2017) and Mosyakin & Shiyan (in Ukrayins'k. Bot. Zhurn. 76: 473–485. 2019) provided arguments in favour of a different interpretation of Besser's text. According to these authors, the name "*Senecio ucranicus*" was never validated by Besser (l.c. 1822) because he did not accept that name; moreover, this binomial does not exist because the word "Ucranicus" was not intended as a specific epithet (Mosyakin, l.c. 2017: 126). Mosyakin (l.c. 2017: 127) also commented that, by the word "Ucranicus" following the epithet "*tenuifolius*", Besser simply indicated that the name *S. tenuifolius* was (mis)applied by him in 1816 (Besser, l.c. 1816: 129) to Ukrainian plants. In modern terms, it is equivalent to citing "*S. tenuifolius* sensu Besser (1816), quoad plantae ucrainicae, non Jacquin (1775)". Throughout Besser's *Enumeratio* (l.c. 1822), he consistently used italic for scientific names and the information on distribution generally followed a name and was in Roman type, just as "Ucranicus" appears following the epithet "*tenuifolius*".

It should also be noted that neither Besser nor his student and follower Andrzejowski mentioned the name "*Senecio ucranicus*" in their post-1822 publications. This name is also absent in labels of all available herbarium specimens of *Senecio* sensu lato deposited in the Besser memorial herbarium (KW-BESS) at the National Herbarium of Ukraine (KW).

The main taxonomic and nomenclatural problem is that specimens from Ukraine identified by Besser as "*Senecio tenuifolius*", "*Senecio tenuifolius*?" (G00471754), or "*Senecio* affinis *tenuifolio* & *borysthenico*" (G00471752) and at present deposited in G (syntypes of *S. praealtus* var. *borysthenicus* DC., Prodr. 6: 351. 1838; see Mosyakin & al. in Candollea 74: 217–221. 2019; and Mosyakin & Shiyan, l.c.) and KW (several specimens, see Mosyakin & Shiyan, l.c.) evidently belong to the species currently accepted as *Jacobaea borysthenica* (DC.) B. Nord. & Greuter (in Willdenowia 36: 712. 2006 ≡ *S. praealtus* var. *borysthenicus* DC. ≡ *S. borysthenicus* (DC.) Andrz. ex Czern., Conspect. Pl. Charc.: 32. 1859). If we, contrary to the arguments presented by Mosyakin (l.c. 2017) and Mosyakin & Shiyan (l.c.), assume that the name *S. ucranicus* was validly published by Besser, the specific epithet *ucranicus* would have priority for the species of *Jacobaea* now generally accepted as

J. borysthenica, and a new combination in that genus with the epithet "*ucranica*" will be required.

Initially, one of us (SM) thought that the best solution, most probably accurately reflecting the original intention of Besser (l.c. 1822), for safeguarding the widely accepted name *Jacobaea borysthenica* (≡ *Senecio borysthenicus*) and preserving the nomenclatural stability in this taxonomically complicated group of *Jacobaea*, would be to make a binding decision that the name "*S. ucranicus*" Besser was not validly published, for the reasons discussed and explained above and, in more detail, in Mosyakin (l.c. 2017) and Mosyakin & Shiyan (l.c.). However, one of us (JM) correctly indicated that a request for a binding decision is currently (under Art. 38.4 of the *Shenzhen Code*: Turland & al. in Regnum Veg. 159. 2018) possible only when "it is doubtful whether a descriptive statement satisfies the requirement of Art. 38.1(a) for a description or diagnosis", which is not the case with Besser's text (see the comment by Greuter cited above).

We therefore have a situation where some experts (e.g. Werner Greuter, Kanchi Gandhi) treat the name "*Senecio ucranicus*" Besser as validly published while others (e.g. the present authors) consider that name not to exist, which leaves the names of at least two accepted taxa, *Jacobaea borysthenica* (see above) and *S. ucranicus* Hodálová (≡ *S. hercynicus* subsp. *ucranicus* (Hodálová) Greuter [or subsp. *ucranicus* Greuter] in Willdenowia 33: 247. 2003), unresolved in a nomenclatural limbo. We therefore propose to amend Art. 38.4 of the *Code* by allowing a request for a binding decision when it is doubtful whether a name was accepted by its author in the original publication. We estimate that there are not many doubtful cases such as the one described above. In particular, we considered some supposedly provisional names published but not accepted by Klokov (see, e.g., Mosyakin in Phytotaxa 258: 164–170. 2016). We do not therefore expect too many proposals of this type.

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(218–220) Proposals to authorize binding decisions to be implemented upon General Committee approval of a recommendation, subject to ratification by a later International Botanical Congress

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According to the rules in the current *Code* (Turland & al. in Regnum Veg. 159. 2018), a final decision regarding a request for a binding decision (i.e. "whether a descriptive statement satisfies the requirement of Art. 38.1(a) for a 'description or diagnosis'", Art. 38.4, or "whether names or their epithets are sufficiently alike to be confused", Art. 53.4) is taken by an International Botanical Congress (IBC), with retroactive effect, and listed in the Appendices VI and VII of the *Code*, respectively. In other words, depending on the date of the request for a binding decision, it is usually necessary to wait from one to six years to have a final decision, with a retroactive effect. Therefore, if one wished to publish a replacement name (or name of a new taxon) for a name whose future use would be rendered impossible by either of these

decisions, one technically might have to publish a superfluous, illegitimate name that would then be retroactively made legitimate at the next Congress. This will seem unsatisfactory to many, as will the alternative of waiting up to six years to correct the nomenclature.

Since the Cambridge *Rules* of 1935 (Briquet, Int. Rules Bot. Nomencl., ed. 3. 1935), the implementation of a recommendation by the General Committee (GC) (or its predecessor) to conserve a name has been authorized pending its final approval by the IBC. In the Leningrad *Code* (Stafleu & al. in Regnum Veg. 97. 1978), the creation of a list of rejected names was authorized; because procedures for managing that process were not specified, initially the procedures used for conservation proposals were to be followed. In the following Sydney *Code* (Voss & al. in Regnum Veg. 111. 1983), Art. 15.1 specified that both retention and rejection of names were authorized following GC decisions, "subject to the decision of a later International Botanical Congress". The scientific community using the *Code* retains the right to make the ultimate decision through the IBC (see Div. III Prov. 5.4), but since rejection of GC recommendations is expected to remain extremely rare, it is beneficial for scientists to be allowed to begin implementing those decisions as soon as possible, including by taking actions such as publishing a legitimate replacement name for a name that will no longer be usable. That rule has been consistently maintained since. Most recently, the relevant articles were changed in the *Shenzhen Code* to clarify that the GC recommendation "takes effect on the date of effective publication (Art. 29–31) of the General Committee's approval" (on or after 1 Jan 1954 in the case of conservation; see Art. 14.15 and 56.3).

In a similar fashion, when the GC has approved a proposal for the suppression of a work under Art. 34.1, Art. 34.2 provides that "[…] suppression of that publication is authorized subject to the decision of a later International Botanical Congress (see also Art. 14.15 and 56.3) and takes retroactive effect". In that case, because the effect of the decision is retroactive, the exact date upon which the GC approved the recommendation is irrelevant and need not be specified.

We argue that it would be simpler and less confusing to have the same rule for all proposals (conservation, rejection and suppression of a work) and binding decisions, allowing the recommendations of the GC to be provisionally implemented as soon as they are available. There is no logical reason why the *Code* should not permit scientists to act upon the results of requests for binding decisions as promptly as they act in response to reported results of deliberations on proposals to conserve or reject names or to suppress a work.

After recent internal discussions and votes, several members of the GC decided to publish these proposals to change the *Code* to bring the rules for binding decisions in line with the rules for conserved and rejected names and suppression of works.

(218) Amend Art. 38.4 (new text in bold, deleted text in strikethrough):

"*38.4*. When it is doubtful whether a descriptive statement satisfies the requirement of Art. 38.1(a) for a "description or diagnosis", a request for a decision may be submitted to the General Committee, which will refer it for examination to the specialist committee for the appropriate taxonomic group (see Div. III Prov. 2.2, 7.9, and 7.10). A **General** Committee recommendation as to whether or not the name concerned is validly published **is to be treated as a binding decision subject to ratification by a later** ~~may then be put forward to an~~ International Botanical Congress **(see also Art. 14.15, 34.2, 53.4, and 56.3)** and~~, if ratified, will become a binding decision with~~ **takes** retroactive effect. These binding decisions are listed in App. VI."

(219) Amend Art. 53.4 (new text in bold, deleted text in strikethrough):

"*53.4*. When it is doubtful whether names or their epithets are sufficiently alike to be confused, a request for a decision may be submitted to the General Committee, which will refer it for examination to the specialist committee(s) for the appropriate taxonomic group(s) (see Div. III Prov. 2.2, 7.9, and 7.10). A **General Committee** recommendation **as to** whether or not to treat the names concerned as homonyms **is to be treated as a binding decision subject to ratification by a later** ~~may then be put forward to an~~ International Botanical Congress **(see also Art. 14.15, 34.2, 38.4, and 56.3)** and~~, if ratified, will become a binding decision with~~ **takes** retroactive effect. These binding decisions are listed in App. VII."

(220) Amend Div. III Prov. 5.4 (new text in bold, deleted text in strikethrough):

"*5.4*. When a vote to reject a General Committee recommendation achieves the required majority (Prov. 5.1(e) or (f)), that recommendation is cancelled and the matter is referred back to the General Committee. Retention or rejection of a name ~~or~~, suppression of a work**, or a binding decision on valid publication or homonymy** is no longer authorized (Art. 14.15, 56.3,~~ and~~ 34.2**, 38.4, and 53.4**)."

(221) Proposal to add a new Recommendation after Article 38, with the advice to report local/indigenous vernacular names (if available) of new taxa and to use such names, if appropriate, in scientific nomenclature

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Vernacular names and ethnobiological classifications of plants, fungi and other organisms form a valid ethnobotanical/ethnobiological system that is independent of, but at the same time complementary to, the system of scientific biological nomenclature (see Berlin, Ethnobiological Classification: Principles of Categorization of Plants and Animals in Traditional Societies. 2014; Heenan & al. in New Zealand J. Bot. 59: 291–322. 2021; McGlone & al. in New Zealand J. Bot. 60: 215–226. 2022; and references therein). However, many scientific (Latin/latinized) names of organisms are based on or derived from ancient Greek or Latin vernacular names (Stearn, Bot. Latin, ed. 3. 1983), while some other scientific names use vernacular names of organisms in other languages.

Wright & Gillman (in Taxon 71: 6–10. 2022; see also Gillman & Wright in Commun. Biol. 3: 609. 2020) proposed to amend the *International Code of Nomenclature for algae, fungi, and plants* (Turland & al. in Regnum Veg. 159. 2018) by allowing the retroactive replacement of scientific names and/or epithets of plants and other organisms in favour of "indigenous names", meaning vernacular names used by indigenous peoples. These ideas received much public attention and were discussed or criticized in several publications (see Knapp & al. in Taxon 69: 1409–1410. 2020; Heenan & al., l.c.; Palma & Heath in Bionomina 22: 32–38. 2021; McGlone & al., l.c.); see also detailed, critical comments by Mosyakin (in Taxon, 2022, https://doi.org/10.1002/tax.12837, and references therein).

However, we understand that for many people the recognition of traditional knowledge of plants, fungi, and algae and the reflection of local/indigenous vernacular names of those organisms in scientific nomenclature is indeed important. In partial response to these sentiments and concerns, we propose the following new Recommendation to be added after Art. 38.

(221) Add a new Rec. 38F, as follows:

"*38F.1*. When describing new taxa that have existing local or indigenous vernacular names, authors are advised to report these names and associated information on traditional knowledge in the protologue and, if appropriate and feasible, to use the local or indigenous vernacular names in forming the scientific names of new taxa."

The present proposal does not encourage any rejection or replacement of existing legitimate names with "indigenous" ones (as suggested by Wright & Gillman, l.c. and Gillman & Wright, l.c.). We strongly believe that Art. 51.1 of the *Code*, stating that "A legitimate name must not be rejected merely because it, or its epithet, is inappropriate or disagreeable, or because another is preferable or better known (but see Art. 56.1 and F.7.1), or because it has lost its original meaning", should remain in full force.

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(222) Proposal to amend Article 40.4 to avoid an unintended conflict with Article 40.2

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There appears to be a direct conflict between Art. 40.2 and 40.4 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) related to the indication of the type for valid publication of names published on or after 1 January 2007. Article 40.2 states "[…]

indication of the type as required by Art. 40.1 can be achieved by reference to an entire gathering, or a part thereof, **even if it consists of two or more specimens** […] [emphasis added]". In contrast, Art. 40.4 states "For the purpose of Art. 40.1, the type of a name of a new species or infraspecific taxon […] may be an illustration prior to 1 January 2007; **on or after that date, the type must be a specimen** (except as provided in Art. 40.5) [emphasis added]".

In our view, the emphasized language in Art. 40.4 is intended to make it clear that illustrations may not be types for names published after 2006. However, as written, it seems to provide a new rule that on and after 1 January 2007, a type may not be indicated by reference to an entire gathering that consists of more than one specimen, thereby limiting the application of Art. 40.2. In our view, this is not the intended meaning of Art. 40.4.

(222) Amend Art 40.4 as follows (new text in bold, deleted text in strikethrough):

"*40.4*. For the purpose of Art. 40.1, the type of a name of a new species or infraspecific taxon (fossils excepted: see Art. 8.5) may be an illustration prior to 1 January 2007; **for names published** on or after that date, the type ~~must be a specimen~~ **may not be an illustration** (except as provided in Art. 40.5)."

(223–224) Proposals to remove redundancy in Recommendation 40A concerning indication of type

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Recommendation 40A.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) advises "The indication of the nomenclatural type should immediately follow the description or diagnosis and should include the Latin word 'typus' or 'holotypus'." However, we have found that in many protologues Rec. 40A.1 has not been followed, including those published in reputable taxonomic periodicals. For example: *Campanula dersimensis* Fırat & Yıldırım (in Willdenowia 52: 170. 2022), *Chlorophytum delicatulum* Osborne & al. (in Kew Bull. 77: 677. 2022), *Croton nagaoi* Tagane & al. (in Phytotaxa 570: 102. 2022), *Eriolaena barnettiae* Dorr (in Taxon 70: 109. 2020), *Impatiens katjae* Nob. Tanaka & J.J. Verm. (in Novon 30: 56. 2022) and *Primula surculosa* Y. Xu & G. Hao (in PhytoKeys 212: 30. 2022). In our opinion, it matters little where the type is cited. In these instances, the types have been cited just after the name of the new species and before the diagnosis, and the indication of the type has used the English word "holotype" instead of the Latin "holotypus". Article 40.6 rules "For the name of a new taxon at the rank of genus or below published on or after 1 January 1990, indication of the type must include one of the words 'typus' or 'holotypus', or its abbreviation, or its equivalent in a modern language", and Rec. 40A.4 advises "Details of the type specimen of the name of a new species or infraspecific taxon should be published in the Latin alphabet." It therefore seems redundant, or at least archaic, to additionally recommend using the Latin word "typus" or "holotypus", and we propose that Rec. 40A.1 be deleted from the *Code*. Simultaneously, we propose to amend Rec. 40A.4 to make it explicit that the "details of the type specimen", which should be published in the Latin alphabet, include the words required by Art. 40.6.

(223) Delete Rec. 40A.1:

"~~*40A.1*. The indication of the nomenclatural type should immediately follow the description or diagnosis and should include the Latin word "typus" or "holotypus".~~"

(224) Amend Rec. 40A.4 (new text in bold):

"*40A.4*. Details of the type specimen of the name of a new species or infraspecific taxon**, including the words required by Art. 40.6,** should be published in the Latin alphabet."

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(225–226) Proposals to more clearly provide the date limitations in Article 41

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A taxonomist without much expertise in the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) seeking to publish a new combination might assume the most important rule would be set forth in Art. 41.1. In fact, the applicable rule is in Art. 41.5, which is not referenced in Art. 41.1. Because most users have little interest in the pre-1953 rules, Art. 41 should immediately direct the reader to Art. 41.5.

(225) Amend Art. 41.1 as follows (new text in bold):

"*41.1*. In order to be validly published, a new combination, name at new rank, or replacement name must be accompanied by a reference to the basionym or replaced synonym. (See Art. 6.10 and 6.11). **See Art. 41.5 for such names published on or after 1 January 1953.**"

Article 41.5 states that "On or after 1 January 1953, a new combination, name at new rank, or replacement name is not validly published" unless there is a full and direct bibliographic reference. As literally written, this would mean that new combinations etc. published before that date without a full and direct bibliographic reference would cease to be validly published on that date. Article 41.6 provides the correct formulation, i.e. "a name published on or after 1 January 1953".

(226) Amend Art. 41.5 as follows (new text in bold, deleted text in strikethrough):

"*41.5*. ~~On or after 1 January 1953, a~~ **A** new combination, name at new rank, or replacement name **published on or after 1 January 1953** is not validly published unless its basionym or replaced synonym is clearly indicated and a full and direct reference given to its author and place of valid publication, with page or plate reference and date (but see Art. 41.6 and 41.8). **In addition** ~~On or after 1 January 2007~~, a new combination, name at new rank, or replacement name **published on or after 1 January 2007** is not validly published unless its basionym or replaced synonym is cited."

Conforming changes are needed for Art. 41.3 and 41.8.

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(227) Proposal to permit a binding decision on whether or not an indirect reference to a basionym or replaced synonym is sufficient for valid publication of a name

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Recently, a proposal was published to amend the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) to permit a binding decision on valid publication under Art. 38.4 when it is doubtful whether an illustration with analysis is acceptable in place of a description or diagnosis (Prop. 076, Pastore & al. in Taxon 70: 456. 2021). Now we have a similar proposal to permit a binding decision on whether or not an indirect or cryptic reference to a basionym or replaced synonym is sufficient for valid publication. The *Code* has a number of provisions where an indirect reference to a previous publication can affect the valid publication of a name, e.g. Art. 38.12, 38.13, 40.3, 41.3 and 43.2.

According to Art. 41.3: "Before 1 January 1953 an indirect reference (see Art. 38.14) to a basionym or replaced synonym is sufficient for valid publication of a new combination, name at new rank, or replacement name." In some situations, the form in which such a

reference appears creates doubt as to whether it fulfils the requirement of Art. 41.3. This situation has no simple solution, and its subjectivity could lead to a name being considered validly published or not depending on the interpretation of the original publication. The case of *Polygala pubescens* Muhl. was comprehensively described by Pastore & Mota (in Phytotaxa 383: 125–127. 2018), where the authors argued that *P. pubescens* Muhl. was a replacement name for *P. senega* var. *rosea* Michx., because the name at new rank based on Michaux's name was preoccupied by *P. rosea* Desf. at the time. However, this interpretation has not been widely accepted. The alternative interpretation, that "*rosea*" was treated by Muhlenberg (Cat. Pl. Amer. Sept.: 63. 1813) as a variety of *P. pubescens*, a binomial that did not exist at that time, renders *P. pubescens* var. *rosea* (Michx.) Muhl. as not validly published. As regards "*Polygala pubescens* Muhl.", IPNI (https://www.ipni.org/ accessed 5 Feb 2023) provides the following remarks: "Muhlenberg published Polygala pubescens rosea Mx and thus indirectly referred to P. senega var. rosea Michx. Since P. pubescens remained invalid in 1813, var. rosea Muhl. was also invalidly published." This situation creates instability for some related names because *P. pubescens* Mart. (in Denkschr. Königl. Bot. Ges. Regensburg. 1(1): 185. 1815), a heterotypic synonym, is either an illegitimate later homonym or a correct name, and *P. pubescens* Nutt. (Gen. N. Amer. Pl. 2: 87. 1818) is either a later isonym or a later homonym.

Furthermore, there is no provision in the *Code* to resolve the issue as to whether or not something is a new combination, name at new rank or replacement name, and so a stalemate is reached. Therefore, we present a proposal to modify Art. 41 in order to permit, when it is unclear if a cryptic "indirect reference" satisfies Art. 41.3, the submission of a request for a binding decision to the General Committee.

(227) Add a new Article to Art. 41 as follows:

"*41.n*. When it is doubtful whether an author has satisfied the requirement of Art. 41.3 for an "indirect reference" to a basionym or replaced synonym, a request for a decision may be submitted to the General Committee, which will refer it for examination to the specialist committee for the appropriate taxonomic group (see Div. III Prov. 2.2, 7.9, and 7.10). A Committee recommendation as to whether or not the name concerned is validly published may then be put forward to an International Botanical Congress and, if ratified, will become a binding decision with retroactive effect. These binding decisions are listed in App. VI."

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(228–232) Proposals on orthography: Diacritical signs

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There appear to be two ways to read Art. 60.7 in the current *Shenzhen Code* (Turland & al. in Regnum. Veg. 159. 2018). The key question is where the diacritical signs are to be found. There was discussion (23–27 Aug 2021 at https://taxacom.markmail.org/) on the name *Eflugelia* after Erik Flügel, some authors having come to the conclusion that the diacritical sign needs "to be suppressed with the necessary transcription of the letters so modified", i.e. a correction of spelling would be required to *Efluegelia*. Given that this is a name established and correctly formed under the *International Code of Zoological Nomenclature* (*ICZN*; https://www.iczn.org/the-code/the-code-online/) for a taxon that has been treated as a fossil alga by some authors, such a correction would lead to alternate correct spellings of this generic name, depending on taxonomic placement. As a matter of principle, this is unsettling (the protologue shows that it is more complicated: the dedication is after "E. Flugel", but the protologue also mentions "Flügel"; compare Art. 60 Ex. 7).

The other and more sensible way to read Art. 60.7 is that it is the original spelling that matters: does a diacritical sign appear in the original spelling? If the original spelling is controlling, the spelling *Eflugelia*, selected by the author and composed of perfectly allowable letters, should be final. This interpretation is supported by the stated intent of Art. 60.1 and Art. 60.9 and by the history of Art. 60.7 (which were Recommendations IVc and XIc in the 1906, Vienna *Rules* [Briquet, Règles Int. Nomencl. Bot. 1906], deriving from Art. 27 of the 1867 *Lois* [Candolle, Lois Nomencl. Bot. 1867]). It would also be in line with the treatment by Art. 60.4 of "letters and ligatures foreign to classical Latin", which are only to be transcribed when they "appear in scientific names". A problem with this approach is that the phrasing of the first part of the second sentence of Art. 60.7 requires highly creative reading to be made to fit.

The languages of the world use various diacritical signs. It seems uncertain how many ways of "necessary transcription" there may exist for these diacritical signs. Is it really desirable that the *Code* should prescribe a one-size-fits-all manner in how to form a name from any word that holds a diacritical sign? Would it not be simpler to leave the choice with the author of the name and support this author with a Recommendation? And have the *Code* focus on correction afterwards, preferably as rarely as possible.

(228) Amend the second sentence of Art. 60.7 as follows (new text in bold, deleted text in strikethrough):

"*60.7*. Diacritical signs are not used in scientific names. When **such signs appear in the spelling of a name at valid publication** ~~names (either new or old) are drawn from words in which such signs appear~~, the signs are to be suppressed with the necessary transcription of the letters so modified; […]."

This is a minimalistic fix, so that, hopefully, the provision can be read only one way. This phrasing would put the responsibility of setting the spelling primarily with the author of the name. For comparison, the *ICZN* also has a provision dealing with diacritical signs that are present in an original spelling. That provision prescribes deletion of such signs (without transcription), except that in a name published before 1985 and based on a German word, any umlaut that is present in an original spelling is to be transcribed (Article 32.5.2.1). It seems indeed to be so that umlauts constitute most of the occurrences of diacritical signs.

(229) Rephrase the second sentence of Art. 60.7, so that it reads:

"*60.7*. […] When such a sign appears in the original spelling of a name, this sign is to be suppressed without transcription (*é*, *è*, *ê* become *e*; *ñ* becomes *n*), except a Germanic *ä*, *ö*, or *ü*, which is to be transcribed, to become, respectively, *ae*, *oe*, and *ue*; or the Scandinavian *å* or *ø*, which is also to be transcribed, to become, respectively, *ao* and *oe*."

[Current wording: "When names (either new or old) are drawn from words in which such signs appear, the signs are to be suppressed with the necessary transcription of the letters so modified; for example *ä, ö, ü* become, respectively, *ae*, *oe*, *ue* (not *œ* or *Œ*, see below); *é, è, ê* become *e*; *ñ* becomes *n*; *ø* becomes *oe* (not *œ*); *å* becomes *ao*."]

In case a more rigorous rewrite of Art. 60.7 would be acceptable, this phrasing would be more explicit, lessening the need for interpretation. It would establish that, once a name has been validly published, actual transcription (adding a new letter) is limited to just these five cases.

(230) Move the last sentence of Art. 60.7 to Art. 60.4.

The last sentence of Art. 60.7 deals with *æ* and *Œ*, two ligatures that were first adopted by medieval Latin. Therefore it concerns "ligatures foreign to classical Latin", meaning that this sentence fits seamlessly in Art. 60.4, which deals with "letters and ligatures foreign to classical Latin". By contrast, these two ligatures have nothing in common with diacritical signs, otherwise the topic of Art. 60.7. It may be worth considering a clarifying addition after "*æ* and *Œ*" such as "(first adopted in medieval Latin)".

(231) Add a new Example to Art. 60.7:

"*Ex. n*. The letter *å* to become *ao*. '*Forsskålea*' (dedicated to Peter Forsskål) is to be cited as *Forsskaolea* L. (Opobalsamum: 17. 1764), not as '*Forskohlea*', as done by Linnaeus (Mant. Pl.: 72. 1767), or as '*Forskalea*', as done by Jussieu (Gen. Pl.: 403. 1789)."

This is a classic case, and the reason that the *å*-to-become-*ao* was included in the *Code*.

(232) Add a new Recommendation to Art. 60 (perhaps after Rec. 60A or before, in or after Rec. 60E):

"*60(new)*. In forming names or epithets that are based on personal, geographical, or vernacular names or on other words, in which signs (such as diacritical signs or ligatures) or letters appear that do not belong to the twenty-six letters of the modern Latin alphabet (Art. 32.1(b)), authors should suppress or transcribe these signs or letters in conformity with modern nomenclatural usage (see also Art. 60.4 and 60.7)."

If Art. 60.7 is adjusted as proposed, it would be well to offer authors guidance on how to deal with diacritical signs, ligatures, etc. as may occur in various languages. It is better to prevent misformed names and epithets rather than to correct them afterwards (by Art. 60.4 and 60.7). As now phrased, Rec. 60E goes some way towards this, but it does not explicitly mention transcription and is limited to epithets. This last may be a historical accident; when proposing this to the Cambridge Congress of 1930, Valckenier Suringar (Prop. Rules Bot. Nomencl.: 3–6. 1929) intended it for names (Prop. Rec. B IVc) and epithets (Prop. Rec. VIIIbis); the proposed parallel Recommendation for names was rejected because of its supporting Examples, not its content (Briquet, Rec. Syn. Cambridge: 20, 23. 1930; Avis Préal. Cambridge: 9, 10. 1930).

(233–240) Proposals on orthography: Epithets honouring persons

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To eliminate a "back-door rule", Rec. 60C.1 in the *Melbourne Code* (McNeill & al. in Regnum Veg. 154. 2012) was moved into Art. 60.8 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), but in doing so the opening sentence was rewritten. The Shenzhen wording introduces several new issues, one of which is the added phrase "derived from personal names". This can be read variously, but could include any, or all, of the following: translations of personal names into Latin (or another language), anagrams of personal names (like *celiae* for Alice Leblanc), epithets based on initials (*armianus* from Anthony R. Mitchell) and personal names combined with another word (*chrisolum* for Chris Rodgerson and Latin "solus"; *arthurolfago* for Arthur Tischer, Rolf Rawé and Latin

"ago" from the verb "agere"). This wide interpretation has two problems: (1) it is not compatible with clauses (a)–(d) of Art. 60.8, which prescribe how a personal name is to be converted into an epithet by adding a termination (and which say nothing about words "derived from personal names") and (2) this would require several additional classes of epithets to be examined for correctability or require exceptions to be made to Art. 60.8, as was proposed for abbreviations of personal names (Prop. 186, McNeill & al. in Taxon 71: 1340–1341. 2022).

A second issue is the new blanket exception made for "personal names that are already in Greek or Latin or that possess a well-established latinized form". There are supposed to be two ways of forming specific or infraspecific epithets based on personal names. That is, as detailed in Art. 60.8(a)–(d) for modern names, or by regular Latin grammar (for personal names already in Greek or Latin and for personal names that have been properly latinized): an epithet based on Martius can be either *martiusii* (by Art. 60.8) or *martii* (by Latin grammar). The new blanket exception allows a user to read here that Martius is entirely excepted from the scope of Art. 60.8, so that epithets like *martiusi* or *martiusiensis* are allowable. Obviously this is not what is intended.

A further issue is that whether a latinization is acceptable (or not) is regulated by Art. 60.9. This does not recognize any such concept as a "well-established latinized form", but rather that of "intentional latinizations". Article 60.9 allows any (intentional) latinization (as long as it does not involve only the terminal letter, in which case restrictions apply), no matter if it is a well-established form or a one-of-a-kind effort, or anything in between. To make Art. 60.8 and 60.9 work well together it appears necessary to eliminate the "well-established latinized form" from the opening sentence of Art. 60.8 while also referring to Art. 60.9. The phrase "well-established latinized form" belongs in Rec. 60C.1, where it is placed in context.

(233) Rephrase the opening sentence of Art. 60.8 so that it reads:

"*60.8*. When a specific or infraspecific epithet is formed by adding a termination to a personal name (see Rec. 23A.1), this is done as follows (but see Art. 60.9 and Art. 60 Note 5):"

[Current wording: "*60.8*. The termination of specific or infraspecific epithets derived from personal names that are not already in Greek or Latin and do not possess a well-established latinized form (see Rec. 60C.1) is as follows:"]

The proposed phrasing fits Art. 60.8(a)–(d) and is close in intent to the opening sentence of Rec. 60C.1 of the *Melbourne Code* but uses "termination" rather than "Latin termination". This accords not only with the present phrasing but also with the provision starting "Terminations contrary […]" (the Melbourne Art. 60.12). That implies that terminations added to personal names are correctable, regardless of the language of the termination. As shown above, the Shenzhen listing of exceptions fails in several respects but is redundant anyway because the exceptions are explicitly ruled elsewhere: a listing of existing exceptions belongs in a Note rather than a rule.

(234) Provide the final (main text) paragraph of Art. 60.8 ("Terminations contrary […]") with its own number.

It would be helpful, for purposes of referring to it, if the provision that was the Melbourne Art. 60.12, now starting "Terminations contrary […]" would receive a separate number, just like it has had for decades. In its present form, Art. 60.8 is uncomfortably long. The same could apply to the final (main text) paragraph of Art. 60.10 ("Adjectival epithets not formed […]").

(235) Rephrase Art. 60.9 so that it reads:

"*60.9*. When the spelling of a name or epithet used at valid publication resulted from the intentional latinization of a personal, geographical, or vernacular name, this original spelling (Art. 60.2) is to be retained (Art. 60.1). Excepted from this are epithets formed from personal names when the latinization involves *(a)* only a termination to which Art. 60.8 applies, or *(b)* only *(1)* omission of the terminal vowel or terminal consonant or *(2)* conversion of the terminal vowel to a different vowel, for which the omitted or converted letter is to be restored."

[Current wording: "*60.9*. When changes in spelling by authors who adopt personal, geographical, or vernacular names in nomenclature are intentional latinizations, they are to be preserved, except, in epithets formed from personal names, when they concern *(a)* only a termination to which Art. 60.8 applies, or *(b)* personal names in which the changes involve only *(1)* omission of the terminal vowel or terminal consonant or *(2)* conversion of the terminal vowel to a different vowel, for which the omitted or converted letter is to be restored."]

In the opening sentence of Art. 60.9, the "by authors" is a remnant of "by earlier authors" present in this provision from the Stockholm *Code* (Lanjouw & al. in Regnum Veg. 3. 1952) up to the Berlin *Code* (Greuter & al. in Regnum Veg. 118. 1988), presumably intended to mark latinization as a practice from the past, not continuable in the present. This is out of place in a retroactive rule, so the "earlier" was removed; the remnant "by authors" has no function: all new names and epithets are formed by authors. The phrase "changes in spelling" here refers to the process of latinization of "personal, geographical, or vernacular names" and is confusing in a chapter on correct spellings of (scientific) names. Both elements can be eliminated without loss for a gain in clarity.

(236) Amend the last sentence of Art. 60 Note 5 so that it reads (new text in bold, deleted text in strikethrough):

"*Note 5*. […] Epithets **resulting from or** derived from ~~such~~ Latin translations ~~fall under Rec. 60C.1 and~~ are not subject to standardization under Art. 60.8**, although Rec. 60C.1 and 60C.2 may apply**."

In (pre-)Linnaean times, authors often adopted a Latin pen name for themselves (see Stearn, Bot. Latin, ed. 4: 282–284. 1992), including translating their name. To such Latin names, Rec. 60C.1 applies, as well as 60C.2: tradition has indeed turned these pen names into "names already in Greek or Latin, or that possess a well-established latinized form". But translations may have other causes: the epithet *nobilis* in *Wollemia nobilis* does not imply an intent to refer to a Latin personal name Nobilis. Similarly, the epithets in *Avonia mallei* (honouring Stephen A. Hammer) and *Byrsonima baccae* (honouring Paul E. Berry) are just wordplay, part of the freedom that an author has in forming an epithet.

(237) Add two Examples to Art. 60 Note 5:

"*Ex. n1. Melaleuca fabri* Craven (in Austral. Syst. Bot. 12: 876. 1999) honours Basil and Mary Smith, with *fabri* the translation into Latin of the name Smith, in the nominative plural, as a noun in apposition. This epithet was not formed by adding a termination to a personal name (Art. 60.8), but is just a translation to a Latin word. Although this practice is not recommended, the epithet is to be

accepted in its original spelling (and is not to be altered to "*fabrorum*")."

"*Ex. n2*. The epithet, in apposition, in *Crataegus spes-aestatum* J. B. Phipps (in Novon 16: 382. 2006) honours Bill Summers, one person, but the genitive plural ("*aestatum*") is not to be altered to the singular. The epithet is just a translation to Latin."

(238) Add a new rule to Art. 60 supported by two Examples:

"*60.9bis*. For a specific or infraspecific epithet formed from two or more parts, with the part in final position a personal name to which a termination is added, the provisions of Art. 60.8 and 60.9 apply equally to the part of the epithet formed from that personal name."

"*Ex. n1*. The epithet in *Vochysia hannekesaskiae* Marc.-Berti (in Pittieria 18: 7. 1989) is dedicated to the wife and two daughters of the author; in total three persons, two of whom are named Hanneke and one Saskia. Although such a practice is not recommended, this epithet is not to be altered, because the correct termination was added to the personal name Saskia (in final position), which refers to a single person. However, the epithet in *Qualea* '*hannekesaskiarum*' Marc.-Berti (in Pittieria 13: 5. 1986), dedicated to the two daughters of the author (i.e. Hanneke and Saskia), is to be corrected to the singular."

"*Ex. n2*. The epithet in *Cestrum* '*johnniegentrianum*' D'Arcy (in Ann. Missouri Bot. Gard. 60: 601. 1974) is composed of a given name and a surname ("Nomen Johannis L. Gentryi […] designatur"). The component in final position is a personal name, Gentry, to which a termination is added: the final part of the epithet is correctable and the name is to be cited as *Cestrum johnniegentryanum*."

It seems fairly clear that the spirit of Art. 60.8 is to standardize terminations of epithets, but its wording deals with converting personal names to epithets. This leaves a vacuum when an epithet is composed of more than just a personal name, especially if dedicated to several persons (in the proposed Example, no entity with the personal name "Hannekesaskia" exists, but separate persons with separate personal names do). Only a termination added to the personal name in final position should be correctable. The same applies to epithets composed of several personal names (e.g. given name + surname), in various permutations, and also to epithets combining a personal name with another word (*flos*-, etc.) or a prefix (*pseudo*-, *neo*-, etc.).

(239) Add a new Recommendation to Art. 60 supported by an Example:

"*60(new1)*. When dedicating a name to a person, authors should preferably form the new epithet by adding a termination to the personal name (surname, given name, or nickname) as described in Art. 60.8, unless Rec. 60C.1 or 60C.2 applies."

"*Ex. n*. An epithet such as that in *Verhulstia trisororum* Hern.-Rest. (in Persoonia 39: 449. 2017), dedicated to "the three sisters Jikke, Anoek and Elke Verhulst, who collected the soil sample from which the fungus was isolated", while perfectly permissible (and understandable here as it avoids the near-tautonym '*Verhulstia verhulstiarum*'), in general is not recommended as it does not signal that it honours persons."

As the *Code* stands, an author desiring to honour a person is in no way required to use Art. 60.8 in forming an epithet. However, a Recommendation to do so would be useful. Notwithstanding the freedom of authors to publish an epithet in any form they want when honouring a person, epithets formed by adding a termination to a personal name will, in general, be more effective in making clear the identity of the person(s) honoured by an epithet. For example, an epithet *amicorum*, used in modern times to honour a group of friends, while perfectly allowable, does not signal that it honours persons. Traditionally, the epithet *amicorum* is geographical in nature ("from the Friendly Islands" = from Tonga).

(240) Add a new Recommendation to Art. 60:

"*60(new2)*. When forming an epithet from a word derived from a personal name, such as an abbreviation of a personal name, an anagram, its initials, etc., authors should follow the Recommendations made in this *Code* for personal names as far as possible."

This could be supported by Examples of such cases as mentioned in the introduction (above) or those provided in Prop. 186 (McNeill & al., l.c. 2022).

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The *Etymological Dictionary of Succulent Plant Names* by Eggli and Newton was used to find epithets that were derived from personal names in uncommon ways.

(241) Proposal to amend Article H.11.1 by additionally allowing a combination of the name of a hybridogenous genus and a nothospecific epithet for naming a nothospecies of which the postulated or known parent species belong to different genera

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Under the present wording of Art. H.11.1 of the *International Code of Nomenclature for algae, fungi, and plants* (Turland & al. in Regnum Veg. 159. 2018), "The name of a nothospecies of which the postulated or known parent species belong to different genera is

a combination of a nothogeneric name with a nothospecific epithet." No other option for naming such bigeneric or multigeneric hybrids is mentioned in the *Code*, and therefore we think that Art. H.11.1 is restrictive rather than instructive, regardless of the initial intent of the authors of this nomenclatural provision.

While considering some problems of taxonomy and nomenclature of *Sorbus* L. s.l. (see, e.g., Mosyakin & al. in Taxon 71: 480–481. 2022), we noticed that, according to Art. H.11.1 as it stands now, the nothospecies name *Majovskya* ×*ambigua* (Decne.) Sennikov & Kurtto (in Memoranda Soc. Fauna Fl. Fenn. 93: 63. 2017) is incorrect because it is not "a combination of a nothogeneric name with a nothospecific epithet". The same is true for several other names of intergeneric hybrids placed by Sennikov and Kurtto in hybridogenous genera (see below). This conclusion is further supported by Art. H.11 Ex. 1, which states that the name *Heuchera* ×*tiarelloides* Lemoine & É. Lemoine (the basionym of ×*Heucherella tiarelloides* (Lemoine & É. Lemoine) H.R. Wehrh., the intergeneric hybrid that probably "originated from the cross between a garden hybrid of *Heuchera* L. and *Tiarella cordifolia* L.") is incorrect. We interpret the term "incorrect" used here as meaning "not correctly applicable to a particular taxon under a particular taxonomic concept". Non-compliance with Art. H.11 does not make a name illegitimate or not validly published.

Since *Majovskya* ×*ambigua* was considered by Sennikov & Kurtto (l.c.) to be a non-stabilized intergeneric hybrid (but not a hybridogenous species!) between *Chamaemespilus alpina* (Mill.) K.R. Robertson & J.B. Phipps (*Sorbus chamaemespilus* (L.) Crantz) and *Aria edulis* (Willd.) M. Roem. (*Sorbus aria* (L.) Crantz), its correct name under that taxonomic treatment should be a combination of a nothogeneric name, in this case ×*Chamaearia* Mezhenskyj (Netradytsiini Plodovi Kul'tury: 27. 2012 = *Chamaemespilus* Medik. × *Aria* (Pers.) Host) and the epithet "*ambigua*":

×***Chamaearia ambigua*** (Decne.) Mosyakin & McNeill, **comb. nov.** ≡ *Aria ambigua* Decne. in Nouv. Arch. Mus. Hist. Nat. 10: 165. 1874.

As it stands now, Art. H.11.1 *requires* the double generic nomenclature, with different nothogeneric and generic names for nothospecies and hybridogenous species, respectively, that resulted from the same intergeneric crosses. For example, those entities that originated from crosses between taxa of *Chamaemespilus* and *Aria* that are considered to be hybridogenous species should be placed in *Majovskya* Sennikov & Kurtto (l.c.: 63; a hybridogenous genus), while entities of the same origin considered to be nothospecies (hybrids) should be placed in ×*Chamaearia* (a nothogenus). By analogy, the hybrid *Normeyera* ×*hostii* (J. Jacq. ex Host) Sennikov & Kurtto (l.c.: 65), which "is not considered a constant taxon" (Sennikov & Kurtto, l.c.), under that taxonomic concept should be correctly placed not in the hybridogenous genus *Normeyera* Sennikov & Kurtto (l.c.: 64) but in the nothogenus ×*Chamariosorbus* Mezhenskyj (l.c.: 29; *Aria* × *Chamaemespilus* × *Sorbus*) and be called ×*Chamariosorbus hostii* (J. Jacq. ex Host) Mezhenskyj (l.c.: 29). Our further nomenclatural comments on intergeneric hybrids in *Sorbus* s.l. will be published separately (in preparation).

Considering this and some other similar cases, we propose the following amendment to Art. H.11.1. We also think that adding a new Example based on the case of *Majovskya* ×*ambigua* would be useful for illustrating the proposed amendment.

(241) Amend Art. H.11.1 as follows (new text in bold) and add a footnote and a new Example:

"*H.11.1*. The name of a nothospecies of which the postulated or known parent species belong to different genera is **either** a combination of a nothogeneric name with a nothospecific epithet **or a combination of a name of a hybridogenous genus[1] with a nothospecific epithet**."

[footnote] "[1] For the purposes of this *Code*, a hybridogenous genus is a genus that is derived from and has evolved from an intergeneric hybridization event or events and that contains one or more hybridogenous species, i.e. evolutionarily stabilized species that, although of hybrid origin, are regularly treated similarly to other species of non-hybrid origin; however, a hybridogenous genus may also contain hybrids (including intergeneric ones)."

"*Ex. 1bis. Majovskya* ×*ambigua* (Decne.) Sennikov & Kurtto (in Memoranda Soc. Fauna Fl. Fenn. 93: 63. 2017) is considered to have originated from the cross between *Chamaemespilus alpina* (Mill.) K. R. Robertson & J. B. Phipps and *Aria edulis* (Willd.) M. Roem. Sennikov & Kurtto (l.c.) treated it as a non-stabilized intergeneric hybrid (for which, however, the correct name is ×*Chamaearia ambigua* (Decne.) Mosyakin & McNeill in Taxon 72: 462. 2023) but placed it in a hybridogenous genus. Despite that, their combination is considered correct and acceptable under certain taxonomic treatments, e.g. if all crosses between *Chamaemespilus* Medik. × *Aria* (Pers.) Host are treated as belonging to a hybridogenous genus but not a nothogenus."

If our proposed amendment is adopted, the definitions of a hybridogenous genus and a hybridogenous species should be added to the Glossary.

Acknowledgements

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NOMENCLATURE COMMUNICATIONS

Taxon closed for proposals to amend the *Code* on 31 March 2023. Late submissions received until 30 June 2023 may be accepted at the editors' discretion if no reviewing or major editing is necessary. From 1 July 2023, no further submissions will be accepted.

(242–244) Proposals to clarify the use of the terms "name" and "designation" and add a definition of "potential name" (Articles 6.3, 12.1 and 38.4)

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Article 6.3 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) states "In this *Code*, unless otherwise indicated, the word 'name' means a name that has been validly published, whether it is legitimate or illegitimate". In many cases, "otherwise indicated" is implicit. We propose that Art. 6.3 state that the contrary usage may be implicit.

The *Shenzhen Code* sometimes uses the term "designation" to refer to a name that is not validly published. In the Glossary, the term "designation" appears as "*designation*. [Not defined] – the term used for what appears to be a name but that (1) has not been validly published and hence is not a name in the sense of the *Code* (Art. 6.3) or (2) is not to be regarded as a name (Art. 20.4 and 23.6) (see also *type designation*)." The term "designation" has two meanings in the *Shenzhen Code*: (1) a "name" that is actually not a name in the sense of the *Code* and (2) as defined in the Glossary under type designation, an explicit statement that establishes the type of a name. In at least one case, they are used in the same sentence. Article 40 Ex. 4 states: "'*Baloghia pininsularis*' was published by Guillaumin (in Mém. Mus. Natl. Hist. Nat., B, Bot. 8: 260. 1962) with two cited gatherings: *Baumann 13813* and *Baumann 13823*. Because the author failed to designate one of them as the type, the designation was not validly published. […]." Moreover, the two usages have different connotations: a type designation is generally an effective typification, whereas a designation in the other sense is not a validly published name.

The rules do not provide an appropriate term for a name/designation whose status has not yet been determined. For example, if an application is made to the General Committee to decide if a "descriptive statement" is a validating description or diagnosis (Art. 38.4), it is unknown if there is a name or a designation until the decision is made. While the rules already use phrases such as "intended name" or "intended new combination" (Art. 41 Ex. 25 and Art. 43 Ex. 1), those terms are always used for designations. We suggest the term "potential name" be used if the status has not been determined.

We offer the following proposals to introduce this new term and provide flexibility as to when it is used.

(242) Amend Art. 6.3 as follows, incorporating the definition of "designation" from the Glossary (new text in bold, deleted text in strikethrough):

"*6.3*. In this *Code*, unless ~~otherwise~~ **explicitly** indicated **or implicitly used otherwise**, the word "name" means a name that has been validly published, whether it is legitimate or illegitimate (see Art. 12; but see Art. 14.9 and 14.14). **The word "designation" is used for what appears to be a name but that *(1)* has not been validly published and hence is not a name in the sense of this *Code* or *(2)* is not to be regarded as a name (Art. 20.4 and 23.6). The term "potential name" may be used for what appears to be a name before its status as a name or designation has been determined.**"

In addition, we recommend that the Editorial Committee use "designation" as infrequently as possible when referring to a name that is not validly published, as opposed to a type designation. We prefer "name that has not been validly published" instead of "designation that has not been validly published."

(243) Amend the second sentence of Art. 38.4 as follows (new text in bold):

"*38.4*. […] A Committee recommendation as to whether or not the **potential** name concerned is validly published may then be put forward to an International Botanical Congress and, if ratified, will become a binding decision with retroactive effect. […]."

A statement to the effect that a name is not validly published, while technically correct because Art. 6.3 allows a name to be used as such "if indicated otherwise", is still somewhat contradictory. We prefer the following formulation.

(244) Amend Art. 12.1 as follows (new text in bold):

"*12.1*. A **potential** name of a taxon has no status under this *Code* unless it is validly published (see Art. 6.3; but see Art. 14.9 and 14.14)."

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(245–248) Proposals regarding rank-denoting terms (Articles 6, 21, 24 and 32)

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Presumably, all professional botanists are familiar with the four different categories of names – names of new taxa, new combinations, names at new rank, and replacement names. However, many might be surprised to learn the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) added a fifth kind of name. Article 6 Note 5 states "A new combination can at the same time be a name at new rank (comb. & stat. nov.); a nomenclatural novelty with a basionym need not be either of these." Example 13 illustrates this point: "*Centaurea jacea* subsp. *weldeniana* (Rchb.) Greuter, […] based on *C. weldeniana* Rchb. […], was not a new combination because *C. jacea* var. *weldeniana* (Rchb.) Briq. […] had been published previously; nor was it a name at new rank, due to the existence of *C. amara* subsp. *weldeniana* (Rchb.) Kušan […]; it was nevertheless a nomenclatural novelty."

Surprisingly, no provision in the *Shenzhen Code* addresses how to publish these names. One might assume that Art. 41 would apply, but that applies to new combinations, names at new ranks and replacement names; Art. 6 Note 5 makes clear that these names are none of those. Similarly, no provision in Art. 7 tells us the type of a name described in Art. 6 Note 5. Article 49 provides the correct author citation because it covers names with a basionym.

It is unclear how a Note, which is described as a clarification of an Article in the Preface of the *Shenzhen Code*, can create a new fifth kind of name. Finally, and most important, the very notion that a name other than a new combination or name at a new rank has a basionym is inconsistent with Art. 6.10, which in effect defines a basionym as the legitimate earlier name upon which a later new combination or name at a new rank is based.

One could solve these problems by converting Note 5 into an Article, and further state that names covered by this new Article are treated as new combinations or names at new ranks for purposes of Art. 7 and 41 (and perhaps other Articles) even though they are not new combinations or names at new ranks. Apart from that statement seeming rather incredible, why are these names not new combinations or names at new ranks? Nothing in Art. 6 provides an explanation.

The presumable rationale for Art. 6 Ex. 13 is set forth in Art. 24. Article 24.1 states "The name of an infraspecific taxon is a combination of the name of a species and an infraspecific epithet. A connecting term is used to denote the rank." In turn, Art. 24 Note 2 (which appears after Art. 24.4, not Art. 24.1) clarifies that "Names of infraspecific taxa within the same species, even if they differ in rank, are homonyms if they have the same final epithet but are based on different types (Art. 53.3), **because the rank-denoting term is not part of the name.**" [Emphasis added.] Similar language appears in Art. 21 Note 1 pertaining to names of subdivisions of the same genus. However, the emphasized language does not appear in Art. 53.3. It therefore appears that this emphasized language adds a new rule, as opposed to clarifying a rule. This raises a question as to whether the Note should be converted into an Article, or the emphasized language should be deleted.

In our view, the statement that the rank-denoting term is not part of the name makes little sense. For example, the rank-denoting term is not ignored for purposes of determining priority – see Art. 11 Ex. 3. If the rank-denoting term is ignored, it would seem appropriate to treat *C. jacea* subsp. *weldeniana* (Rchb.) Greuter and *C. jacea* var. *weldeniana* (Rchb.) Briq. as isonyms. After all, Art. 53.3 provides they would be homonyms if based on different types. The two names fit the definition of isonym (the same name based on the same type) perfectly if the rank-denoting term is ignored. As isonyms, the latter of the two names has no nomenclatural status under Art. 6 Note 2.

The rationale of Art. 53.3 is best explained by Art. 53.2, which provides that two names based on different types are homonyms if they "are so similar that they are likely to be confused". Similarly, permitting two identical names, except for their infraspecific rank, to be legitimate if they are based on different types would be immensely confusing. In contrast, there is little confusion if two names are spelled the same, except for their infraspecific rank, and are based on the same type. This should make it clear that the rationale behind Art. 53.3 is not that the rank-denoting term is not part of the name, as expressed in Art. 24 Note 2.

Based on the comments above, we present the necessary changes as follows.

(245) Amend Art. 6 Note 5 as follows and delete Art. 6 Ex. 13 (deleted text in strikethrough):

"*Note 5*. A new combination can at the same time be a name at new rank (comb. & stat. nov.)~~; a nomenclatural novelty with a basionym need not be either of these~~."

"~~*Ex. 13. Centaurea jacea* subsp. *weldeniana* (Rchb.) Greuter, "comb. in stat. nov." (in Willdenowia 33: 55. 2003), based on *C. weldeniana* Rchb. (Fl. Germ. Excurs.: 213. 1831), was not a new combination because *C. jacea* var. *weldeniana* (Rchb.) Briq. (Monogr. Centaurées Alpes Marit.: 69. 1902) had been published previously; nor was it a name at new rank, due to the existence of *C. amara* subsp. *weldeniana* (Rchb.) Kušan (in Prir. Istraž. Kral. Jugoslavije 20: 29. 1936); it was nevertheless a nomenclatural novelty.~~"

(246) Amend Art. 21 Note 1 as follows (deleted text in strikethrough):

"*Note 1*. Names of subdivisions of the same genus, even if they differ in rank, are homonyms if they have the same epithet but are based on different types (Art. 53.3)~~, because the rank-denoting term is not part of the name~~."

(247) Amend Art. 24 Note 2 as follows (deleted text in strikethrough):

"*Note 2*. Names of infraspecific taxa within the same species, even if they differ in rank, are homonyms if they have the same final epithet but are based on different types (Art. 53.3)~~, because the rank-denoting term is not part of the name~~."

Article 32 Note 1 states "The use of typographical signs, numerals, or letters of a non-Latin alphabet in the arrangement of taxa (such as Greek letters α, β, γ, etc. in the arrangement of varieties under a species) does not prevent valid publication because rank-denoting terms and devices are not part of the name." It is also desirable to delete the statement about rank-denoting terms here. Article 32.1(b) states that a name must "be composed only of letters of the Latin alphabet, except as provided in Art. 23.3, 60.4, 60.7, and 60.11–14". The statement in Art. 32 Note 1 provides an exception that is more appropriately stated in an Article.

(248) Move Art. 32 Note 1 to the end of Art. 32.1 and amend it as follows (new text in bold, deleted text in strikethrough):

"*32.1*. In order to be validly published, a name of a taxon (autonyms excepted) must: *(a)* be effectively published (Art. 29–31) on or after the starting-point date of the respective group (Art. 13.1 and F.1.1); *(b)* be composed only of letters of the Latin alphabet, except as provided in Art. 23.3, 60.4, 60.7, and 60.11–14; and *(c)* have a form that complies with the provisions of Art. 16–27 (but see Art. 21.4 and 24.4) and Art. H.6 and H.7 (see also Art. 61). ~~The~~ **However, the** use of typographical signs, numerals, or letters of a non-Latin alphabet in the arrangement of taxa (such as Greek letters α, β, γ, etc. in the arrangement of varieties under a species) does not prevent valid publication~~ because rank-denoting terms and devices are not part of the name~~."

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(249–252) Miscellaneous proposals to address inconsistencies in the *Code*

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These miscellaneous proposals address minor inconsistencies in various provisions of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018).

Article 7.9 provides that names with starting-points after 1753 are typified by "an element selected from the context of its valid publication […]". Yet Art. 9 Note 2 states that "only elements from the context of the protologue" are original material if Art. 7.9 applies. The latter seems preferable.

(249) Amend Art. 7.9 as follows (new text in bold, deleted text in strikethrough):

"*7.9*. A name of a taxon assigned to a group with a nomenclatural starting-point later than 1 May 1753 (see Art. 13.1) is to be typified by an element selected from the context of its **protologue** ~~valid publication~~ (Art. 32–45)."

Article 11.1 states "Each family or lower-ranked taxon with a particular circumscription, position, and rank can bear only one correct name." However, Art. 11.3 and 11.4 describe the correct name without regard to the circumscription of the taxon.

(250) Amend Art. 11.3 and 11.4 as follows (new text in bold, deleted text in strikethrough):

"*11.3*. For any taxon ~~from~~ **with a particular circumscription at the rank of** family to genus, inclusive, the correct name is the earliest legitimate one with the same rank, except in cases of limitation of priority by conservation or protection (see Art. 14 and F.2) or where Art. 11.7, 11.8, 19.4, **19.5,** 56, 57, F.3, or F.7 apply."

"*11.4*. For any taxon **with a particular circumscription** below the rank of genus, the correct name is the combination of the final epithet of the earliest legitimate name of the taxon at the same rank, with the correct name of the genus or species to which it is assigned, except […]."

Article 31.1 states that "The date of effective publication is the date on which the printed matter or electronic material became available as defined in Art. 29 and 30." Not only is there no definition of "became available", but the rules in Art. 29 and 30 do not even use the term "available" (although three Examples do: Art. 29 Ex. 3 and 4 and Art. 31 Ex. 4). Instead, Art. 29 and 30 generally use the word "distributed".

(251) Amend Art. 31.1 as follows (new text in bold, deleted text in strikethrough):

"*31.1*. The date of effective publication is the date on which the printed matter or electronic material ~~became available~~ **is first distributed as an effective publication in accordance with** ~~as defined in~~ Art. 29 and 30. In the absence of proof establishing some other date, the one appearing in the printed matter or electronic material must be accepted as correct."

Article 52.1 states that a name is illegitimate "if it was nomenclaturally superfluous when published, i.e. if the taxon to which it was applied, as circumscribed by its author, definitely included the type […] of a name that ought to have been adopted […] under the rules […]." This is hardly helpful to an inexperienced user of the rules. In marked contrast, Turland (The Code Decoded: 64. 2019, https://doi.org/10.3897/ab.e38075) explicitly states "The rules on priority (Art. 11.3 and 11.4) decide which name or epithet ought to have been adopted."

(252) Amend Art. 52.1 as follows (new text in bold, deleted text in strikethrough):

"*52.1*. A name, unless conserved (Art. 14), protected (Art. F.2), or sanctioned (Art. F.3), is illegitimate and is to be rejected if it was nomenclaturally superfluous when published, i.e. if the taxon to which it was applied, as circumscribed by its author, definitely included the type (as qualified in Art. 52.2) of a name that ought to have been adopted, or of which the epithet ought to have been adopted, under **Art. 11** ~~the rules~~ (but see Art. 52.4 and F.8.1)."

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(253) Proposal to clarify the option in Art. 7.11 for equivalency to "here designated"

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Article 7.11 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) defines several criteria that must be satisfied for effective designation of a type for a name at or below the rank of genus in the absence of a holotype or original type. Two of these requirements stipulate that the typifying author must employ specific language to achieve this. They must include "the term 'type' (typus) or an equivalent" and, after 1 January 2001, they must include "the phrase 'designated here' (hic designatus) or an equivalent". Both of these requirements allow "equivalent" terms or phrases to substitute for the stipulated word(s), and this can lead to differing interpretations as to what is, or is not, considered "equivalent". By its definition, to be "equivalent" something must be (as a noun), or have the property of being (as an adjective), equal to something else in value, amount, function, meaning, etc. (Oxford Languages, https://www.google.com/search?as_epq=equivalent).

This word is widely used elsewhere in the body of the *Code*, some 30 times under other Articles, in 24 instances (e.g. Art. 8.2: "equivalent preparation"; Art. 10.1: "full equivalent of its type"; also Art. 19.4: "equivalent to that type"; Art. 22.2: "equivalent to exclusion of the type"; Art. 52 Note 3: "equivalent to citation of the name itself"; Art. F.3 Note 2: "equivalent to original material"; Art. H.6.1: "equivalent to a condensed formula"; etc.) specifying what is to be considered equivalent in meaning or effect to something defined elsewhere in this or another *Code*. A single case (Art. 11.9: "equivalent rank") is clear enough and requires no further comment. In four remaining cases, which, as in Art. 7.11, likewise stipulate that a specific term must be used, the *Code* provides further guidance on what the employed equivalent term should be (Art. 16 Note 1: "their equivalents in modern languages"; Art. 9.23 & 40.6: "its abbreviation, or its equivalent in a modern language"). This implies that to include a term equivalent to "type", the term employed must either be an appropriate abbreviation or be linguistically equivalent, i.e. have the same meaning in another language. Its lack of linguistic equivalence may be the reason *Ex. 16 under Art. 7.11 ("'standard species' […] treated as equivalent to 'type'") became a voted Example.

Under Art. 7.11, Ex. 12 suggests that only a "linguistic equivalent" can replace the phrase "designated here" in the last part of the Article. There are other English expressions, or their equivalents in other modern languages, that would seem to easily meet this criterion, such as "selected here", "chosen here" or "established here", which imply an active step having been taken by an author to designate a type in that place. But what about more passive phrases like

"indicated here" or "delineated here"? As pointed out by Turland & al. (in Taxon 69: 626–627. 2020) the *Code* itself makes a distinction between a type designation and a type indication, the latter lacking the explicit nature of the former, so should these be equivalent phrases? And what about active phrases having slightly different meaning, such as "accepted here", or in the case of a second- or later-step typification a phrase like "restricted here" or "narrowed here", or when a previous typification was imprecise: "clarified here" or "detailed here"? Or phrases like "altered here", "corrected here", "modified here" or "superseded here" when the previous typification was ineffective or improper?

Given the plausible acceptability of many alternative phrases that might not be considered equivalent to "designated here", what seems to be necessary in order to determine if a type designation has been achieved on or after 1 January 2001 is the author's usage of some expression that will demonstrate their clear intent to carry out an act of typification in that place. This reflects the Rapporteurs' comment (Greuter & Hawksworth in Taxon 48: 75. 1999) on the original proposal that it "would eliminate for the future the risk of 'incidental type designations' which has often caused difficulties in the past". We therefore propose the following amendment:

(253) Amend Art. 7.11 as follows (new text in bold, deleted text in strikethrough):

"*7.11*. For purposes of priority (Art. 9.19, 9.20, and 10.5), designation of a type is achieved only if the type is definitely accepted as such by the typifying author, if the type element is clearly indicated by direct citation including the term "type" (typus) or an equivalent, and, on or after 1 January 2001, if the typification statement includes the phrase "designated here" (hic designatus) or ~~an equivalent~~ **a similar expression demonstrating the author's intent to designate a type there**."

(254) Proposal to add a new Recommendation 7A.2 to suggest deposition of holotypes in herbaria, collections or institutions within the native geographical distribution of any new taxon

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The *Code* strongly recommends that material upon which new taxa are based be placed in public collections to enable examination by future generations of researchers (Rec. 7A.1, Turland & al. in Regnum Veg. 159. 2018). National regulations post-Convention on Biological Diversity (https://www.cbd.int/) and Nagoya Protocol often require types of new taxa to be placed in national collections, but recent work has shown that this is far from the case (Nicholson & al. in Plants, People, Planet, in press).

National requirements for permission to collect and export material are often silent on any requirement for deposition of types. For example, Brazilian law states that export of collected material is only allowed with a Material Transfer Agreement (MTA) with a registered institution, the consequence being that after 2015 material must be left in a Brazilian institution (Decreto nº 8.772, de 11 de Maio de 2016; https://www2.camara.leg.br/legin/fed/decret/2016/decreto-8772-11-maio-2016-783077-norma-pe.html). The MTA associated with export of biological material in Indonesia specifies that material remains the property of an Indonesian institution (https://jdih.maritim.go.id/en/peraturan-menteri-lingkungan-hidup-dan-kehutanan-no-p2menlhksetjenkum112018-tahun-2018). Nevertheless, permits issued by some nations (in this example Peru, with permit number 084-2012-AG-DGFFS-DGEFFS to Sandra Knapp & al. in 2012) stipulate that all unicate material and holotypes are only allowed to be exported as loans ("Los ejemplos únicos de los grupos taxonómicos colectados y holotipos, sólo podrán ser exportandos en calidad de préstamo"). This effectively requires the describer of a new taxon to deposit the holotype in the country issuing the permit if the type gathering has been collected by that person under the auspices of that particular permit.

When a new taxon is described from older material or from material not collected by the describer, it can be difficult to find information about specimens in relevant herbaria. It is also worth recognizing that searching for specimens in herbaria where foreign collectors leave duplicates, sometimes without the resources to mount, file and digitize, can be time consuming and a burden on curators. This should not, however, deter researchers from making the effort to find duplicates deposited in national collections to designate as holotypes (see Aubriot & Knapp in PhytoKeys 198: 182–183. 2022; Knapp in PhytoKeys 209: 65. 2022). There is a fine balance to be struck, but we feel it is important to at least try to place holotype specimens near

where taxa natively occur, even when not stipulated by national requirements.

To explicitly recommend best practice that is increasingly becoming national legislation, we propose a new Recommendation as follows:

(254) Add a new Recommendation to Rec. 7A:

"*7A.2*. Insofar as possible the herbarium, collection, or institution in which the holotype is deposited should be within the native geographical distribution of the taxon."

(255–257) Proposals to clarify the meaning of "author" in Article 9.4 and exempt Article 7.8 from applying to names untypified before 2026

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While the definition of "original material" in Art. 9.4 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) is relatively easy to apply if the author of the name is also the author of the description and/or diagnosis of the taxon, it is quite difficult if they are different. Article 9.4 states: "For the purposes of this *Code*, original material comprises the following elements: *(a)* those specimens and illustrations (both unpublished and published prior to publication of the protologue) that **the author** associated with the taxon, and that were available to **the author prior to, or at the time of, preparation of the description, diagnosis, or illustration with analysis** (Art. 38.7 and 38.8) validating the name; *(b)* any illustrations published as part of the protologue; *(c)* the holotype and those specimens which, even if not seen by **the author of the description or diagnosis validating the name**, were indicated as types (syntypes or paratypes) of the name at its valid publication; and *(d)* the isotypes or isosyntypes of the name irrespective of whether such specimens were seen **by either the author of the validating description or diagnosis or the author of the name** (but see Art. 7.8, 7.9, and F.3.9)" [emphasis added].

Whereas Art. 9.4(c) and (d) refer explicitly to the author of the description or diagnosis or of the name, Art. 9.4(a) does not specify which author is meant when it states "that **the author** associated with the taxon, and that were available to **the author prior to, or at the time of, preparation of the description or diagnosis**" [emphasis added]. This seemingly leaves us to assume that "the author" means the author of the name, as would be determined in accordance with Art. 46. However, as recently as the *Melbourne Code* (McNeill & al. in Regnum Veg. 154. 2012), this portion read: "*(a)* those specimens and illustrations (both unpublished and published either prior to or together with the protologue) upon which it can be shown that the description or diagnosis validating the name was based", a passage that made no mention of an author and had remained unchanged through four *Codes* from its first inclusion in a footnote to Art. 9 of the *Tokyo Code* (Greuter & al. in Regnum Veg. 131. 1994).

The change in this wording in the *Shenzhen Code* came about as a result of Prop. 367 (McNeill & al. in Taxon 65: 1189. 2016), which sought to remove what was perceived as a faulty interpretation that "only if such a specimen also exhibits some character included in the description or diagnosis can it be 'shown' to be part of the basis for that description or diagnosis" and therefore be original material. There was clearly no intent in that proposal to eliminate from being original material any specimens that had been used in the preparation of the description or diagnosis, yet the ambiguous usage of "the author" has done just that in cases where the author of the name differs from that of the description or diagnosis. We are left with the absurd situation that if a name was validly published solely by reference to a description or diagnosis **in an earlier publication**, its original material would mostly consist only of material available to the earlier author under Art. 7.8, but if the description or diagnosis validating the name **in the same publication** was prepared by and ascribed to someone different from the publishing author, any specimens used to prepare the description or diagnosis but not available to the publishing author would not be original material.

In our view, the unfortunate and ambiguous reference to "the author" in Art. 9.4(a) of the *Shenzhen Code* has unwittingly altered the delineation of original material from its previous content. A specimen used in the preparation of the description or diagnosis that was unquestionably original material before the *Shenzhen Code* is no longer always so. To address this situation, we propose that the specimens and illustrations used by either person be treated as original material. Given the recentness of this change to the rules, little disruption to nomenclature is expected from this proposal, and any neotypes designated under the *Shenzhen Code* from specimens used in preparing the validating description or diagnosis could instead become lectotypes under Art. 9.10 (see Kirkbride & Wiersema in Taxon 71: 1306. 2022).

There are other related concerns. Article 9.4 does not currently address the possibility that the author of the publication may not be

the author of the name or description (see Art. 46.2). Take the cases of *Sisymbrium myriophyllum* Humb. & al. ex/in Candolle (Syst. Nat. 2: 477. 1821), with the name ascribed to "Humb. Bonpl. et Kunth", a diagnosis to Willdenow, and a description to Bonpland; or *Nicotiana repanda* Willd. ex/in Lehmann (Gen. Nicot. Hist.: 40. 1818), with a diagnosis and description of Lehmann together with the name and a brief diagnosis ascribed to Willdenow; or *Erythrina mulungu* Mart. ex/in Bentham (in Martius, Fl. Bras. 15(1): 173. 1859), with the name and part of the description ascribed to Martius, a diagnosis and the remaining description supplied by Bentham. In such cases, the publishing author may have contributed to the description (and in fact designated or cited other specimens unknown to the author of the name). Article 9.4 should be modified to account for any specimens or illustrations associated with all of these persons.

In addition, Art. 9.4 does address the possibility that the author of the name may be different from the author of the description. While Art. 46 defines the person who is the "author of the name", it generally does not use the term "author of the description". Instead, Art. 46 refers to the person to whom the description or diagnosis is ascribed. For consistency, it is preferable that Art. 9.4 use the terms "publishing author" (sensu Art. 46.6) and "other author(s) to whom the description or diagnosis is ascribed" (sensu Art. 46.3) rather than the author of the name and author of the description or diagnosis, as well as limit the designation of original material only to those persons, besides the publishing author, to whom either the description or diagnosis may have been ascribed. Because it may not be clear to users that one of these two persons is always the author of the name, we propose a brief note to that effect.

Article 9.4(c) and (d) state that holotypes, syntypes, paratypes, isotypes and isosyntypes are original material. Those terms are defined in Art. 9 without mentioning whether they were (or were not) seen by the author. For that reason, the language in Art. 9.4(c) and (d) that they need not be seen by various authors is unnecessary and possibly confusing. Wisnev (in Taxon 72: 446. 2023, Prop. 202) proposed a new Note to address this matter. The same approach is used here with the appropriate changes in terminology.

(255) Amend Art. 9.4 as follows (new text in bold, deleted text in strikethrough):

"*9.4*. For the purposes of this *Code*, original material comprises the following elements: *(a)* those specimens and illustrations (both unpublished and published ~~prior to publication of the protologue~~) that ~~the author~~ **were** associated with the taxon **by**, and that were available to**, *(1)* the publishing** author**(s)** prior to, or at the time of, **publication of the protologue or *(2)* other authors(s) to whom the description or diagnosis may have been ascribed (or unequivocally associated) prior to, or at the time of,** preparation of the description, diagnosis, or illustration with analysis (Art. 38.7 and 38.8) validating the name; *(b)* any illustrations published as part of the protologue; *(c)* the holotype and those specimens which ~~even if not seen by the author of the description or diagnosis validating the name,~~ were indicated as types (syntypes or paratypes) of the name at its valid publication; and *(d)* the isotypes or isosyntypes of the name ~~irrespective of whether such specimens were seen by either the author of the validating description or diagnosis or the author of the name~~ (but see Art. 7.8, 7.9, and F.3.9)."

(256) Add the following new Note after Art. 9.4:

"*Note n*. Under Art. 46, the author(s) of a name are either the publishing author(s) (or at least one of them) or the person(s) to whom the name is ascribed (or unequivocally associated). A specimen or illustration need not be seen by either the publishing author(s) or the person(s) to whom the description or diagnosis is ascribed (or unequivocally associated) in order to be original material under Art. 9.4(c) or 9.4(d)."

The foregoing proposals raise a further question regarding the original material of a name falling under Art. 7.8. Article 7.8 states in full: "A name of a new taxon validly published solely by reference to a previously and effectively published description or diagnosis (Art. 38.1(a)) (and not by a reproduction of such a description or diagnosis) is to be typified by an element selected from the entire context of the validating description or diagnosis, unless the validating author has definitely designated a different type, but not by an element explicitly excluded by the validating author (see also Art. 7.9)." While "entire context" is not defined, it suggests that elements cited or used by the publishing author, unless explicitly designated as types, are not original material unlike those cited (or perhaps used) by the author who prepared the validating description or diagnosis.

We question whether the original material of a name should differ in cases where an author simply refers to an earlier description or diagnosis as opposed to reproducing it. While we do not wish to introduce any instability for names that have already been typified under Art. 7.8, we see little merit in limiting original material for those names that have not yet been typified. As discussed above, we view these names as jointly authored, and their original material should be considered in that light. To address this situation, we propose adding a new sentence to Art. 7.8.

(257) Add the following new sentence at the end of Art. 7.8:

"*7.8*. […] However, if the name is first typified on or after 1 January 2026, the original material is to be determined in accordance with Art. 9.4 without regard to the preceding sentence."

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(258–260) Proposals to eliminate contradiction between Articles 11.7 and 11.8 and to equate non-fossil with fossil names of dinophytes for purposes of priority

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The purpose of naming organisms is to provide a means of reference to enable exchange of information about those organisms. A universally understood, precise and stable system of naming is therefore essential for effective scientific communication. Principle III and IV of the *Shenzhen Code* ("*Code*": Turland & al. in Regnum Veg. 159. 2018) state that "the nomenclature of a taxonomic group is based upon priority of publication" and that there is "only one correct name, the earliest that is in accordance with the rules, except in specified cases". Only few exceptions are made from these Principles, such as separate names for different organs of fossil-taxa (Art. 11.1).

The *Code* distinguishes between the two categories "non-fossil" and "fossil" and has developed different rules and provisions regarding starting-points (Art. 13) or priority (Art. 11). Primarily, Art. 11.7 and 11.8 of the *Code* regulate the priority of scientific names considering non-fossil taxa and fossil-taxa. The genesis of their contemporary wording is intricate. In the *Tokyo Code* (Greuter & al. in Regnum Veg. 131. 1994), there was only an equivalent to the current Art. 11.8 and in the *Saint Louis Code* (Greuter & al. in Regnum Veg. 138. 2000), there was only an equivalent to the current Art. 11.7 (and the Art. 11.8 equivalent became a Note, i.e. not binding rule in itself). In the *Tokyo Code*, also the term "algae" was restricted to "diatoms" and in the *Vienna Code* (McNeill & al. in Regnum Veg. 146. 2006), both Art. 11.7 and 11.8 were established. We found that the polyphasic changes have resulted in contradicting statements in these Articles (see below).

Many microalgae such as the dinophytes are characterized by different, morphologically distinct developmental stages during their life history. It frequently includes a flagellated, motile stage and a coccoid stage broadly interpreted as a resting and/or dormancy cell ("cyst": Stein, Organism. Infusionsthiere 3(2). 1883; Stosch in Brit. Phycol. J. 8: 105–134. 1973; Dale in Fryxell, Survival Strategies of Algae: 69–136. 1983; Pfiester & Anderson in Taylor, Biology of Dinoflagellates: 611–648. 1987; Fensome & al., Classification of Living and Fossil Dinoflagellates. 1993; Bravo & Figueroa in Microorganisms 2: 11–32. 2014). Some of these coccoid cells can be embedded into sediments and eventually fossilize there. It is worthy to note that flagellated cells of dinophytes are usually, though not necessarily, associated with the non-fossil category and coccoid cells usually, though not necessarily, with the fossil category.

The different habitats in which flagellated and coccoid cells of dinophytes occur (and the fact that flagellated cells of dinophytes usually do not fossilize) make it not always easy to recognize the link between different life-history stages of the same species (so called "cyst-motile" relationships). However, many such relations have been clarified in the past (e.g. †*Calciodinellum operosum* Deflandre: Montresor & al. in J. Phycol. 33: 122–131. 1997; †*Posoniella tricarinelloides* (G. Versteegh) Streng & al.: Gu & al. in Protist 164: 583–597. 2013; †*Dapsilidinium pastielsii* (R.J. Davey & G.L. Williams) J.P. Bujak & al.: Mertens & al. in Geology 42: 531–534. 2014), and more will be elucidated in future by ongoing research. Therefore, there is no reason to express independence between flagellated and coccoid stages taxonomically and nomenclaturally as well. We propose here to treat dinophytes like the diatoms with respect to priority of those names published first, irrespective of the non-fossil or the fossil category, with the following changes to the *Code*.

(258) Delete Art. 11.7:

"~~*11.7.* For purposes of priority, names of fossil-taxa (diatom taxa excepted) compete only with names based on a fossil type.~~"

Generally this Article is superfluous because priority is clearly regulated in the *Code*, which means that if only fossil names are available, they compete with each other. Due to the various changes of the *Code* over the decades, the phrasings of Art. 11.7 and 11.8 have also become contradictory. If (Art. 11.8) "names of organisms […] based on a non-fossil type are treated as having priority over names […] based on a fossil type […]" is true, then (Art. 11.7) "names of fossil-taxa […] compete only with names based on a fossil type [for purposes of priority]" cannot be true at the same time (with the emphasis on "only" – without that word, Art. 11.7 would be a matter of course). Therefore, the two phrasings are mutually exclusive. In order to avoid contradicting rules in the *Code* and redundancy with, for example, the Principles and Art. 11.1, we propose to delete Art. 11.7 including

both Examples (Ex. 29 and 30) and without replacement, returning to the concept of the *Tokyo Code*.

(259) Delete Ex. 30 from Art. 11:

"~~*Ex. 30*. Reid (in Nova Hedwigia 29: 429–462. 1977) indicated that his new fossil-species *Votadinium calvum* was the resting cyst of the non-fossil dinoflagellate *Peridinium oblongum* (Auriv.) Cleve (in Kongl. Svenska Vetensk. Acad. Handl., n.s., 32(8): 20. 1900). *Votadinium calvum* can be used as the correct name for the cyst fossil-species because it has a fossil type and therefore does not compete for priority with *P. oblongum*.~~"

The example of *Votadinium calvum* P.C. Reid (in Nova Hedwigia 29: 444. 1977) is unfortunate. The type of the name is a coccoid cell from recent sediments and it is therefore a non-fossil taxon, not fossil as claimed by Head & al. (in Taxon 65: 902–903. 2016). Even if this would be a case of doubtful stratigraphic relations, provisions for non-fossil taxa apply (Art. 13.3) and therefore non-fossil *V. calvum* competes with non-fossil *Peridinium oblongum* (Auriv.) Cleve for purposes of priority (Principles III and IV, Art. 11.1, 11.3 and 11.4). Moreover, the valid publication of the name *V. calvum* is controversial. Lentin & Williams (in Contr. Ser. Amer. Assoc. Stratigr. Palynologists 28: 666. 1993) and Fensome & Williams (in Contr. Ser. Amer. Assoc. Stratigr. Palynologists 42: 681. 2004) considered the name superfluous (and to be rejected) based on Art. 52.1(e) (and we agree), whereas Head & al. (l.c.) did not see the need to adopt the older name. Controversial Examples should be avoided in the *Code*, and the given Example is proposed for deletion here (irrespective of the Article being proposed for deletion, see Prop. 258).

Some of the present authors are of the opinion that the zoologically connoted term "dinoflagellate" (as used in the present Example) should be removed from the *Code*. The equivalent botanical terms are "*Dinophyta*" or "*Dinophyceae*", so "dinophyte" would be the preferred term to use in the *Code*. We consider submitting a future proposal to amend the *Code*, depending on the outcome of Prop. 180–183 (Woelkerling & Moestrup in Taxon 71: 1337–1338. 2022) at the Madrid Congress.

(260) Amend Art. 11.8, its Ex. 35, and the caption of Art. 13.1(f) as follows (new text in bold, deleted text in strikethrough):

"*11.8*. Names of organisms (diatoms **and dinoflagellates** excepted) based on a non-fossil type are treated as having priority over names at the same rank based on a fossil type where these names are treated as synonyms for a non-fossil taxon."

"*Ex. 35*. The non-fossil species *Gonyaulax ellegaardiae* K. N. Mert.~~ens~~ & al. (in J. Phycol. 51: 563. 2015) was indicated in the protologue to produce a cyst corresponding to the fossil-species *Spiniferites pachydermus* (M. Rossignol) P. C. Reid (in Nova Hedwigia 25: 607. 1974). Both names were correct because Mertens & al. **(l.c.)** did not treat them as synonyms. However, if these names are treated as synonyms~~ for the non-fossil species~~, ***S. pachydermus*, based on a fossil type,** ~~*G. ellegaardiae* is treated as having~~ **has** priority **because Art. 11.8 excepts dinoflagellates**~~ even though it is antedated by S. pachydermus~~."

"*13.1*. […] Fossil organisms (diatoms **and dinoflagellates** excepted):"

The argument made by Chaloner & al. (in Taxon 47: 907–910. 1998) for the exception from precedence of a name with a non-fossil type over that with a fossil type to be restricted to diatom names was to prevent names of fossil algae displacing junior non-fossil names considered to belong to the same biological taxon. However, in a group such as the dinophytes, the change can lead to long-established names based on a fossil type being displaced by names more recently published for flagellated stages that might be comparatively little known, which seems nomenclaturally disruptive. Therefore, by exempting dinophytes from this provision, we propose to return to the concept of the *Tokyo Code* and to expand the priority rules again also to dinophytes with a rich fossil record and a large body of established names both non-fossil and fossil (Fensome & al., l.c. 1993). Furthermore, if non-fossil and fossil dinophytes are treated equally regarding priority, then it is logical to exclude dinophytes from the later starting-point of fossils.

The acceptance of our proposals would make fossil names of dinophytes more important in contemporary nomenclature. For the frequently encountered example of *Gonyaulax* Diesing (in Sitzungsber. Kaiserl. Akad. Wiss., Wien, Math.-Naturwiss. Cl., Abt. I, 52: 305, 382. 1866) and †*Spiniferites* Mantell (Pict. Atlas Foss. Remains: 191[, 207]. 1850), the latter fossil name would have priority (again) over the younger non-fossil name, if both are considered synonyms of a non-fossil taxon. Moreover, newly published non-fossil names for "living fossils" currently have priority over well-established fossil names (Art. 11.8). We think this is a serious threat to nomenclatural stability, because numerous (superfluous) new names of non-fossil species could be created for already existing and established names of fossil-species. If the categories "non-fossil" and "fossil" were treated equally for the purpose of priority, then this would also approach the harmonization of the *Code* and the *International Code of Zoological Nomenclature* (Ride & al., Int. Code Zool. Nomencl., ed. 4. 1999; https://www.iczn.org/the-code/the-code-online/), which has particular importance for ambiregnal taxa such as dinophytes but also, for example, euglenophytes.

Explicitly, the harmonization between diatoms and dinophytes proposed here refers only to the priority of names, not to a complete equation of rules as per Art. 1.2. The latter would create clear disadvantages for dinophyte fossil-taxa described between 1958 and 2012, in accordance with the special provisions for fossil algae (see Art. 39.1 and 43.1): names of dinophyte fossil-taxa published during this period and lacking a Latin description or diagnosis would become retroactively not validly published under Art. 44.1, if now considered non-fossil algae (but see Prop. 181 by Woelkerling & Moestrup, l.c.). Disadvantages may also occur for "names" of dinophyte fossil-taxa published between 1912 and 1957 but lacking the validating illustration required by Art. 43.2, which would nevertheless now become validly published under Art. 44.2 if considered non-fossil. If these proposals are accepted, no disadvantages are anticipated with respect to the other *Code* provisions relating to fossil algae (see Art. 7 Note 1 and Art. 8.5, Rec. 8A.3 and Art. 9.15).

Disadvantages of the present proposals are minor. The most heard counter-arguments are name stability and inability to read older literature with expired names. However, name changes are an inevitable result of increasing taxonomic progress since the dawn of scientific naming. In particular, a few names of non-fossil dinophyte taxa in current use may need to be put into the synonymy of fossil names. If this is not desirable, then conservation or rejection proposals under Art. 14 or 56 can be considered in such cases. This may also impact suprageneric names, although Art. 11.10 indicates that the principle of priority does not apply to names above the rank of family. Name changes are usually the result of revisionary work in taxonomy, and the desired nomenclatural stability remains elusive in the microscopy domain, irrespective of whether non-fossil or fossil names or both are assessed. Application of scientific names is a

hypothesis inferred from a phylogenetic tree, and this is the best representation we have to date of the real Tree of Life. Fensome & al. (in Contr. Ser. Amer. Assoc. Stratigr. Palynologists 50: 13. 2019) and the online database system DINOFLAJ3 (http://dinoflaj.smu.ca/dinoflaj3/index.php/Main_Page) provide an easy means to obtain accepted names to synonyms and vice versa.

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(261–266) Proposals to amend the *Code* to update regulations of the nomenclature of fossils

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These initiatives consist of a few specific, mostly editorial amendments of the provisions of the *International Code of Nomenclature for algae, fungi, and plants* (*ICN*; Turland & al. in Regnum Veg. 159. 2018) in order to reflect the historical development of palaeobotanical nomenclature.

Because the former outdated notions such as "organo-genus", "forma-species" and others have been eliminated in the newest revisions of the *ICN*, it is necessary to formally fix their correspondence with modern notions of the *ICN*, thereby allowing their correct treatment in the functioning indexing centres. However, the *ICN* should also have additional operational notions for how to proceed with another category of artificial binary "names", which have been applied to fossil spore, pollen and other microfossil taxa (algal and fungal in nature). These proposals formally outline the distinction between fossil-taxa and these artificial designations and will significantly help indexing centres correctly interpret nomenclatural difficulties found in the old palaeobotanical literature.

The International Fossil Plant Names Index (IFPNI; http://ifpni.org/) has recorded numerous fossil "names" generated in the early years of palaeopalynology (1930s–1960s), which were formed as binary designations, but unlike fossil-species names (formed as a combination of a generic name and a specific epithet) these designations were associated with the artificial "names" of non-generic groups or subgroups of fossil spore, pollen or other microfossils. These designations, substituting at generic level in artificial systems of classification, were initially developed in the artificial system of classifications of fossil spores and pollen. The most influential authority of such a classification approach, Russian palaeopalynologist Sofia Naumova (in Trudy XVII Sess. Mezhdunar. Geol. Kongr. 1937(1): 357. 1940 ["1939"]), explicitly stated that "in the description of the spores and pollen a binary nomenclature is adopted: the «generic» names are given to the author's subgroups; and the names of «families», to groups". "*Leiotriletes*" (Naumova, l.c.: 357. 1940) was published as a name of a subgroup of fossil spores in the artificial classification of microfossils ("Group *Azonotriletes* Luber of Class *Irrimales* Naumova"). "*Leiotriletes*" is not therefore a fossil-generic name, although it was used in binary combinations such as "*L. minutissimus*" (Naumova in Izv. Akad. Nauk S.S.S.R., Ser. Geol. 1949(4): 52. 1949). As a fossil-generic name, *Leiotriletes* was later validly published based on different fossil spore materials by various researchers nearly simultaneously and independently: *Leiotriletes* Naumova (in Trudy Inst. Geol. Nauk Akad. Nauk S.S.S.R. 143: 20, 17 [rank]. 27 Oct 1953) and *Leiotriletes* Naumova ex R. Potonié & Kremp (in Geol. Jahrb. 69: 120. 31 Mar 1954).

Such an approach forming artificial fossil spore/pollen designations eliminated the potential nomenclatural conflict if the fossil spore/pollen genus or species would be found and described earlier than its fossil plant, because the spore/pollen designations would not then compete with the fossil-genus names established on other organs of the plant. However, later in palaeopalynology another option was chosen to form the so-called "form-genera" or "organ-genera" in plant classification (which formally existed in former editions of the *Code* from Stockholm [Lanjouw & al. in Regnum Veg. 3. 1952] to Tokyo [Greuter & al. in Regnum Veg. 131. 1994], superseded by "morphogenus" from Saint Louis [Greuter & al. in Regnum Veg. 138. 2000] to Melbourne [McNeill & al. in Regnum Veg. 154. 2012], and all at least now eliminated from the *ICN* after Melbourne). Nevertheless, fossil spore taxa designations, formed as artificial binary combinations, persisted and were actively used in palaeopalynology up to the 1990s (!). In addition, as IFPNI has recorded, it was a usual practice to recombine species of these artificial designations into exact fossil spore or pollen genera, and vice versa: fossil species of exact fossil spore or pollen genera might be recombined under these artificial designations. For example, the fossil spore species *Selaginella hirta* Bolchovitina (in Trudy Inst. Geol. Nauk Akad. Nauk S.S.S.R. 145: 33. 1953), validly published under the generic

name *Selaginella* P. Beauv. (in Mag. Encycl. 9(5): 478. 1804) and the simultaneously published morphographic binary combination of species epithet and subgroup name of fossil spores "*Lophotriletes hirtus*" (Bolchovitina, l.c.: 33. 1953), was later transferred (recombined) as the fossil spore species *Lophotriletes hirtus* (Bolchovitina) Bolchovitina ex E.V. Semenova (Spory Pyl. Jursk. Otlozh. Donbassa: 48. 1970). In this case, *Lophotriletes* S.N. Naumova ex R. Potonié & Kremp (in Geol. Jahrb. 69: 129. 1954) was accepted as a name of a fossil spore genus, not as a name of a formal artificial subgroup of fossil spores, "*Lophotriletes*" (Naumova, l.c.: 357. 1940). "*Lophotriletes hirtus*" in 1953 is not therefore a fossil-species name, but merely a morphographic binary combination of species epithet and subgroup name of fossil spores, and has no standing in botanical nomenclature, even for the purposes of homonymy; it is superseded by *Lophotriletes hirtus*, validly published only in 1970 as a new combination with a validly published fossil spore genus name. As a result of the existence of natural and artificial systems of classification of fossil spores and pollen with their own binary names in the past, IFPNI now faces an enormous nomenclatural conundrum of artificial and non-artificial (exact) designations, which should be distinguished in taxon records. Needless to say, none of these artificial designations is validly published in terms of botanical nomenclature, and none is to be considered even for the purposes of homonymy. In this connection, a few new provisions are proposed below to resolve the historical situation.

(261) Amend Art. 20.4 as follows (new text in bold) and add two new Examples:

"*20.4*. The following are not to be regarded as generic names:

(a) Words not intended as names.

(b) Unitary designations of species.

***(c)* Designations representing fossil spore, pollen, or other microfossil groupings (substituting at generic level in artificial systems of classification) that are usually followed by an epithet.**

***(d)* Designations representing microfossils (substituting at generic level in artificial systems of classification) intended to be distinct in rank from the fossil-genus names used by authors in the same work.**"

"*Ex. n1*. "*Leiotriletes*" (Naumova in Trudy XVII Sess. Mezhdunar. Geol. Kongr. 1937(1): 357. 1940 ["1939"]) was published as a "name" for a subgroup of fossil spores in an artificial classification of microfossils ("Group *Azonotriletes* Luber of Class *Irrimales* Naumova" in Naumova, l.c. 1940). Naumova explicitly stated that "in the description of the spores and pollen a binary nomenclature is adopted: the «generic» names are given to the author's subgroups; and the names of «families», to groups". "*Leiotriletes*" was not therefore a generic name, although it was used in binary combinations such as "*L. minutissimus*" (Naumova in Izv. Akad. Nauk S.S.S.R., Ser. Geol. 1949(4): 52. 1949). As a fossil-generic name, *Leiotriletes* was later validly published based on different fossil spore materials by various researchers nearly simultaneously and independently: *Leiotriletes* Naumova (in Trudy Inst. Geol. Nauk Akad. Nauk S.S.S.R. 143: 20, 17 [rank]. 27 Oct 1953) and *Leiotriletes* Naumova ex R. Potonié & Kremp (in Geol. Jahrb. 69: 120. 31 Mar 1954)."

"*Ex. n2*. In the author's artificial classification of fossil coccoliths, "*Lophodolithus*" (Deflandre in Ann. Paléontol. 40: 146. 1954) was published with the rank of "manipula" for some fossil coccoliths (then classified as fossil protists of Coccolithophorida or now algae of *Prymnesiophyceae*); at the same time, the genera *Clathrolithus* Deflandre (l.c.: 168. 1954) and *Pyxolithus* Deflandre (l.c.: 170. 1954), explicitly published with the rank of genus in the same work, are considered as validly published generic names. As a genus, "*Lophodolithus*" was validly published later: *Lophodolithus* Deflandre ex Bramlette & Sullivan (in Micropaleontology 7: 145. 1961)."

In order to provide a distinction between the "names" of the artificial groupings of fossil spore and pollen names from names of fossil-genera, traditionally accepted in botanical nomenclature, new special provisions are proposed below. Because in palaeobotany several now obsolescent and nearly forgotten generic categories, now considered fossil-genera, were used – "pseudogenus", "form(a)-genus", "organ(o)-genus", "sporogenus", "morphogenus" – it is proposed to describe their equal status with fossil-generic names in contrast to artificial names of spore and pollen subgroupings.

(262) Add a new paragraph to Art. 20 with two new Examples:

"*20.n*. Names with their rank denoted by the terms "pseudo-genus", proposed for artificial fossil-taxa, or "form(a)-genus", "organ(o)-genus", "sporogenus", or "morphogenus", or their equivalents in modern languages, once permissible under past editions of this *Code*, are treated as having been published at the rank of genus."

"*Ex. n3. Cycadeorhachis* Stopes (Cretac. Fl. 2: 53. 1915), originally published with the rank-denoting term "pseudo-genus", is treated as published at the rank of fossil-genus, reflecting the author's intention to consider "rachises of Cycadean foliage", on which the name was based, as an artificial fossil-taxon with no clear relations with other fossil-taxa."

"*Ex. n4. Maceopolipollenites* Leffingwell (in Spec. Pap. Geol. Soc. Amer. 127: 29. 1970) was published as an organ-genus for fossil dispersed pollen; *Insulapollenites* Leffingwell (l.c.: 48. 1970) was created in the same work as a form-genus for fossil dispersed pollen; both generic names are treated as validly published at the rank of genus."

(263) Add a new paragraph to Art. 23:

"*23.n*. Names with their rank denoted by the terms "form(a)-species", "organ(o)-species", "sporospecies", "species praedicta", "sporomorpha" (if the epithet is associated with a generic name, not an artificial spore group designation), "morphospecies", or their equivalents in modern languages, once permissible under past editions of this *Code*, are treated as having been published at the rank of species."

(264) Amend Art. 23.6 as follows (new text in bold) and add a new Example:

"*23.6*. The following designations are not to be regarded as species names:

(a) Designations consisting of a generic name followed by a phrase name (Linnaean "nomen specificum legitimum") commonly of one or more nouns and associated adjectives in the ablative case, but also including any single-word phrase names in works in which phrase names of two or more words predominate.

(b) Other designations of species consisting of a generic name followed by one or more words not intended as a specific epithet.

(c) Designations of species consisting of a generic name followed by two or more adjectival words in the nominative case.

(d) Formulae designating hybrids (see Art. H.10.2).

***(e)* Designations formed as a combination of the name of the fossil pollen (sub)group followed by a epithet."**

"*Ex. n5*. "*Leiotriletes minutissimus*" (Naumova in Izv. Akad. Nauk S.S.S.R., Ser. Geol. 1949(4): 52. 1949), originally proposed for fossil sporomorphs (erroneously treated as spores), is not a fossil-species name (although labelled "sp. nov."), because it is formed as a combination of the fossil pollen subgroup "*Leiotriletes*" (Naumova in Trudy XVII Sess. Mezhdunar. Geol. Kongr. 1937(1): 357. 1940 ["1939"]) and the sporomorph epithet "*minutissimus*". The name of this microfossil, now treated in the algal group *Acritarcha*, was first validly published as *Leiosphaeridia minutissima* Jankauskas (Mikrofoss. Dokembr. S.S.S.R.: 79. 1989). Although Jankauskas wrongly transferred "*Leiotriletes minutissimus*" to the fossil-genus *Leiosphaeridia* Eisenack (in Palaeontographica, Abt. A, Paläozool. 110: 2. 1958), he otherwise met the conditions for valid publication of the name of a new fossil-taxon."

In order to emphasize the artificial status of the binary names of sporomorphs, not accepted under the *ICN* even for the purposes of homonymy, it is proposed to add a new Example demonstrating that these designations are not to be considered as alternative names under Art. 36.3, and therefore do not nullify otherwise validly published species names of fossil-taxa, when such artificial sporomorph binary names are proposed simultaneously for the same fossil remains.

(265) Add a new Note and a new Example after Art. 36.3:

"*Note n1*. Names published and accepted simultaneously for the same fossil pollen, spore, or other microfossil remains (so-called sporomorphs) are not alternative names as defined by Art. 36.3 if one is a designation formed by combining a sporomorph group with a sporomorph epithet."

"*Ex. n6*. Bolchovitina (in Trudy Inst. Geol. Nauk Akad. Nauk S.S.S.R. 145: 1–183. 1953) employed two parallel systems of classification of fossil spores and pollen, one natural (assigning microfossils to extant genera) and another artificial (combining pollen or spore group designations with an epithet). *Ginkgo tripartita* Bolchovitina (l.c.: 62. 1953) and "*Dolichotrilistrium tripartitum*" (Bolchovitina, l.c.: 62. 1953), based on the same type, are not alternative names as defined by Art. 36.3, because "*D. tripartitum*" (although labelled "sp. nov."), resulting from combining the fossil pollen subgroup "*Dolichotrilistrium*" (Naumova in Trudy XVII Sess. Mezhdunar. Geol. Kongr. 1937(1): 358. 1940 ["1939"]) and the sporomorph epithet "*tripartitum*", is not the name of a fossil-species (see Art. 23.6(e)). *Ginkgo tripartita* was therefore validly published by Bolchovitina."

When the provision on the publication date of Schlotheim's *Petrefactenkunde* (1820) was first established in the Paris *Code* (Lanjouw & al. in Regnum Veg. 8. 1956), the initial idea was to suppress this work in favour of Sternberg's *Flora der Vorwelt*, Heft 1 (1820). The precise dates of publication of the two monographs were not known at that time. However, there were concerns about the possible priority of Schlotheim's fossil-taxa over those of Sternberg, which could disrupt the established nomenclature of plant fossils. But these concerns turned out to be unfounded, because all of Schlotheim's fossil-taxa except one, *Anthotypolithes ranunculiformis* Schloth., were not validly published, because Schlotheim failed to provide separate generic descriptions for his new genera, and therefore no fossil-species were validly published as well (Art. 35.1). However, the name *A. ranunculiformis* and that of its monotypic genus *Anthotypolithes* Schloth. were validly published in 1821 (Schlotheim in Arch. Neuesten Entdeck. Urwelt 3: 174. 1821), but both have recently been rejected against *Ullmannia* Göpp. and *U. bronnii* Göpp. (see Doweld in Taxon 65: 190. 2016; Wiersema & al., Int. Code Nomencl. Algae, Fungi, and Plants: Appendices I–VII. 2018+ [continuously updated] https://naturalhistory2.si.edu/botany/codes-proposals/ [accessed 28 Jan 2023]), such that concerns about destabilization of palaeobotanical nomenclature from Schlotheim's monograph are no longer relevant. The historical bibliographical studies of Stafleu & al. (for Taxonomic Literature, ed. 2, in Regnum Veg. 94, 98, 105, 110, 112, 115, 116, 125, 130, 132, 134, 135, 137, 149, 150. 1976–2009) and myself (for the IFPNI, see http://ifpni.org/publication.htm?id=38E68EF4-00BC-42A9-A48A-72DF8CFD181F) regarding precise publication dates for Sternberg's and Schlotheim's monographs have confirmed the priority of Sternberg (June 1820) over Schlotheim (September 1820: Becker's advertisement ["ist so eben erschienen" in Leipziger Literatur-Zeitung, # 238, col. 1904, for 16 September 1820]). This new bibliographic finding finally erases the need to establish in Art. 13(f) a specific provision that Schlotheim's *Petrefactenkunde* (1820) is regarded as published before 31 December 1820, because this coincides with reality, hence this rule is proposed for deletion. Finally, I can see no reason not to adopt the exact date of publication of Sternberg's *Flora* as 8 July 1820 (IFPNI: http://ifpni.org/publication.htm?id=D0BCBFC6-DDC6-4B75-8CC0-AF311DE7BEA4), rather than using the conventional albeit artificial date, because the underlying concerns over the relative priority of the two works are no longer relevant, as discussed above. But this problem might be further discussed among palaeobotanists.

(266) Delete the second sentence of Art. 13.1(f) as follows (deleted text in strikethrough):

"Fossil organisms (diatoms excepted):

(f) All groups, 31 December 1820 (Sternberg, *Flora der Vorwelt, Versuch* 1: 1–24, t. 1–13). ~~Schlotheim's *Petrefactenkunde* (1820) is regarded as published before 31 December 1820.~~"

(267–269) Proposals to define description and amend the definition of diagnosis in Article 38

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The word description as used in Art. 38.1 is not explicitly defined in the *Code* (Turland & al. in Regnum Veg. 159. 2018). Therefore, it is a daily struggle for indexers and users of algal, fungal and plant names to assess whether names are validly published with the descriptive text provided. This is made worse because direction from specialist committees that provide a decision on whether a descriptive statement satisfies the requirements of a description, as provided for in Art. 38.4, is increasingly contradictory. This is partly the result of strong opposing opinions that have taken hold because of a lack of guidance in the *Code*. Description is by some defined in a strict sense that any descriptive statement is sufficient for valid publication. This results from the statement in Art. 38 Note 2 that a description need not be diagnostic. However, as the committees under Art. 38.4 regularly considered names that have a descriptive statement as not validly published, this cannot be the only guiding principle. We therefore propose to add a new Article defining description similar to how Art. 38.2 defines diagnosis, making it clear which kinds of descriptive statements are insufficient for valid publication. There are three main issues the editors of the International Plant Names Index (IPNI; https://www.ipni.org/) regularly encounter and which invariably cause opposing opinions.

The first issue that is occasionally encountered is new species names within the same genus or infraspecific names within the same species that have exactly the same description. A recent example is *Triticum durum* f. *tristepseudoalbiprovinciale* Lyapunova (in Vavilov J. Genet. Breed. 21: 156. 2017), which has exactly the same description "albo in combinatio cum nigro gluma color nigromarginata" as *T. durum* f. *tristeboeufii* Lyapunova and *T. durum* f. *tristemuticoboeufii* Lyapunova published as new in the same paper. Strictly speaking, all three taxa have a description but it seems undesirable that new taxa published under the same taxon in the same paper have the same description and suggests the statement was not intended to describe the taxa.

We encounter similar cases with diagnoses, such as a recent find that was an assumed earlier publication of *Nepenthes macfarlanei* Hemsl. (in Nature 71(1851): 599. 1905), with the descriptive statement that it "differs from all other known species, except *N. Lowii*, in the underside of the lip being thickly beset with stiff bristles, interspersed with honey-glands". Although this diagnosis distinguished the new taxon "from other taxa" (Art. 38.2), it did not distinguish the new taxon from all taxa being compared to it. We therefore propose to add a qualification to the words "other taxa" in Art. 38.2.

(267) Amend Art. 38.2 as follows (new text in bold):

"*38.2*. A diagnosis of a taxon is a statement of that which in the opinion of its author distinguishes the taxon from **all** other taxa **being compared to it**."

The second issue is single words or a combination of these words that only describe habit, height, stem width or stem circumference of taxa, mostly trees. These statements often come from notes on herbarium labels or are part of the description of economic features. Although economic features on their own are not considered sufficient under Art. 38.3, the height, width and circumference of a tree trunk can serve both economic and taxonomic descriptive purposes. Other statements that have been deemed sufficient are absolute statements of length, e.g. *Alsophila brunoniana* Wall. (Numer. List: 241, n. 7073. 1832) has a statement "Hujus filicis arborea caudex ped. 45 altus ab ampliss. Procuratione Brit. Ind. Orient Museum Britanico anno 1831 donatio", which we consider a description of a single specimen rather than "of the taxon" as specified in Art. 38.1 (a) and therefore not in compliance with that Article. Another example which is widely considered not to be validly published is *Hydnocarpus anthelminthicus* Pierre ex Laness. (Pl. Util. Col. Franç.: 303. 1886), for which, apart from economic information on the wood, the height and width are given: "Arbre de 8 à 15 mètres de hauteur sur 20 à 25 centimètres de diamètre."

(268) Add a new Article to Art. 38 to define description:

"*38.1.bis*. A description of a taxon is a statement describing a feature or features of an individual taxon. A validating description (Art. 38.1) need not be diagnostic. A description is considered insufficient for the requirements of Art. 38.1 if *(a)* an identical statement is used in the same work (publication as a whole, see Art. 37.5) for a species description within the same genus or for an infraspecific taxon description within the same species, *(b)* the description applies only to a single individual plant or specimen rather than the taxon, or *(c)* the description is limited to habit, height, stem width, stem circumference, or a combination of these. Statement (c) could however be sufficient as a diagnosis under Art. 38.2."

The third issue is so-called negative descriptions, i.e. only a statement on how an existing taxon differs from the new taxon. Although it seems obvious to us that Art. 38.2 clearly defines diagnosis as "distinguishes the taxon from other taxa" and not the other way round, this has recently been challenged. The Nomenclature Committee for Vascular Plants recently deemed such a statement as sufficient under Art. 38.4 for *Agave gustaviana* J.N. Haage & E. Schmidt (in Pflanzen-Verzeichnis 1874: 1. 1874), the description of which is "nähert sich in der Form der Blätter und im Habitus einigermassen der prächtigen *A. Vershaffelti*; bei letzterer sind jedoch die Blätter kürzer, gedrängter, eine dichtere Rosette bildend und von starker blaugrauer Färbung". [In the form of the leaves and in the habit somewhat approaches the splendid *A. Vershaffelti*; in the latter, however, the leaves are shorter, more crowded, forming a

denser rosette, and of a strong bluish-grey colour.] If a descriptive statement indicates that an existing taxon differs from the new species because the existing one has yellow flowers, we do not know the colour of the flowers of the new taxon and therefore in our opinion this cannot be considered a description. The name *Agave gustaviana* is now rejected, so the addition of a Note will not change existing nomenclature but will prevent such names being accepted in the future because indexers like IPNI have always considered those not to be validly published.

(269) Amend Art. 38 Note 2 (new text in bold, deleted text in strikethrough):

"*Note 2*. ~~Whereas a~~ **A** diagnosis must comprise one or more descriptive statements **on how the new taxon differs from one or more other taxa** (Art. 38.2 and 38.3)~~, a validating description (Art. 38.1) need not be diagnostic~~. **A statement on how one or more existing taxa differ from the new taxon is not sufficient to satisfy Art. 38.2.**"

(270) Proposal to add a Note after Article 40.1 to clarify that elements that cannot serve as types on their own should not be considered as part of a type indication

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It is now commonplace for authors to supplement the holotype by citing illustrations, mostly digital images of specimens. Digital images with a caption stating that they are the holotype are also sometimes included when a nomenclatural novelty is published. For orchids in particular, it is common to cite the wild-collected plants that were cultivated and from which a specimen was subsequently made. There has been debate as to whether such names should be considered validly published, because more than one element is cited as the holotype (contrary to Art. 8.1 of the *Shenzhen Code*, Turland & al. in Regnum Veg. 159. 2018). Even though this should be discouraged, it is now common practice, so we propose a new Note to make it clear that elements cited as part of the type indication that, on their own, cannot serve as a type under Art. 8 and 40 should not be taken into account when assessing whether a name is validly published.

(270) Add a new Note after Art. 40.1:

"*Note n*. When elements are cited as part of the type indication that cannot on their own serve as types as defined under Art. 8 and 40 (e.g. living organisms cited contrary to Art. 8.4 or illustrations cited contrary to Art. 40.4), they should not be taken into account and do not affect valid publication of the name."

(271) Proposal to add a Note after Article 41.3 to clarify the meaning of "indirect reference" in the context of a basionym or replaced synonym citation

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Under Art. 41.3 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), the definition of an indirect reference to a basionym or replaced synonym is referred to Art. 38.14, where an indirect reference is defined in the context of reference to a previously published description. The two cases are not exactly the same and the word "indirect" itself seems to have caused different opinions to emerge in recent years. It seems clear to us that the indirect reference, i.e. "clear (if cryptic) indication", has to be "to a basionym or replaced synonym" as defined in Art. 41.3. All the Examples under that Article refer to a basionym or replaced synonym in a single step. However, it has recently been asserted that such a reference to a basionym or replaced synonym can also be two-stepped or more, i.e. to a publication where there is a further reference to the basionym or earlier validly published name. We do not think the Article has been traditionally used in that sense, but this has resulted in a number of names being declared illegitimate superfluous names, despite the limiting statement in the last sentence of Art. 52 Note 3.

A recently discussed example is *Aster pyrenaeus* Desf. ex DC. (Fl. Franç., ed. 3, 4: 146. 1805), in the synonymy of which Candolle cited "*Aster sibiricus* Lam. Dict. 1. p. 305.", which refers to an entry in Lamarck's *Encyclopédie méthodique* (1: 305. 1783), where Lamarck gave a description of "*Aster sibiricus* L." including plants from Siberia and the Pyrenees. In our opinion and as has traditionally been assumed, Candolle's reference is to be interpreted as "*Aster sibiricus* sensu Lam., non L.", though others have recently argued that it is a two-step reference to the avowed replaced synonym *Aster sibiricus* L. (Sp. Pl.: 872. 1753) because that name was not excluded and therefore the name *A. pyrenaeus* would be superfluous and illegitimate. This was clearly not the intention of Candolle, who provided a new name for the specimens from the Pyrenees, which he considered to be different from those originating in Siberia, and therefore he merely referred to the Pyrenean plants included by Lamarck under *A. sibiricus*. In older literature such indications were not unusual because using "sensu" was not yet established. We also feel this is in contradiction to Art. 41.3 because the indirect reference does not refer "to a basionym or replaced synonym" but rather to another publication in which a different, earlier-published name is used.

Some have taken this even further, to include many steps from one publication to another to eventually arrive at a publication that includes an earlier-published name that they therefore assert must be included in the new taxon. This does not seem the intention of an indirect reference and could lead to great instability in any eighteenth or early nineteenth century name that cites another name or reference. Therefore, we feel it is necessary to define indirect reference in the context of Art. 41.3. Such a clarification should maintain current usage because Art. 41.4 can still apply in cases where an indirect reference is not to a basionym or replaced synonym.

(271) Add a new Note after Art. 41.3:

"*Note n*. An indirect reference to a basionym or replaced synonym is a clear (if cryptic) indication of the place of publication of that basionym or replaced synonym or one of its homotypic names. An indication of an author and/or publication different from those of a potential basionym or replaced synonym is in itself not considered sufficient to be an indirect reference to that basionym or replaced synonym."

(272–273) Add a new Note to Article 41 and amend Recommendation 41A.2 to clarify what is and what is not allowed as a page reference for a basionym or replaced synonym citation

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Confusion surrounds the indication of a page reference required by Art. 41.5 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) for valid publication of a new combination, name at new rank or replacement name. In recent years there has been a proliferation of online publications that have a diverse array of possible indications of page numbers. This has caused issues for authors of new combinations and replacement names regarding what to cite to allow for valid publication under Art. 41.5. Recently the designation "*Epigeneium nageswarayanum*" (Agrawala & al. in Mao & Dash, Fl. Pl. India Annot. Checkl. Monocot.: 50. 2020) was published with the basionym citation as:

"*Dendrobium nageswarayanum* Chowlu, Natl. Acad. Sci. Lett. (2020), https://doi.org/10.1007/s40009-020-00919-x".

The DOI link in this case refers to the entire article in which the basionym is published, which is coextensive with the protologue of the basionym. However, this citation does not constitute a page reference as required by Art. 41.5; therefore, the new combination is not validly published. Authors may feel forced to use such indications when unpaginated early-view papers are published online. Sometimes PDF documents do not have page numbers included on the pages of the article but, instead, page numbers are automatically generated as part of the electronic PDF format. There are also traditional issues with books in print lacking page numbers.

We therefore propose a new Note to make clear what is and what is not allowed as a page reference for a basionym or replaced synonym citation, in line with current practice. This will provide clarity for authors and reduce the number of disagreements among users of a name.

(272) Add a new Note after Art. 41 Note 1:

"*Note 1bis*. For publications lacking page numbers, a page reference can be achieved by a clear indication of the page or pages on which the protologue of the basionym or replaced synonym appears by:

(a) citing an assumed page number when there is continuous pagination;

(b) citing the page number automatically generated within the PDF of an electronic publication;

(c) using the words "without page number", "sine pagina", "s.p." or similar; or

(d) including any indication that refers to the exact page on which the protologue appears, for example citing the species number, or the words "addition" or "supplement" if indicated as such on the page.

The citation of a DOI or URL to the web page on which the electronic paper appears is not sufficient for page indication even if the entire publication is coextensive with the protologue."

(273) Amend Rec. 41A.2 to read (new text in bold, deleted text in strikethrough):

"*41A.2*. In the absence of established tradition, if publications are not paginated, page numbers **indicated according to Art. 41 Note 1bis(a), (b), or (c)** should be ~~referenced with~~ **enclosed in** square brackets."

(274–280) Proposals to amend the *Code* to harmonize botanical and zoological nomenclature used for the so-called "ambiregnal" microorganisms (as exemplified by fossils)

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When the International Fossil Plant Names Index (IFPNI; http://ifpni.org/) was established in 2014 as a global registry of scientific names of fossil organisms covered by the *International Code of Nomenclature for algae, fungi, and plants* (*ICN*; Turland & al. in Regnum Veg. 159. 2018), it was realized that some plant microfossils (and exceptionally some macrofossils) were initially described as zoological taxa under the rules of the *International Code of Zoological Nomenclature* (*ICZN*; Ride & al., Int. Code Zool. Nomencl., ed. 4. 1999; https://www.iczn.org/the-code/the-code-online/), but later were revised and attributed to algae, fungi or even plants. A large group of fossil problematic microorganisms, Acritarcha, as well as the traditional so-called "ambiregnal" groups of flagellates/algae (Dinoflagellates, Prasinomonada, Haptomonada, Volvocina, etc.) and Myxomycetes/Mycetozoa are now governed simultaneously by the *ICN* and the *ICZN*. These groups of organisms are simultaneously indexed in Index Nominum Algarum, MycoBank and Index Fungorum as well as the zoological indices, Nomenclator Zoologicus and Zoological Record. *ICN* Art. 45 regulates the conditions when the algal or fungal names published under other *Codes* (zoological and former bacteriological, now prokaryotic) are accepted with the dates and authorship from the original protologue to avoid conflicting treatment of the names.

The existence of so-called "ambiregnal" taxa necessitates a new principal requirement for the established IFPNI to be compatible with both *Codes*. It was always very important in some exceptional, but numerous, cases when fossil species originally described as animals were partially later reclassified into botanical fossil taxa, or otherwise, when fossils originally described as plants or algae were transferred into the animal kingdom, leaving botanical nomenclature with the names only for considerations of homonymy. In reality, numerous more confused situations exist in palaeobotany when only part of the former generic circumscription of plant fossils is retained in botanical nomenclature, with another part of the genus (including its type) no longer considered as plant fossils, but fossil animals. For example, the fossil-plant genus *Ptilophyton* Dawson (in Canad. Naturalist & Quart. J. Sci. 8: 385. 1878), originally established as fossil plants, was later reclassified with 3 fossil-species transferred into the animal kingdom (including the type of the genus, *P. vanuxemii* (Dawson) Dawson), but only one species, *P. thompsonii* Dawson (l.c.: 385. 1878) was left in palaeobotany as a species of progymnosperm, *Protopteridium thomsonii* (Dawson) Kräusel & Weyland. In such cases, retrospective registration of fossil plant names was done for *Ptilophyton* Dawson, but mentioning its current taxonomic status as a genus of fossil animal Graptolites (IFPNI: http://ifpni.org/genus.htm?id=779990C7-46EF-4E2A-9D92-E59B98641CF4). The fossil-generic name *Ptilophyton* Dawson, though reconsidered in the 1930s to apply to fossil animals, and thus excluded from the plant kingdom, is nevertheless regarded as a senior homonym for the genus of fossil algae, *Ptilophyton* Vologdin (in Dokl. Akad. Nauk S.S.S.R. 175: 1145. 1967). This example of confused nomenclature of fossils illustrates the necessity of the complete record of fossil plant names, irrespective of their later taxonomic assignment to either plants or animals.

Botanical nomenclature is independent of zoological nomenclature, but there are several important groups of microorganisms and their fossil counterparts, which interlinked both nomenclatures in the indexing of names. The differences in the application of the respective *Codes* resulted in so-called "dual" nomenclatures in botany and in zoology, where the same organism might have a different correct name under each *Code*. In order to resolve problems with different nomenclature regulations, IFPNI was upgraded to also accommodate provisions of the *ICZN*. As a result, to achieve compliance with both *Codes*, the correct registration of fossil microorganisms requires further formal clarification of the provisions and regulations of the *ICN* for the nomenclature of microorganisms governed by both *Codes* under Art. 45.

The main aim of the following proposed new provisions for the *ICN* is to build a workable environment for existing indexing centres of plant fossils, algae and fungi, dealing with registration and nomenclatural evaluation of the names generated under other nomenclature *Codes*. A few important omissions have been found in the existing provisions, and they are resolved below by new proposals. The aim is to avoid "dual" nomenclature, with one name correct in botany and another in zoology under different *Codes*, but applying to the same organism.

(274) Add two new Examples after Art. 45.1:

"*Ex. n1. Bacillariaceae* Bory (Dict. Class. Hist. Nat. 2: 127. 1822, '*Bacillariées*'), originally published with a French termination in vernacular form for a family then considered to be animals (animalcules), is available under the *International Code of Zoological Nomenclature* (*ICZN* Art. 11.7.2) and is validly published as the name of a family of algae and retains its original authorship and date but with the original termination changed in accordance with Art. 18.4 and 32.2, Art. 18.4 last sentence notwithstanding, with the diatoms now treated as algae."

"*Ex. n2. Prorocentraceae* F. Stein (Organism. Infusionsthiere 3 (2): 8, 16–17. 1883, '*Prorocentrinen*'), originally published with a German termination in vernacular form for a family of protozoans,

is available under the *International Code of Zoological Nomenclature* (Art. 11.7.2) as the name of a family of protists. When the dinoflagellate taxon is treated as a algae, its name is validly published and retains its original authorship and date but with the original termination changed in accordance with Art. 18.4 and 32.2, Art. 18.4 last sentence notwithstanding."

These two new Examples are proposed to make it clear that family names published with non-Latin terminations and considered not validly published under Art. 18.4 last sentence, but treated as available if published prior to 1900 in zoological nomenclature, should also be permitted by the *ICN* in order to avoid production of dual correct nomenclatures for the same suprageneric groupings, one currently correct in botany: e.g. *Prorocentraceae* Buetschli (in Bronn, Kl. Ordn. Thier-Reichs 1: 1002. 1885, '*Prorocentrina*'), as first latinized but still with an improper and correctable termination, and the second correct in zoology: *Prorocentraceae* F. Stein (Organism. Infusionsthiere 3(2): 8, 16–17. 1883, '*Prorocentrinen*').

(275) Add a new paragraph to Art. 45 with a new Example:

"*45.n1*. If a taxon originally assigned to a group not covered by this *Code* is treated as belonging to the algae or fungi, but when published its name did not meet the requirements of the relevant other *Code* for status equivalent to valid publication, the name has no standing under this *Code* despite satisfying the other requirements of this *Code* for valid publication."

"*Ex. n3. Hystrichosphaera* Wetzel (in Palaeontographica, Abt. A, Paläozool. 78: 33. 1933), originally published as a fossil protist genus under the *International Code of Zoological Nomenclature* without designation (fixation) of the type and thereby unavailable (*ICZN* Art. 13.3), was therefore not a validly published name under this *Code* despite satisfying the other requirements of this *Code* for valid publication. Deflandre (in Ann. Paléontol. 26: 61. 1937) validly published the name by providing a description together with fixation of the type, and therefore *Hystrichosphaera* Wetzel ex Deflandre (l.c.) is treated as validly published under both the *ICZN* and this *Code* from 1937, not from the publication by Wetzel in 1933."

This new Article and Example are introduced to avoid the acceptance of originally unavailable zoological names upon their later treatment as algae. Under the editions of the *International Code of Botanical Nomenclature* in operation in the past, numerous generic names, published originally for zoological taxa but with infringement of the *ICZN* requirements, and therefore unavailable under zoological nomenclature rules, were nevertheless accepted as validly published in botanical nomenclature due to different requirements for type fixation/indication of generic names between *ICZN* Art. 13.3 (where required from 1930) and the *ICN* Art. 40.1 (required from 1958). Hence "dual" nomenclature was produced in the Example provided: *Hystrichosphaera* Wetzel (in Palaeontographica, Abt. A, Paläozool. 78: 33. 1933), now correct under the *ICN*, but *Hystrichosphaera* Wetzel ex Deflandre (in Ann. Paléontol. 26: 61. 1937) correct under the *ICZN*. Furthermore, the type citation of this "ambiregnal" genus differs under both *Codes*, viz. *H. furcata* (Ehrenb.) Wetzel (l.c.: 34. 1933) under the *ICN* (see Index Nominum Algarum: http://ucjeps.berkeley.edu/cgi-bin/porp_cgi.pl?575967), but *H. furcata* (Ehrenb.) Wetzel ex Deflandre (l.c.: 61. 1937) under the *ICZN*. This Example illustrates the necessity to amend *ICN* Art. 45 so as not to accept names unavailable under the relevant other *Code*. Such a new regulation will harmonize treatment of the names under both *Codes*, and resolve difficulties for indexing centres, when the same name would otherwise have two different places of validation depending on the *Code*, which is absurd.

(276) Add a second new paragraph to Art. 45 with two new Examples:

"*45.n2*. If a taxon originally assigned to a group not covered by this *Code* is treated as belonging to the algae or fungi and its name was originally published with status equivalent to valid publication under the relevant other *Code*, the name retains its original authorship and date of publication, especially for the purposes of homonymy, even though this *Code* might have later starting-points for some groups of algae or fungi."

"*Ex. n4. Gyrogonites* Lam. (Syst. Anim. Sans Vertèbr.: 401. 1801) was originally published and available under the *International Code of Zoological Nomenclature* for a genus of fossil molluscs, but later shown to apply to remains of the reproductive organs of charophycean algae. It nonetheless retains its original authorship and date of publication from 1801 for the purposes of homonymy despite not being considered as validly published under this *Code* until after 1820, the starting-point for plant fossils (*Gyrogonites* Lam. ex Bowdich, Man. Conchol.: 16. 1822)."

"*Ex. n5. Pirea* Vavrdová (in Věstn. Ustředn. Ústavu Geol. 47: 82. 1972), originally published as a microfossil of Acritarcha, which is treated simultaneously under the rules of the *International Code of Zoological Nomenclature* and this *Code*, is a later homonym of *Pirea* T. Durand (Index Gen. Phan.: 494. 1888), a genus of *Brassicaceae*. *Pirea* Vavrdová is correct in zoological nomenclature, since no senior zoological homonym exists, but not under this *Code*, so it was proposed for conservation against its earlier homonym to avoid the existence of different correct names for the same organism under two different *Codes* (see Doweld in Taxon 67: 452. 2018 and Taxon 70: 670. 2021)."

The case of *Gyrogonites* Lam. (1801) (see Doweld in Taxon 66: 180–188. 2017) illustrates the situation where a fossil-genus name now applied to a fossil charophycean alga was originally described as a fossil animal prior to the starting-point of palaeobotanical nomenclature (1820, the starting-point for fossil nomenclature in the *ICN*, Art. 13.1(f)). *Gyrogonites* continued to be considered as a fossil animal (not plant or algae) until Bowdich (Man. Conchol.: 16. 1822). If this later publication date (1822), where the name is in reality a later isonym and has no standing in zoological nomenclature where this taxon has been established, is taken as its date of valid publication for the purposes of the *ICN*, we will have a conflict in nomenclature: accepting what is considered a later isonym under the *ICZN* (with no standing) as the validly published name under the *ICN*. The current Art. 45.1 imposes the need to "satisfy only the requirements of the relevant other *Code*", which in this case automatically disregarded later isonyms as such. To accept what was a later isonym under the *ICZN* would contradict Art. 45.1. Therefore, I can see no serious disadvantage for the *ICN* to accept the original date of availability under the *ICZN* of names formerly applied to animal fossils when this precedes the 1820 starting-point for some algal fossils. In order to clarify such exceptional situations, where valid publication of taxon names might precede the starting-points of nomenclature under the *ICN* for some groups of algae and possibly fungi, a new Article and Example are proposed.

(277) Amend Art. 45.1 as follows (deleted text in strikethrough) and add a third new paragraph to Art. 45 with two new Examples:

"*45.1*. If a taxon originally assigned to a group not covered by this *Code* is treated as belonging to the algae or fungi, any of its names need satisfy only the requirements of the relevant other *Code* that the author was using for status equivalent to valid publication under this *Code* (but see Art. 54 and F.6.1, regarding homonymy). The *Code* used by the author is determined through internal evidence, irrespective of any claim by the author as to the group of organisms to which the taxon is assigned. ~~However, a name generated in zoological nomenclature in accordance with the Principle of Coordination is not validly published under this *Code* unless and until it actually appears in a publication as the accepted name of a taxon.~~"

"*45.n3*. If a taxon originally assigned to a group not covered by this *Code* is treated as belonging to the algae or fungi and its name was originally generated in zoological nomenclature in accordance with the Principle of Coordination, the name is not validly published under this *Code* unless and until it actually appears in a publication as the accepted name of a taxon. An exception is made for the names of taxa simultaneously and continuously assigned to traditional groups covered by different *Codes*, i.e. Myxomycetes/Mycetozoa (Amoebae) and Protista, where the authorship and date of publication established by the Principle of Coordination overrides that determined by the rules of this *Code*."

"*Ex. n6. Arcyriini* Rostaf. (Vers. Syst. Mycetoz.: 15. 1873, '*Arcyriaceae*') was originally published for a tribe of Mycetozoa under the *International Code of Zoological Nomenclature*. When Rostafiński later established the mycetozoan family *Arcyriidae* Rostaf. (in Pamiętn. Towarz. Nauk Ścisłych Paryżu 5(4): 70, 87. 1874), in accordance with the Principle of Coordination of the *ICZN* (Art. 36.1) the authorship and date of publication of family-group names at every rank should be Rostafiński (l.c. 1873). Under this *Code*, the family name *Arcyriaceae* and tribal name *Arcyrieae* are considered as validly published for Myxomycetes, but retain their original authorship and date in accordance with the Principle of Coordination: *Arcyrieae* Rostaf. (l.c. 1873) and *Arcyriaceae* Rostaf. (l.c. 1873, not *Arcyriaceae* Rostaf., l.c. 1874), but with their original terminations changed in accordance with Art. 18.4, 19.7, and 32.2. The subfamily name *Arcyrioideae* J. Schröt. (in Cohn, Krypt.-Fl. Schlesien 3(1): 108. 1885, '*Arcyriei*'), although published for a fungal taxon of Myxomycetes, in accordance with the Principle of Coordination has authorship and date of publication from Rostafiński (l.c. 1873), but with the original termination changed in accordance with Art. 19.7 and 32.2."

"*Ex. n7. Physaroideae* Fr. (Syst. Orb. Veg.: 139. 1825, '*Physarei*') was originally published for a fungal taxon at the rank of subfamily ("Subord[o naturalis].") of the family ("Ord[o naturalis].") '*Trichospermi*' Fr. Although Chevallier later established the family name *Physaraceae* Chevall. (Fl. Gén. Env. Paris 1: 332. 1826, '*Physarieae*') as a fungal taxon, since the organisms are now considered as Mycetozoa, in accordance with the Principle of Coordination of the *International Code of Zoological Nomenclature* (Art. 36.1), the authorship and date of publication of family-group names at every rank should be Fries (l.c. 1825). Later established tribal (*Physareae* Grev., Scott. Crypt. Fl. 6(Synops.): 13. 1828, '*Physarei*') and subtribal (*Physarinae* Tul. in Durieu de Maissoneuve, Explor. Sci. Algérie 1: 406. 1848–1849, '*Physarei*') suprageneric names retain the original authorship and date (Fries, l.c. 1825) in accordance with the Principle of Coordination, but with their original terminations changed in accordance with Art. 19.7 and 32.2."

The progress in molecular phylogenetic systematics in the last years dramatically changed the affiliation of some groups of microorganisms which were traditionally treated under the *ICN*, namely Myxomycetes, Algae (flagellates) and Oomycetes. These groups were also continuously covered by the *ICZN* under different suprageneric designations, Mycetozoa, Flagellata and Chromista. Myxomycetes are now deeply embedded in the amoeboid kingdom or phylum, or even partially interspaced between single amoeboid phylads, and as a consequence, the nomenclature of this group should be made easily understandable for the users. But contradictions between the *ICN* and *ICZN* are mainly visible for suprageneric nomenclature. The Principle of Coordination, basic to zoological nomenclature, is not recognized under the *ICN*, and this is a basic conflict in the authorship and places of valid publication for suprageneric names in particular groups of microorganisms governed by both *Codes*. Proof of the deep affiliation of Myxomycetes with protistan amoebas in recent molecular trees necessitates building a uniform nomenclatural approach to the systematic treatment of this group by overcoming these contradictions. In this connection, because Art. 45.1 currently provides for the valid publication of names originating in accordance with the Principle of Coordination only after they are accepted in a publication, I am proposing to recognize, in only those groups traditionally covered by both *Codes*, their valid publication as determined by the Principle of Coordination. This necessitates the proposal of a new Article and two Examples, to show the treatment of suprageneric names in particular, and elimination of the final sentence from the current Art. 45.1, which is converted into a newly proposed Article.

(278) Add a fourth new paragraph to Art. 45 with a new Example and revise Art. 41.5 to add a special exception (new text in bold, deleted text in strikethrough):

"*45.n4*. For a taxon originally assigned to a group not covered by this *Code* that is treated as belonging to the algae or fungi, any new combination, name at new rank, or replacement name published with status equivalent to valid publication under the relevant other *Code* is considered as validly published under this *Code* even if its basionym or replaced synonym was not clearly indicated and a full and direct reference was not given to its author and place of valid publication, with page or plate reference and date (see Art. 41.5)."

"*Ex. n8*. The new combination *Baltisphaeridium longispinosum* (Eisenack) Eisenack (in Neues Jahrb. Geol. Paläontol., Abh. 106: 398. 1958), originally published as a fossil protist of dinoflagellates (not algae) and available under the *International Code of Zoological Nomenclature*, is validly published under this *Code* also, although it was not accompanied by a full and direct reference to its basionym author and place of valid publication with page or plate reference and date (*Ovum hispidum* subsp. *longispinosum* Eisenack in Paläontol. Z. 13: 110. 1931). Its republication by Eisenack (in Palaeontographica, Abt. A, Paläozool. 112: 194. 1959), previously considered necessary for valid publication under earlier editions of this *Code*, should be considered as creating an isonym."

"*41.5*. On or after 1 January 1953, a new combination, name at new rank, or replacement name is not validly published unless its basionym or replaced synonym is clearly indicated and a full and direct reference given to its author and place of valid publication, with page or plate reference and date (but see Art. 41.6, ~~and~~ 41.8**, and 45.n4**). On or after 1 January 2007, a new combination, name at new rank,

or replacement name is not validly published unless its basionym or replaced synonym is cited **(except as provided in Art. 45.n4)**."

The contradiction between both *Codes*, the *ICN* and the *ICZN*, also lies in the necessity to provide references to the basionym or replaced synonym for valid publication of new combinations, names at new rank, or replacement names in the *ICN* on or after 1 January 1953. No comparable provision exists in the *ICZN*. Numerous such names were treated as available under the *ICZN* without fully referenced basionyms or replaced synonyms, in contradiction to the requirement of *ICN* Art. 41.5, and were later independently validated under the *ICN*. As a result, when these identical nomenclatural novelties are produced under the more liberal provisions of the *ICZN*, it has created an absurd "dual" nomenclature for the same taxon. In order to permit valid publication under this *Code* of such nomenclatural novelties where they originated under zoological nomenclature, it is proposed to revise Art. 41.5 and add a new paragraph to Art. 45 with an Example.

(279) Add a fifth new paragraph to Art. 45 with a new Example and revise Art. 20.2 to add a special exception (new text in bold):

"*45.n5*. For a taxon originally assigned to a group not covered by this *Code* that is treated as belonging to the algae or fungi, a generic name published with status equivalent to valid publication under the relevant other *Code* is considered as validly published under this *Code* even if it coincides with a Latin technical term that is not permissible under Art. 20.2."

"*Ex. n9. Ovulum* Jankauskas (in Paleontol. Zhurn. 1975(1): 96. 1975), originally published as a microfossil of the artificial problematic group Acritarcha, which is treated simultaneously under the rules of the *International Code of Zoological Nomenclature* and this *Code*, is considered validly published under this *Code* although coinciding with a Latin technical term."

"*20.2*. The name of a genus may not coincide with a Latin technical term in use in morphology at the time of publication unless it was published before 1 January 1912 and was accompanied by a species name published in accordance with the binary system of Linnaeus**, except for names originally assigned to a group not covered by this *Code* (see Art. 45.n5 and Ex. n9)**."

The *Ovulum* case is a further illustration of the difference between the *ICN* and the *ICZN*. Since such names may coincide with a Latin technical term in use in morphology in zoological nomenclature, in order to not require substitute names under the *ICN*, which would be treated as superfluous and illegitimate in zoological nomenclature in those groups of microorganisms governed traditionally by both *Codes*, it is proposed to modify Art. 20.2 with an exception and add a new paragraph to Article 45 with a new Example.

(280) Add a sixth new paragraph to Art. 45 with a new Example and revise the final sentence of Art. 60.8 to add a special exception (new text in bold):

"*45.n6*. For a taxon originally assigned to a group not covered by this *Code* that is treated as belonging to the algae or fungi, the original spelling of the epithet in its name, which is considered correct under the relevant other *Code* but is correctable under Art. 60.8, is retained under this *Code* as the correct spelling."

"*Ex. n10. Hystrichosphaerina schindewolfi* G. Alberti (in Palaeontographica, Abt. A, Paläozool. 116: 38. 1961), with the epithet spelled as originally established under the *International Code of Zoological Nomenclature*, is retained as the correct spelling under this *Code* although '*schindewolfi*' is correctable to '*schindewolfii*' under Art. 60.8."

"*60.8*. […] Terminations contrary to the above standards are treated as errors to be corrected to *[i]i, [i]ae, [i]ana, [i]anus, [i]anum, [i]arum*, or *[i]orum*, as appropriate (see also Art. 32.2). However, epithets formed in accordance with Rec. 60C.1 **and Art. 45.n6** are not correctable (see also Art. 60.9)."

The difference in spelling of epithets, formed under the different rules of the *ICZN* and *ICN*, is a permanent headache of the IFPNI and indexing centres of other microorganisms. Although a correction of spelling is permissible now under Art. 60.8, the initial form, generated in zoological nomenclature, nevertheless remains correct under the *ICZN*. This schism might not be bridged at present, since traditions of spelling in both nomenclatures are different. In IFPNI we recorded both spellings, and users could find names either by spelling *Hystrichosphaerina schindewolfi* and *H. schindewolfii*. But I suggest that it is rational in "ambiregnal" groups to allow both types of spelling terminations, so one correct under a different *Code* should not be treated as an error to be corrected under the *ICN*. This allows indexing centres compiling names of such microorganisms governed by two *Codes* to record only a single correct spelling.

(281) Proposal to amend Article 46.1 to mention the rules for which the determination of the correct author is critical

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Article 46.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) states "In publications, […] it may be desirable […] to cite the author(s) of the name concerned […]. In so doing, the following rules apply." One could argue that this statement is not much more than a Recommendation, because in general there are no adverse consequences under the *Shenzhen Code* for an incorrect author citation.

However, Art. 46.1 does not mention the rules for which the determination of the correct author is critical. For example, Art. 41.5 states that a full and direct reference to the author is required to validly publish a new combination, name at new rank or replacement name. The determination of the correct author impacts what the original material for a name would be, which in turn will affect its typification. The wrong authorship could also mistakenly imply valid publication in the wrong place, thereby impacting priority and possibly homonymy with another name. Homonyms are distinguished by their different authorship.

Because Art. 46.1 informs readers of the purpose of Art. 46, these important rules should be mentioned.

(281) Amend Art 46.1 as follows (new text in bold, deleted text in strikethrough):

"*46.1.* **The determination of the author(s) of a name and its publication is critical for application of certain rules in this *Code*; see, e.g., Art. 9.4 (original material), 11 (priority), 41.5 (requiring a full and direct reference to the author of a basionym or replaced synonym to publish a new combination, name at new rank, or replacement name), and 53 (homonyms).** In publications, particularly those dealing with taxonomy and nomenclature, it may be desirable, even when no bibliographic reference to the protologue is made, to cite the author(s) of the name concerned ~~(see also Art. 22.1 and 26.1)~~. ~~In so doing~~ **For these purposes**, the following rules **in Art. 46–50** apply **(see also Art. 22.1 and 26.1)**."

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(282) Proposal to amend Article 60 Note 4 by specifying possible options of the grammatical gender and number of epithets honouring certain non-binary persons

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Article 60.8 of the *International Code of Nomenclature for algae, fungi, and plants* (Turland & al. in Regnum Veg. 159. 2018) explains the terminations of specific and infraspecific epithets derived from personal names; in particular, the grammatical gender-determined terminations applied depending on the gender of a person. However, the epithets mentioned in this Article refer only to persons of either the male or female gender. I consider such an approach as not covering all currently recognized gender identities. In particular, it does not take into account non-binary people whose gender identities are beyond the binary gender system (e.g. Matsuno & Budge in Curr. Sex. Health Rep. 9: 116–120. 2017; see also https://nonbinary.wiki/wiki/Main_Page, accessed 22 Mar 2023).

Non-binary (also nonbinary) is an umbrella term encompassing several categories of social gender identities falling outside the

traditional sociobiological binary gender framework, including persons whose gender identity falls between or outside the basic biological male and female identities, persons who experience being male or female at separate times, and persons who do not experience having a gender identity or reject having a gender identity. It is advisable to use people's preferred pronouns and grammatical gender identifiers (in addition to names and terms for gender). For example, some non-binary people use they/their/them/themselves in singular or have explicitly developed neutral pronouns (also sometimes termed neopronouns), such as xe/xyr/xem/xyrself or ze/zir/zem/zirs, rather than he/his/him/himself or she/her/her/herself (Richards & al. in Int. Rev. Psychiatry 28: 95–102. 2016; Hekanaho in Neuphilol. Mitteilungen 121: 498–509. 2020). The first person in Australia in 2003 and the first person in the United States in 2016 obtained legal recognition of their non-binary gender.

Therefore, I propose to amend Art. 60 Note 4.

(282) Amend Art. 60 Note 4 as follows (new text in bold):

"*Note 4*. If the gender and/or number of a substantival epithet derived from a personal name is**/are** inappropriate for the gender and/or number of the person(s) whom the name commemorates, the termination is to be corrected in conformity with Art. 60.8. **However, the grammatical gender used for a person whom the epithet commemorates may be determined by the preferred gender identity of that person. Also, an epithet honouring a non-binary person in some cases may be created by adding *-iorum*, *-iarum*, or another indicator of grammatical plurality.**"

The proposed amendment will not affect the stability of existing nomenclature but will provide for the future an option of forming epithets of scientific names of organisms with due consideration of the gender identities and rights of non-binary people.

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(283) Proposal to amend the use of the termination *-ara* in forming nothogeneric names

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Article H.6 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) provides instructions for the formation of nothogeneric names for intergeneric hybrids. Article H.6.3 and H.6.4, dealing with the formation of nothogeneric names for intergeneric hybrids involving three or more genera, provide for a name to be formed from the name of a person to which is added the termination *-ara*. This is a very workable procedure. However, when the personal name used already ends with *-a*, addition of the termination *-ara* produces a double *a* in the name, as in ×*Hayataara* J.M.H. Shaw, named for Bunzô Hayata (1874–1934). There are at least 48 nothogenera in *Orchidaceae* where the personal name used ends with *-a*. None is known from other families.

At times, nothogeneric names based on personal names ending with *-a* have been formed by the addition of a modified termination *-ra* as, for example, ×*Iwanagara* Iwanaga & Wreford for Ernest T. Iwanaga, ×*Kagawara* Kagawa & Wreford for Hiroshi Kagawa and ×*Yamadara* M. Yamada & Wreford for Masao Yamada, whereas ×*Perreiraara* Perreira & Wreford for Robert J. Perreira conforms to the present rule. The current proposal is designed to simplify the spelling and pronunciation of nothogeneric names by avoiding the formation of the double *a* in the name. A precedent exists in Art. 60.8(c) where the adjectival ending *-anus/ana/anum* is reduced to *-nus/na/num* for personal names ending with *-a*.

It would also be instructive to include in each Example provided for Art. H.6.3 and H.6.4. the personal name on which the nothogeneric name is based.

(283) Amend Art. H.6.3 and Art. H.6.4 to form nothogeneric names when a personal name already ends with *-a* by addition of the modified termination *-ra*, and add to Ex. 6 and Ex. 7 (new text in bold):

"*H.6.3*. The nothogeneric name of an intergeneric hybrid derived from four or more genera is formed from the name of a person to which is added the termination *-ara***, except when the personal name already ends with *-a* in which case the termination *-ra* is added**; no such name may exceed eight syllables. Such a name is equivalent to a condensed formula."

"*Ex. 6*. ×*Beallara* Moir (in Orchid Rev. 78(929): New Orch. Hybr. [1, 3]. 1970) **commemorating J. Ferguson Beall** (*Brassia* R. Br. × *Cochlioda* Lindl. × *Miltonia* Lindl. × *Odontoglossum* Kunth);

×*Cogniauxara* Garay & H. R. Sweet (see Art. H.8 Ex. 3) **commemorating Célestin A. Cogniaux** (*Arachnis* Blume × *Euanthe* Schltr. × *Renanthera* Lour. × *Vanda* W. Jones ex R. Br.)**; ×*Hayatara* J. M. H. Shaw (in Sander's List Orchid Hybrids Addendum 2002–2004: xxxv. 2005, '*Hayataara*') commemorating Bunzô Hayata (*Brassavola* R. Br. × *Cattleya* Lindl. × *Laelia* Lindl. × *Myrmecophila* Rolfe × *Pseudolaelia* Porto & Brade)**."

"*H.6.4*. The nothogeneric name of a trigeneric hybrid is either *(a)* a condensed formula in which the three names adopted for the parental genera are combined into a single word not exceeding eight syllables, using the whole or first part of one, followed by the whole or any part of another, followed by the whole or last part of the third (but not the whole of all three) and, optionally, one or two connecting vowels, or *(b)* a name formed like that of a nothogenus derived from four or more genera, i.e. from a personal name to which is added the termination *-ara*, **except when the personal name already ends with *-a* in which case the termination *-ra* is added**."

"*Ex. 7*. ×*Sophrolaeliocattleya* Hurst (in J. Roy. Hort. Soc. 21: 468. 1898) (*Cattleya* Lindl. × *Laelia* Lindl. × *Sophronitis* Lindl.); ×*Rodrettiopsis* Moir (in Orchid Rev. 84: ix. 1976) (*Comparettia* Poepp. & Endl. × *Ionopsis* Kunth × *Rodriguezia* Ruiz & Pav.); ×*Holttumara* Holttum (see Art. H.8 Ex. 3) **commemorating Richard E. Holttum** (*Arachnis* Blume × *Renanthera* Lour. × *Vanda* W. Jones ex R. Br.)**; ×*Kagawara* Kagawa & Wreford (Orchid Rev. 76: New Orch. Hybr. [2, 4]. 1968) commemorating Hiroshi Kagawa (*Ascocentrum* J. J. Sm. × *Renanthera* Lour. × *Vanda* R. Br.)**."

(284) Proposal to add a Note after Article H.9.1 to clarify that a statement of the names of parent species is sufficient for valid publication of the name of a nothogenus

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A number of nothogenera in the past and in recent years have been published with a statement of the species that make up the cross rather than just the parent genera. A recent example is the name ×*Leontoroides* B. Bock (in Bull. Soc. Bot. Centre-Ouest 42: 274. 2012), which was published as "× ***Leontoroides kaiseri*** (J.Murray) B.Bock - *comb. nov.* - [*Leontodon hispidus* L. × *Scorzoneroides pyrenaica* (Gouan) Holub]". Although there is no separate entry for the nothogenus and parent genera, the nothogeneric name has been considered validly published simultaneously with the nothospecies combination, because the parent generic names are part of the parent species names cited. From the statement of the parent species and the condensed formula of the nothogenus there can be no doubt that the parent genera are *Leontodon* L. and *Scorzoneroides* Moench. Although we stress that this is bad practice, it seems unnecessarily strict to consider such names as not validly published, forcing the authors to publish both names again with an explicit statement of the parent genera. Because this mostly applies to horticultural names, there is often little interest or incentive to publish such names, so they remain technically not validly published. Indication of a type, even though not explicitly required for monotypic genera in Art. 40.3 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), is important for the application of a non-hybrid generic name. The equivalent for nothogenera does not apply, however, because whichever species within the parent genera are postulated, the application of the nothogenus remains the same (Art. H.9 Note 1). Therefore, this proposed Note will have no nomenclatural impact, whereas not allowing this will require the republication of numerous nothogenera and, because this issue has not been routinely recorded in the International Plant Names Index (IPNI; https://www.ipni.org/) or elsewhere, it will be destabilizing to require that retrospectively.

(284) Add a new Note after Art. H.9.1:

"*Note 1bis*. A statement of the names of the parent species of a nothogenus, or of the names of the parent species of any of its included taxa, is sufficient to validly publish the name of a nothogenus, if the full names of all parent genera appear among the species names, when there is no separate statement of the names of the parent genera."

(285) Proposal to streamline proposals to amend the Code that concern only non-voted Examples or the Glossary

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Division III Prov. 5.6 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) requires proposals to amend the *Code* that concern only Examples (excluding voted Examples) or the Glossary to be automatically referred to the Editorial Committee (EC) at the Nomenclature Section (NS) of the International Botanical Congress (IBC). Such a proposal is not then discussed by the NS unless a member of the NS, supported (seconded) by five other members, proposes to discuss it. This is possible because Div. III Prov. 7.11 clearly defines the mandate of the EC, which "is empowered to make any editorial modification not affecting the meaning of the provisions concerned, e.g. to change the wording of any Article, Note, or Recommendation and to avoid duplication, to add or remove non-voted Examples, and to place Articles, Notes, Recommendations, and Chapters of the *Code* in the most convenient place". Because the EC is charged with this task, a discussion of Examples or Glossary entries at the NS would, in effect, be attempting to duplicate the EC's work. It would be an unwise use of the valuable time of members of the NS, many of whom have travelled to the IBC at considerable expense. The NS also has limited time – five working days at recent IBCs – to discuss and vote on hundreds of other proposals.

Currently such proposals may nevertheless be published in *Taxon*. This is a lengthy process requiring review and editing by the Rapporteurs, revision by the authors, editing by the Production Editor and Copy Editors of *Taxon*, issuing and checking page proofs with subsequent corrections, publication in the online and print editions of the journal, inclusion in the "Synopsis of proposals" with comments by the Rapporteurs, inclusion in the preliminary guiding vote, automatic referral to the EC without discussion at the NS and, finally, inclusion in the reports of the NS.

In the "Procedures and timetable for proposals" (Turland & Wiersema in Taxon 68: 1372–1373. 2020), the Rapporteurs suggested that such proposals could be submitted without publication directly to the EC, which is represented prior to the Congress by the Rapporteurs. Over the last three years, several authors of proposals have followed this suggestion. Authors have also kindly complied with the Rapporteurs' request (Turland & Wiersema, l.c.) to provide internet links to, or scanned copies of, protologues or other literature cited in proposed Examples, thereby helping the EC in its task of verifying the suitability of the Examples. Submission of these proposals directly to the EC has streamlined the process: the Rapporteurs simply check each submission and add it to the file to be dealt with by the EC after the next IBC.

The following proposal would make it explicit that proposals that concern only non-voted Examples or the Glossary would not be published in *Taxon* but would instead be submitted directly to the EC.

(285) Amend Div. III Prov. 2.1 as follows (new text in bold, deleted text in strikethrough), add a new Prov. 2.1bis and delete Prov. 5.6:

"*2.1*. Proposals concerning the Preamble~~,~~ **and** Divisions I–III~~, and the Glossary~~ **(but see Prov. 2.1bis)** are submitted by publication (see Prov. 1.4) to the Nomenclature Section of an International Botanical Congress."

"*2.1bis*. Proposals that concern only Examples (excluding voted Examples) or the Glossary are submitted via the Rapporteur and Vice-rapporteur, without publication, to the Editorial Committee, which will consider them and act in accordance with Prov. 7.11."

"~~*5.6*. Any proposal to amend the *Code* that concerns only Examples (excluding voted Examples) or the Glossary is automatically referred to the Editorial Committee unless a proposal to discuss it is moved by a member of the Section and supported (seconded) by five other members (but see Prov. 5.5).~~"

(286–289) Proposals on institutional votes, especially to reduce geographical imbalance

Committee on Institutional Votes

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Supporting Information may be found online in the Supporting Information section at the end of the article.

A list of institutional votes is maintained and updated between International Botanical Congresses (see Lindon & al. in PhytoKeys 150: Appendix B. 2020). This list, including the assignment of votes, is currently the responsibility of the Committee on Institutional Votes, a Permanent Nomenclature Committee newly established at the Shenzhen Congress of 2017 (Div. III Prov. 3, 7.1(c), 7.5, 7.9 and 7.12 of the *Shenzhen Code*, Turland & al. in Regnum Veg. 159. 2018). The updated list must be approved by the General Committee and published before a Congress. The number of votes assigned to an institution ranges from 1 to 7 and depends on the size of the institution and its level of taxonomic activity. There are no written criteria for translating these factors into a number of votes, hence the process seems not to be transparent.

One apparent function of institutional votes is to enfranchise *Code*-users who are based at institutions that lack the financial resources to support their in-person participation in the Nomenclature Section of a Congress. An institution's 1 to 7 votes may be cast, according to the institution's instructions, by an authorized member of the Nomenclature Section (the institution's delegate). This apparent function could become obsolete if online (virtual) participation in the Nomenclature Section, including online voting, becomes standard practice in the future, thereby avoiding often prohibitive travel costs. An institution with very limited financial resources could be represented by one or more of its staff members, each registered as an online member of the Section and carrying one personal vote (Div. III Prov. 5.9(a)). See the report of the Special-purpose Committee on Virtual Participation in the Nomenclature Section and associated proposals to amend the *Code* (Landrum & al. in Taxon 70: 1397–1398. 2021 and Taxon 70: 1399–1401. 2021).

It could be argued that another apparent function of institutional votes is to ensure that larger institutions retain more overall influence. The larger institutions with more votes tend to have more financial resources and could in theory support more of their staff members to participate in the Nomenclature Section, thereby having a double advantage when considering also their personal votes (Prov. 5.9). We propose that it would be fairer to allocate one vote per institution regardless of size or taxonomic activity.

There is also a geographical imbalance, partly because there are more institutions in Europe and fewer in Africa and Latin America and the Caribbean; this especially applies to larger institutions with two or more votes (Table 1). Africa and Latin America and the Caribbean have high biodiversity but very few votes, hence *Code*-users in those regions have relatively little influence on the nomenclature of their high biodiversity. Our proposal would increase their share of the institutional votes. Among the 931 institutional votes on the current list, Europe has 38%, but Africa has only 5% and Latin America and the Caribbean 12%. If each institution had one vote, Europe would have 33%, Africa 6% and Latin America and the Caribbean 14%. There would also be a small increase for Asia (20% to 22%), a decrease for Australasia and the Pacific (6% to 5%) and no change for Northern America (19%). In other words, there would be no major changes but the geographical imbalance would be reduced.

A third apparent function of institutional votes is to reduce the impact of greater attendance at the Nomenclature Section by members from the host country. At the Shenzhen Congress of 2017, members from China carried 30% of the total personal votes, reflecting the expected greater attendance by members from the host country.

Institutional votes reduced this figure: members and institutions from China carried 13% of the total personal + institutional votes. The reduction would have been smaller if each institution had carried one vote: from 30% to 18%. At the Melbourne Congress of 2011, members from Australia carried 34% of the total personal votes and members and institutions from Australia carried 18% of the total personal + institutional votes; the latter figure would have been 23% if each institution had carried one vote. See Table 2.

How else would one vote per institution affect the outcome of votes at the Nomenclature Section? Only the card votes (Div. III Prov. 5.10) preserve a record of numbers of personal and institutional yes or no votes (although there is no record of the number of institutions that voted or how many yes or no votes each one cast). At the Shenzhen Congress of 2017, 166 institutions had 427 institutional votes and eight card votes were conducted (Turland & al. in Taxon 66: 1236 [Table 2], 1243 [Table 5]. 2017). If we multiply the totals of institutional yes or no votes by 0.39 (166/427), and make an assumption that institutions voted yes or no in the same proportion regardless of the number of votes they had, we can calculate new totals for the eight card votes. The new totals differ from the actual totals by −1.9% to +0.8% in the percentage of yes votes, which in no case changes the result of the vote, because none was close to the required thresholds: at least 60% of votes cast is required to accept a proposal to amend the *Code* and more than 50% to establish or refer an item to a Special-purpose Committee (Div. III Prov. 5.1(a) and 5.2(f)). At the Melbourne Congress of 2011, 162 institutions had 396 institutional votes and 11 card votes were conducted (McNeill & al. in Taxon 60: 1507 [Table 1], 1510 [Table 3]. 2011). If the same calculations are made, in this case multiplying institutional yes or no votes by 0.41 (162/396), the new totals differ from the actual ones by −2.3% to +2.8% in the percentage of yes votes and, again, in no case does this change the result of the vote. See Supplementary Table S1. Parallel data from earlier Congresses are not available.

The Committee on Institutional Votes proposes the following amendments to Div. III, the first of which allows a maximum of one institutional vote per institution.

(286) Amend Div. III Prov. 3 and 5.9 as follows (new text in bold, deleted text in strikethrough):

"*3.1*. Prior to an International Botanical Congress, the Committee on Institutional Votes updates the list of institutions from the

Table 1. Distribution of institutions and institutional votes according to geographical regions. Africa includes Madagascar; Australasia and the Pacific include Papua New Guinea; Europe includes Turkey west of the Bosporus strait and Russia west of the Ural mountains; Northern America is defined as north of Mexico; Latin America and the Caribbean are defined as Mexico southward and the Caribbean islands. Source of data: see Lindon & al. (in PhytoKeys 150: Appendix B. 2020).

Geographical region	Number of votes	% of world votes	Number of institutions	% of world institutions	Average number of votes per institution
Africa	48	5%	35	6%	1.4
Asia	185	20%	121	22%	1.5
Australasia and the Pacific	57	6%	28	5%	2.0
Europe	353	38%	182	33%	1.9
Latin America and the Caribbean	111	12%	76	14%	1.5
Northern America	177	19%	104	19%	1.7
World	**931**		**546**		**1.7**

Table 2. How institutional votes reduce the impact of greater attendance at the Nomenclature Section by members from the host country. Analysis of the Shenzhen and Melbourne Congresses, with additional calculations based on one vote per institution. Sources of data: for Shenzhen see Turland & al. (in Taxon 66: 1235 [Table 1]. 2017); Lindon & al. (in PhytoKeys 150: Appendix B. 2020); for Melbourne see McNeill & al. in Taxon 60: 1509 [Table 2]. 2011); Flann & al. (in PhytoKeys 41: Appendix A. 2014).

	Number of institutional votes	Number of personal votes	% of personal votes	Total number of votes	% of total votes	Number of institutions	Total number of votes with 1 vote per institution	% of total votes with 1 vote per institution
Shenzhen								
China	30	46	30%	76	13%	12	58	18%
Other countries	397	109	70%	506	87%	154	263	82%
World	427	155		582		166	321	
Melbourne								
Australia	40	69	34%	109	18%	15	84	23%
Other countries	356	135	66%	491	82%	147	282	77%
World	396	204		600		162	366	

previous Congress and allocates **one vote** to each institution ~~one to seven votes~~ (see Prov. 5.9(b)). The list must be approved by the General Committee and published (see Prov. 1.4) prior to the Congress. No single institution, even in the wide sense of the term (e.g. mycological and botanical divisions together), is entitled to more than ~~seven votes~~ **one vote**."

"*3.2*. Prior to an International Botanical Congress, any institution desiring to vote in the Nomenclature Section and not listed as having been allocated ~~any votes~~ **a vote** in the previous Nomenclature Section should notify the Rapporteur-général of its wish to be allocated ~~one or more votes~~ **a vote** and provide relevant information regarding its level of taxonomic activity (e.g. number of active staff, size of collections, current publications). ~~An institution allocated one or more votes in the previous Nomenclature Section and desiring to alter its number of votes may similarly notify the Rapporteur-général.~~"

"*3.3*. An institution wishing to exercise its ~~vote(s)~~ **vote**, as allocated in the published list (Prov. 3.1), must provide its official written authorization to be presented at the Nomenclature Section by its delegate (Prov. 5.9(b))."

"*3.4*. A delegate who is a member of an institution that has not previously applied for, or been allocated, ~~votes~~ **a vote** may apply in person for one institutional vote at the Nomenclature Section."

"*5.9*. There are two kinds of votes at the Nomenclature Section:

(a) Personal votes. Each member of the Section has one personal vote. No accumulation or transfer of personal votes is permissible.

(b) Institutional votes (see Prov. 3). An institution may authorize in writing any member of the Section as a delegate to carry its ~~votes~~ **one institutional vote**.

No single person will be allowed more than 15 votes, including personal vote and institutional votes."

The following three proposals are independent of the one above. The Committee agreed that when an institution applied for one or more institutional votes, or wished to alter its number of votes, it should be registered in an online, open-access index such as Index Herbariorum (https://sweetgum.nybg.org/science/ih/), although it could be a regional rather than an international index. Hence we propose an addition to Div. III Prov. 3.2.

(287) Amend Div. III Prov. 3.2 as follows (new text in bold):

"*3.2*. Prior to an International Botanical Congress, any institution desiring to vote in the Nomenclature Section and not listed as having been allocated any votes in the previous Nomenclature Section should notify the Rapporteur-général of its wish to be allocated one or more votes and provide relevant information regarding its level of taxonomic activity (e.g. number of active staff, size of collections, current publications) **and show that it is registered in an online, open-access international or regional index of herbaria, collections, or institutions**. An institution allocated one or more votes in the previous Nomenclature Section and desiring to alter its number of votes may similarly notify the Rapporteur-général."

When members of the Nomenclature Section wish to exercise institutional votes as delegates of institutions, they must present written authorization from those institutions. The Committee questioned how the officers at the Section would recognize written authorization as "official", and it was agreed that use of the institution's letterhead should be required.

(288) Amend Div. III Prov. 3.3 as follows (new text in bold):

"*3.3*. An institution wishing to exercise its vote(s), as allocated in the published list (Prov. 3.1), must provide its official written authorization **on the institution's letterhead** to be presented at the Nomenclature Section by its delegate (Prov. 5.9(b))."

Division III Prov. 5.9 implies, but does not explicitly rule, that a member of the Nomenclature Section may serve as a delegate of more than one institution (because one person may carry up to 14 institutional votes, and no institution is allowed more than 7 votes). We propose to add a sentence to make this explicit.

(289) Amend the final sentence of Div. III Prov. 5.9 as follows (new text in bold):

"*5.9*. […] **A member of the Section may carry the institutional votes of more than one institution.** No single person will be allowed more than 15 votes, including personal vote and institutional votes."

(290–295) Proposals to amend Division III to create an "Editorial Committee for Fungi" and to shift the timing of appointment of the Deputy Secretary of the Fungal Nomenclature Bureau

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After the Nomenclature Section of each International Botanical Congress (IBC) the Editorial Committee (elected at that Congress) is empowered to write the new version of the *International Code of Nomenclature for algae, fungi, and plants* arising from that Congress. The *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) introduced Div. III Prov. 8 that mandates the Fungal Nomenclature Session (FNS) of an International Mycological Congress (IMC) to approve alterations to Chapter F of the *Code*, the section that contains material solely related to names of organisms treated as fungi. An oversight in the new provision was a mechanism to formally establish the equivalent of the Editorial Committee, as far as having a committee to prepare the revised Chapter F after each IMC.

An attempt to rectify this omission, by making specific reference to an "Editorial Committee for Fungi", was made via a proposal from the floor at the FNS of the San Juan IMC (Prop. F-010). However, at the FNS this proposal was withdrawn (May & al. in IMA Fungus 9(2): xxii–xxvii. 2018) after discussions made it clear that the proposal was most likely outside the mandate of the FNS – because the governance provisions in Div. III state that the FNS deals with "proposals relating to the content of Chapter F" but "excluding any other content".

In order to proceed with production of the San Juan Chapter F, an ad hoc "Editorial Committee for Fungi", as allowed under Div. III Prov. 5.2(e) and 8.1, was approved by the FNS of the San Juan IMC at the beginning of the FNS, prior to voting on individual proposals (May & al. in IMA Fungus 10(21). 2019). This "Editorial Committee for Fungi" produced the San Juan Chapter F (May & al., l.c. 2019).

The proposed changes enable formal approval of the "Editorial Committee for Fungi" as one of the suite of Permanent Nomenclature Committees under Div. III Prov. 7. The Editorial Committee for Fungi will make any necessary changes to the Chapter F arising from the FNS of an IMC. Proposed wording is based on existing provisions of Div. III, dealing with governance, following the principle adhered to in the original changes to Div. III in relation to governance of names of fungi (May in Taxon 65: 921–925. 2016) – which was to mirror existing procedures as closely as possible.

IBCs are normally held every six years while IMCs are normally held every four years. To reflect these different cycles, we also propose to alter the timing of appointment of the Deputy Secretary of the Fungal Nomenclature Bureau from the current "no later than three years prior" to the IMC to two years prior, i.e. halfway through the time between IMCs. This change does not preclude the appointment being made earlier.

(290) Amend Div. III Prov. 4.12 and 4.13 as follows (new text in bold):

"*4.12*. The Nominating Committee is charged with preparing lists of candidates to serve on the Permanent Nomenclature Committees (with the exception of the Nomenclature Committee for Fungi **and the Editorial Committee for Fungi**; see Prov. 4.13), in consultation with the current secretaries of those committees, and to propose the Rapporteur-général for the next International Botanical Congress. The nominations of the Nominating Committee are subject to approval by the Nomenclature Section."

"*4.13*. The Nominating Committee of the Fungal Nomenclature Session (Prov. 8.1) is charged with preparing lists of candidates ***(a)*** to serve on the Nomenclature Committee for Fungi, in consultation with the current Secretary of that Committee, **and *(b)* to serve on the Editorial Committee for Fungi;** and to propose the Secretary of the Fungal Nomenclature Bureau for the next International Mycological Congress. The nominations of the Nominating Committee of the Fungal Nomenclature Session are subject to approval by the Fungal Nomenclature Session."

(291) Amend Div. III Prov. 7.1 as follows (new text in bold, deleted text in strikethrough) and add two new provisions:

"*7.1*. There are ~~nine~~ **ten** Permanent Nomenclature Committees, including five specialist committees (clauses (~~e~~**f**)–(~~i~~**j**)):

(a) General Committee;
(b) Editorial Committee;
***(c)* Editorial Committee for Fungi;**
*(~~d~~**d**)* Committee on Institutional Votes;

(~~d~~e) Registration Committee;
(~~e~~f) Nomenclature Committee for Vascular Plants;
(~~f~~g) Nomenclature Committee for Bryophytes;
(~~g~~h) Nomenclature Committee for Fungi;
(~~h~~i) Nomenclature Committee for Algae;
(~~i~~j) Nomenclature Committee for Fossils."

"*7.4bis*. The Editorial Committee for Fungi is elected by an International Mycological Congress and comprises individuals who should preferably have been present at the Fungal Nomenclature Session of the relevant International Mycological Congress and includes the Secretary of the Editorial Committee for this *Code*. The Secretary and Deputy Secretary of the Fungal Nomenclature Session of the relevant International Mycological Congress serve as Chair and Secretary, respectively, of the Editorial Committee for Fungi." [Based on existing Prov. 7.4]

Renumber existing Prov. 7.5–7.11 accordingly.

"*7.11bis*. The Editorial Committee for Fungi is charged with the preparation and publication of Chapter F in conformity with the decisions approved by the relevant International Mycological Congress. It is empowered to make the editorial modifications specified in Prov. 7.11." [Based on existing Prov. 7.11]

Renumber existing Prov. 7.12–7.15 accordingly.

(292) Amend Div. III Prov. 8.1 as follows (new text in bold, deleted text in strikethrough):

"*8.1*. For proposals relating to the content of Chapter F, which brings together the provisions of this *Code* that deal solely with names of organisms treated as fungi (but excluding any other content), exactly the same procedures outlined in Prov. 1–7 are to be followed except that in Prov. 1, 2, 4, and 5 mentions of International Botanical Congress, Nomenclature Section [of that Congress], Bureau of Nomenclature, ~~and~~ Nominating Committee**, and Editorial Committee** are to be replaced by International Mycological Congress, Fungal Nomenclature Session [of that Congress], Fungal Nomenclature Bureau, ~~and~~ Nominating Committee of the Fungal Nomenclature Session**, and Editorial Committee for Fungi**, respectively; and officers such as President, Rapporteur-général, and Vice-rapporteur (these specifically renamed Chair, Secretary, and Deputy Secretary, respectively) are to be understood as members of the Fungal Nomenclature Bureau rather than the Bureau of Nomenclature (specifically in Prov. 1.1, 1.2, 1.4 footnote, 2.1, 2.3, 2.4, 2.6, 4.2, 4.4, 4.5, 4.7, 4.8, 4.10, 4.11, **5.1,** 5.2, 5.5, 5.6, 5.7, and 5.8; but not in Prov. 5.3 and 5.4; and the following clauses do not apply: Prov. 5.1(e) and (f) and Prov. 5.2(g)). **See also Prov. 4.12, 4.13, 7.1, 7.4bis, and 7.11bis.**"

(293) Amend Div. III Prov. 8.5 as follows (new text in bold, deleted text in strikethrough):

"*8.5*. The Fungal Nomenclature Session has the following functions:

[…]

(e) elects the ordinary members of the Nomenclature Committee for Fungi;

***(f)* elects the ordinary members of the Editorial Committee for Fungi;**

(~~f~~g) elects the Secretary of the Fungal Nomenclature Bureau for the next International Mycological Congress;

(~~g~~h) receives reports of Special-purpose Committees dealing with matters relating solely to names of organisms treated as fungi."

(294) Amend Div. III Prov. 8.10 and 8.11 as follows (new text in bold):

"*8.10*. The decisions taken at the Fungal Nomenclature Session of an International Mycological Congress relating solely to names of organisms treated as fungi, once accepted by a subsequent plenary session of the same Congress, are binding on the Nomenclature Section convened at the subsequent International Botanical Congress. Such decisions will, however, be open for any editorial adjustments deemed necessary by **the Editorial Committee for Fungi after consultation with** the Editorial Committee **for this *Code***."

"*8.11*. Certain publications, which may be electronic or printed or both, appear as soon as feasible after an International Mycological Congress, not necessarily in this sequence:

(a) the Congress-approved decisions and elections of the Fungal Nomenclature Session including the results of the preliminary guiding vote;

(b) the announcement of Special-purpose Committees and their membership;

(c) **the new edition of Chapter F of this *Code*;**

(d) a transcript of the Fungal Nomenclature Session."

(295) Amend Div. III Prov. 8.7 as follows (new text in bold, deleted text in strikethrough):

"*8.7*. In the Fungal Nomenclature Bureau, the Deputy Secretary is appointed by the Secretary and approved by the Nomenclature Committee for Fungi in consultation with the General Committee no later than ~~three~~ **two** years prior to the International Mycological Congress. The Deputy Secretary assists and, if necessary, serves in place of the Secretary."

NOMENCLATURE COMMUNICATIONS

(296–303) Proposals to clarify basionyms and replaced synonyms in Articles 6, 9 and 41

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While it is usually fairly easy to determine the basionym of a new combination or name at new rank, one problem area involves a string of new combinations with the same basionym. In an effort to clarify this particular issue, Art. 6.10 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) included a new rule that states that a "basionym does not itself have a basionym". The explanatory language accompanying the proposal that resulted in the new rule (Prop. 303, Greuter in Taxon 65: 898. 2016) stated that the rule was added so that a new combination (which obviously has a basionym) cannot serve as a basionym of a later name, as had been tacitly assumed by Art. 41 Ex. 25.

Article 41 Ex. 25 states: "[…] *"Machaerina iridifolia"* was proposed […] with a full and direct reference to "*Cladium iridifolium* Baker […]." However, *C. iridifolium* had been proposed […] based on *Scirpus iridifolius* Bory […]. Because Baker provided an explicit reference to Bory, Art. 41.8(a) does not apply and the combination under *Machaerina* was not validly published […]." Based on the explanation of the proposal (Greuter, l.c.), the new language in Art. 6.10 is intended to make it clear that *C. iridifolium* cannot be the basionym of *M. iridifolia*. However, the statement that a "basionym does not itself have a basionym" can be misread to suggest that *C. iridifolium* no longer has a basionym and *M. iridifolia* is validly published.

We propose that Art. 6.10 be revised to reflect the explanatory language of Greuter's earlier proposal.

(296) Amend Art. 6.10 as follows (new text in bold, deleted text in strikethrough):

"*6.10*. A new combination (combinatio nova, comb. nov.) or name at new rank (status novus, stat. nov.) is a new name based on a legitimate, previously published name, which is its basionym. The basionym ~~does not itself have a basionym; it~~ provides the final epithet[1], name, or stem of the new combination or name at new rank. **A new combination or name at new rank cannot be the basionym of a later new combination or name at new rank; in this case, the basionym of all the later names is the earliest name that provides the final epithet, name, or stem of the later names** (~~See~~ **see** also Art. 41.2)."

Article 41 Ex. 25 raises a question: why is *Machaerina iridifolia* not validly published as a replacement name for *Cladium iridifolium*? Article 6.12 states: "A name not explicitly proposed as a substitute for an earlier name is nevertheless a replacement name either *(a)* if it is validated solely by reference to that earlier name or *(b)* […]." Literally read, a new name whose protologue does not contain or refer to a description or diagnosis or correctly refer to a basionym can be validly published as a replacement name by citing and providing a full and direct bibliographic reference to any earlier validly published name. In this case, the only way to validate *M. iridifolia* is by reference to *C. iridifolium*; *M. iridifolia* appears to be a validly published replacement name.

Mosyakin (in Taxon 70: 1391–1392. 2021) correctly noted that there is no rule that a new combination cannot be a replaced synonym. Mosyakin (l.c.) addressed these concerns by proposing a new rule in Art. 41.5. Because these concerns are addressed in Art. 6 for new combinations and names at new ranks, we prefer that they be addressed in Art. 6 for replacement names as well. To address these problems, we propose a new Article that clarifies the meaning of replaced synonyms.

(297) Add a new Article to Art. 6:

"*6.n1*. A new combination or name at new rank cannot be the replaced synonym of a later new combination or name at new rank, because the basionym of the earlier name would be the actual replaced synonym, unless the earlier new combination or name at new rank is the illegitimate name being replaced by a replacement name."

If this proposal is rejected, we recommend that the Editorial Committee delete Art. 41 Ex. 25. If the proposal is accepted, we recommend the following changes to Art. 6.12 and Art. 41 Ex. 25.

(298) Amend Art. 6.12 and Art. 41 Ex. 25 as follows (new text in bold):

"*6.12*. A name not explicitly proposed as a substitute for an earlier name is nevertheless a replacement name either *(a)* if it is validated solely by reference to that earlier name, **which is its replaced synonym**, or *(b)* under the provisions of Art. 7.5."

"*Ex. 25*. (a) The intended new combination *"Machaerina iridifolia"* was proposed by Koyama (in Bot. Mag. (Tokyo) 69: 64. 1956) with a full and direct reference to "*Cladium iridifolium* Baker, Flor. Maurit. 424 (1877)". However, *C. iridifolium* had been proposed by Baker as a new combination based on *Scirpus iridifolius* Bory (Voy. Îles Afrique 2: 94. 1804). **Under Art. 6.10 and 6.n1, *C. iridifolium* cannot serve as the basionym or replaced synonym of *M. iridifolia*.** Because Baker provided an explicit reference to

Bory, Art. 41.8(a) does not apply and the combination under *Machaerina* was not validly published by Koyama."

The last sentence of Art. 6.11 states "The replaced synonym, when legitimate, does not provide the final epithet, name, or stem of the replacement name (see also Art. 41.2 and 58.1)." It is not clear whether this rule also applies to Art. 6.12 and 6.13. In addition, the use of "does not" instead of "may not" suggests that authors may choose to use the same epithet when the replaced synonym is legitimate but are not required to do so. In fact, if it is the same epithet, it is a basionym, not a replaced synonym. We suggest that these points be added in a new Article.

(299) Add a new Article to Art. 6 and delete the last sentence of Art. 6.11 as follows (deleted text in strikethrough):

"*6.n2*. The replaced synonym, when legitimate, may not provide the final epithet, name, or stem of the replacement name (see also Art. 41.2 and 58.1)."

"*6.11*. A replacement name (nomen novum, nom. nov.) is a new name published as an explicit substitute (avowed substitute) for a legitimate or illegitimate, previously published name, which is its replaced synonym. ~~The replaced synonym, when legitimate, does not provide the final epithet, name, or stem of the replacement name (see also Art. 41.2 and 58.1).~~"

Article 41.3 states "Before 1 January 1953 an indirect reference (see Art. 38.14) to a basionym or replaced synonym is sufficient for valid publication of a new combination, name at new rank, or replacement name." Article 41 Ex. 3, 7 and 8 address new combinations that refer to an earlier name (including a name that was not validly published) to which the basionym also refers. However, there is no Example that addresses the treatment of a name that refers to a new combination or name at new rank but not their common basionym (or replaced synonym).

This is particularly critical if the new name refers to a name that is treated as a new combination or name at new rank under Art. 41.4. (Under that rule, a name that could be validly published as the name of a new taxon or a replacement name is treated as a new combination or name at new rank if that was the author's presumed intent and there is a potential basionym that applies to the same taxon, even though the protologue did not refer to a basionym.) If this later publication occurs on or after 1 January 1953, Art. 41.8(a) provides that a new combination or name at new rank referencing only an earlier new combination or name at new rank is validly published under certain circumstances. However, it is not clear that such a name is validly published if it was published prior to that date. To clarify this, we suggest the following new Note.

(300) Add a new Note to Art. 41:

"*Note n*. Before 1 January 1953, a reference to an earlier new combination, name at new rank, or replacement name is deemed to include a reference to the basionym or replaced synonym of that name."

Articles 6.11–6.13 address replacement names and replaced synonym but do not explain why it is possible to replace a legitimate name. We propose the following new Note to clarify this point.

(301) Add a new Note to Art. 6:

"*Note n*. A replacement name may be published for a legitimate replaced synonym if it is not possible to publish a legitimate new combination or name at new rank because the new name would be an illegitimate later homonym or could not be validly published (such as a tautonym)."

Article 41.4 states "If, for a name of a genus or lower-ranked taxon published before 1 January 1953, no reference to a basionym is given but the conditions for its valid publication as the name of a new taxon or replacement name are fulfilled, that name is nevertheless treated as a new combination or name at new rank when this was the author's presumed intent and a potential basionym (Art. 6.10) applying to the same taxon exists." In many cases, it may not be possible to ascertain the intent of another party by virtue of a meagre protologue. As a result, botanists (and index authorities) are likely to take different positions on any particular name.

It is important to note that Art. 41.4 already requires a determination that the potential basionym and the later name are the same taxon. In light of that requirement, we do not see any reason to seek out the author's intent. The *Shenzhen Code* (i.e. Art. 6.9, 41.4 and 41.8) expresses a preference for new combinations in cases where the name might also be the name of a new taxon or replacement name. In our view, this preference is warranted because it ensures that the names are homotypic and provides the earliest date of priority if there are synonyms for the name. Furthermore, we see no benefit in synonyms with the same epithet having different types, which may lead to later confusion if the taxon is later split into more than one taxon.

We also note that Art. 41.8, which addresses similar situations for names published on or after January 1953, does not require an assessment of the author's intent. In that Article, the fact that the author referenced a different work is sufficient, even though the author obviously did not intend in some cases to publish a new combination or name at new rank. To simplify this rule, we suggest the following change to Art. 41.4.

(302) Amend Art. 41.4 as follows (deleted text in strikethrough):

"*41.4*. If, for a name of a genus or lower-ranked taxon published before 1 January 1953, no reference to a basionym is given but the conditions for its valid publication as the name of a new taxon or replacement name are fulfilled, that name is nevertheless treated as a new combination or name at new rank when ~~this was the author's presumed intent and~~ a potential basionym (Art. 6.10) applying to the same taxon exists."

We have seen more than one case where an author designated an element cited in the protologue of a new combination as a lectotype even though the protologue of the basionym did not cite that element (and the author of the basionym did not use it) and cited one or more other elements. Article 7.3 states that the type of a new combination is the type of its basionym but does not address the original material of these names. A clarification of this rule is presented below through the inclusion of a new Note in Art. 9.

(303) Add a new Note to Art. 9:

"*Note n*. Because a new combination, name at new rank or replacement name is typified by the type of its basionym (Art. 7.3) or replaced synonym (Art. 7.4; but see Art. 7.5), the original material is that of the basionym or replaced synonym. A lectotype may not be designated from among elements cited or used by the author of the later name that are not original material, although such an element may be designated as a neotype if no original material exists."

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(304–305) Proposals to address admixtures (Article 8.2)

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Article 8.2 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) states "For the purpose of typification a specimen is a gathering, or part of a gathering, of a single species or infraspecific taxon, disregarding admixtures (see Art. 9.14)." In turn, Art. 9.14 addresses the treatment of a type that "contains parts belonging to more than one taxon". Because Art. 8.2 does not define admixtures, the cross-reference to Art. 9.14 in Art. 8.2 might suggest that an admixture is any type containing "parts belonging to more than one taxon" even though Art. 9.14 does not use the term "admixture".

In fact, there is a definition of admixture in the Glossary, which states that an admixture is "something mixed in, especially a minor ingredient; used for components of a gathering that represent a taxon or taxa other than that intended by the collector". Because this definition does not preclude a major ingredient mixed in from being an admixture, it is still not clear if an admixture is different from a specimen with more than one taxon.

In contrast, Turland (The Code Decoded, ed. 2: 70. 2019, https://doi.org/10.3897/ab.e38075) suggests that admixtures are not covered by Art. 9.14, stating "Admixtures are disregarded, e.g. microscopic algae or fungi in environmental samples, inseparably mingled bryophytes, epiphytes or their substrate plants, parasites or their hosts." Presumably, these minor ingredients can be automatically disregarded without publishing anything.

We agree that there are two separate exceptions to the rule in Art. 8.2 that the type specimen be a single taxon. To clarify the distinction between Art. 9.14 and admixtures, we propose the following new Article to explain the rule and a clarification to Art. 8.2.

(304) Add a new Article in Art. 8 as follows, incorporating and amending the definition of "admixture" from the Glossary:

"*8.n*. An admixture is automatically disregarded irrespective of Art. 9.14, and does not prevent the gathering, or part thereof, from being a specimen or type specimen (Art. 8.2). An admixture is a minor ingredient mixed into a specimen, used for components of a presumed gathering that represent a taxon or taxa other than that presumed by the collector."

(305) Amend the first sentence of Art. 8.2 as follows (new text in bold, deleted text in strikethrough):

"*8.2*. For the purpose of typification a specimen is a gathering[1], or part of a gathering, of a single species or infraspecific taxon **(but see Art. 9.14)**, disregarding admixtures (see Art. **8.n**~~9.14~~)."

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(306–314) Proposals to address subsequent type designations (Articles 9.14, 9.19 and Recommendation 9A.4)

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This set of proposals addresses Art. 9.14 and related issues in Art. 9.19 and Rec. 9A.4 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018). Article 9.14 states "When a type (herbarium sheet or equivalent preparation) contains parts belonging to more than one taxon (see Art. 9.11), the name must remain attached to the part […] that corresponds most nearly with the original description or diagnosis."

The first proposal clarifies what, if any, action is required to "attach" a part to the name under Art. 9.14. While the cross-reference to Art. 9.11 suggests that a formal typification is required, the words "must remain" suggest that this attachment is automatic, or perhaps that publication of the correction without the use of "designated here" or other formalities is sufficient. While an automatic attachment may be useful in some cases, in others it may not be clear which part is most consistent with the original description, and botanists may disagree on the answer, leading to disparate treatment of the name.

To address this concern, we are of the view that a formal typification should be required. The following proposal would require one and is based on the language of Art. 9.17 (which provides that a type "that later is found to" consist of more than one specimen can be narrowed "by way of a subsequent […]typification" to one of the specimens).

(306) Amend Art. 9.14 as follows (new text in bold, deleted text in strikethrough):

"*9.14*. ~~When a~~ **A** type (herbarium sheet or equivalent preparation) **that is later found to contain** ~~contains~~ parts belonging to more than one taxon (see Art. 9.11) **must nevertheless be accepted (subject to Art. 9.19 and 9.20), but may be further narrowed (by way of a subsequent typification)** ~~the name must remain attached~~ to the part (specimen as defined in Art. 8.2) that corresponds most nearly with the original description or diagnosis."

The second proposal addresses the apparent contradiction between Art. 9.14 and Rec. 9A.4. Recommendation 9A.4 states "When two or more heterogeneous elements were included in or cited with the original description or diagnosis, the lectotype should be so selected as to preserve current usage." While this Recommendation may have been intended to address untypified names, it also appears to apply to a type that contains more than one taxon; in that case, it recommends that current usage be maintained despite the rule in Art. 9.14 that the type be narrowed to the one corresponding most nearly to the original description. There is no explanation for the different treatments.

If one part of a type most nearly corresponds to the original description while the other preserves longstanding current usage, the application of Art. 9.14 leads to unnecessary nomenclatural instability. Revising Art. 9.14 retroactively might in some cases create instability; amending Art. 9.14 prospectively is not a problem in this respect. If there is no longstanding current usage, the designation should be left to the judgment of the designating parties, who may wish to consider the different usages of the name, the original description and the particulars of the specimen. To address this situation, we propose the following change to Art. 9.14.

(307) Add a new sentence to Art. 9.14 (new text in bold):

"*9.14*. When a type (herbarium sheet or equivalent preparation) contains parts belonging to more than one taxon (see Art. 9.11), the name must remain attached to the part (specimen as defined in Art. 8.2) that corresponds most nearly with the original description or diagnosis. **However, on or after 1 January 2026, a type that remains mixed must be narrowed to a part that preserves the traditional and current usage of the name insofar as possible.**"

If the protologue cites a specimen that does not preserve current usage and an illustration that does, Rec. 9A.4 incorrectly recommends that the latter should be designated in violation of Art. 9.12. It also appears that Rec. 9A.4 has not been revised to accord with the current definition of original material. Finally, the last sentence does not reflect the actual language of Art. 9.19(c). We offer the following proposal to address these matters.

(308) Amend Rec. 9A.4 as follows (new text in bold, deleted text in strikethrough):

"*9A.4*. When **the original material consists of** two or more heterogeneous elements ~~were included in or cited with the original description or diagnosis~~, the lectotype should be ~~so selected~~ **designated so** as to preserve current **and traditional** usage **insofar as possible (but see Art. 9.12)**. ~~In particular, if~~ **If** another author has already segregated one or more elements as other taxa, one of the remaining element~~s~~ should be designated as the lectotype provided that this element is not in **serious** conflict with the ~~original description or diagnosis~~ **protologue** (see Art. 9.19(c))."

Article 9.19(b) provides that a type may be superseded if it is shown that it is contrary to Art. 9.14. Article 9.14 does not provide what, if anything, is required to show which part most closely resembles the original description, and a proposal in that regard might be controversial. However, if an author later shows that the earlier-designated part is contrary to Art. 9.14, the earlier part was necessarily unacceptable when first designated; in fact, there is nothing to supersede. To resolve this situation the following proposal is presented.

(309) Add a new sentence at the end of Art. 9.14 and delete Art. 9.19 clause (b) (new text in bold, deleted text in strikethrough):

"*9.14*. When a type (herbarium sheet or equivalent preparation) contains parts belonging to more than one taxon (see Art. 9.11), the name must remain attached to the part (specimen as defined in Art. 8.2) that corresponds most nearly with the original description or diagnosis. **Any later designation from this type contrary to this rule has no standing.**"

"*9.19*. The author who first designates (Art. 7.10, 7.11, and F.5.4) a lectotype or a neotype in conformity with Art. 9.11–9.13 must be followed, but that choice is superseded if *(a)* the holotype or, in the case of a neotype, any of the original material is found to exist; the choice may also be superseded if it can be shown that *(b)* ~~it is contrary to Art. 9.14 or *(c)*~~ it is in serious conflict with the protologue […]."

The next proposals clarify that neither Art. 9.14 nor 9.17 applies to illustrations. Both of these Articles apply to "types" (which includes both specimens and illustrations) but have additional language referring to specimens without mentioning illustrations. While many treat that language as sufficient to exclude illustrations from their coverage, some have designated a second-step lectotype to exclude a portion of an illustration previously designated as the type. The following proposals explicitly state that illustrations are not covered by either Art. 9.14 or Art. 9.17.

(310) Add a new Note after Art. 9.14:

"Note n. Article 9.14 does not apply to illustrations. An illustration that contains parts belonging to more than one taxon cannot be a type, and any prior indication or designation of such an illustration as a type is not effective unless the prior indication or designation limited the type to one taxon."

(311) Amend Art. 9.17 as follows (new text in bold):

"*9.17*. A designation of a lectotype, neotype, or epitype **(in each case, excluding illustrations)** that later is found to refer to a single gathering but to more than one specimen must nevertheless be

accepted (subject to Art. 9.19 and 9.20), but may be further narrowed to a single one of these specimens by way of a subsequent lectotypification, neotypification, or epitypification (see also Art. 9.14)."

The next proposal addresses the rule in Art. 9.19 that states "The author who first designates (Art. 7.10, 7.11, and F.5.4) a lectotype or a neotype in conformity with Art. 9.11–9.13 must be followed, but that choice is superseded [in certain circumstances]". The purpose of "in conformity with Art. 9.11–9.13" is not immediately clear. While it may have been added because the supersession rules in Art. 9.19 are not applicable to Art. 9.16 (which has its own supersession rule in Art. 9.18), it fails to state that a type designated in Art. 9.14, 9.16, 9.17 or 9.19 must be followed, and those four Articles do not state that a type designated under the applicable Article must be followed. The requirement that a type be followed also arguably conflicts with the rules that permit a new type to be designated if the earlier one is lost, destroyed or missing. To address these matters, the following changes are proposed.

(312) Amend Art. 9.19 as follows (new text in bold, deleted text in strikethrough):

"*9.19*. The author who first designates (Art. 7.10, 7.11, and F.5.4) a lectotype or a neotype in conformity with **the relevant rules of** Art. **9** ~~9.11–9.13~~ must be followed, ~~but that choice~~ **unless a new replacement type is designated in conformity with the relevant rules of Art. 9. Any lectotype or neotype (other than a neotype under Art. 9.16)** is superseded if *(a)* the holotype or, in the case of a neotype, any of the original material is found to exist; the ~~choice~~ **designation** may also be superseded if it can be shown that […]."

Article 9.19(c) states that if the type seriously conflicts with the protologue, "an element that is not in conflict with the protologue is to be chosen; a lectotype may only be superseded by a non-conflicting element of the original material, if such exists; if none exists it may be superseded by a neotype". Because there is no requirement to designate a non-conflicting lectotype or neotype, the only apparent reason to require it in Art. 9.19(c) is to avoid a second supersession. In any case, this standard is too strict, especially because many protologues are now quite long and exceedingly detailed: any conflict whatsoever arguably renders the new typification ineffective. Finally, the last part of the rule states that if no non-conflicting elements of original material exist, then a neotype, theoretically including one that seriously conflicts with the protologue, may be designated. To address these matters, the following amendments to Art. 9.19(c) are proposed.

(313) Amend Art. 9.19 clause (c) as follows (new text in bold, deleted text in strikethrough):

"*9.19*. […] *(c)* it is in serious conflict with the protologue, in which case an element that is not in **serious** conflict with the protologue is to be ~~chosen~~ **designated**; a lectotype may only be superseded by **an** ~~a non-conflicting~~ element of the original material **that does not seriously conflict with the protologue**, if such exists; if none exists it may be superseded by a neotype **that does not seriously conflict with the protologue**."

Article 9 Ex. 15 provides that a herbarium sheet designated as a type containing more than one gathering (and more than one taxon) can be superseded under Art. 9.19(b) with a new designation to comply with Art. 9.14. However, Art. 8.2 (and Ex. 3 thereunder) is very clear that a specimen cannot include more than one gathering. As such, the sheet simply cannot be the type, and the original designation has no nomenclatural standing. To avoid future confusion related to this subject, we propose the deletion of Ex. 15.

(314) Delete Art. 9 Ex. 15.

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(315–316) Proposals to clarify the role of epitypes and to further nomenclatural stability with regard to epitypes and neotypes

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The nomenclatural problems emerging from epitype designations (see Art. 9.9, also Art. 9.17, 9.20 and 9.21 of the *International Code of Nomenclature for algae, fungi, and plants*, the "*Code*": Turland & al. in Regnum Veg. 159. 2018), especially situations when an epitype and the type it supports differ taxonomically, were recently considered and discussed in several publications (e.g. Ariyawansa & al. in Fungal

Diversity 69: 57–91. 2014; Rindi & al. in Fottea (Olomouc) 17: 78–88. 2017; Mosyakin & McNeill in Phytotaxa 376: 133–137. 2018; Mosyakin & Mandák in Taxon 67: 1218–1219, 1220–1221. 2018; in Ukrayins'k. Bot. Zhurn. 77: 413–427. 2020; in Taxon 70: 206–207. 2021; Lendemer in Taxon 69: 849–850. 2020), including proposals to amend the *Code* (e.g. Lendemer in Taxon 69: 631. 2020; Mazumdar & al. in Taxon 69: 631. 2020; Wisnev in Taxon 70: 1382–1383. 2021; de Lírio & al. in Taxon 70: 1384. 2021; Steudel in Taxon 70: 1385–1385. 2021) and summarized by Sennikov (in Nordic J. Bot. 2022(8): e03535. 2022).

However, it seems that Sennikov (l.c.) disagreed with our conclusion that "the application of a name is ultimately established by the epitype, not the lectotype (or even the holotype or neotype)" (Mosyakin & McNeill, l.c.: 134) because "this conclusion is in contradiction with the other functions of the primary types" (Sennikov, l.c.: 2). However, let us consider the logic of Art. 9.9. First, it states that an epitype serves as "an interpretative type". Second, an epitype can be designated "when the holotype, lectotype, or previously designated neotype, or all original material associated with a validly published name, is demonstrably ambiguous and cannot be critically identified for purposes of the precise application of the name to a taxon". Therefore an epitype, by definition, serves as the type used for taxonomic interpretation of a taxonomically ambiguous name thereby establishing the proper taxonomic application of that name. That is exactly what we stated in our article (see above).

But what should be done if, after the designation of an epitype, it is demonstrated that the supported type or all original material associated with a name *can* "be critically identified for purposes of the precise application of the name to a taxon"? Probably in that case an epitype is no longer needed and can be simply cancelled, abandoned or disregarded? Unfortunately, that is not the case.

It is supposed (or implied) in the *Code* (Art. 9.9) that the author who designates an epitype is certain that a type or all original material associated with a name "is demonstrably ambiguous and cannot be critically identified for purposes of the precise application of the name to a taxon". No requirements for any specific proof of that demonstrable ambiguity is currently prescribed in the *Code* (see, however, Rec. 9B), but Lendemer (l.c.: 631) recently proposed to require a statement of demonstrable ambiguity for epitype designation, which we consider a useful amendment. There are also some other proposals to amend the *Code* (see above). However, in our opinion, more certainty might be needed in the future, in comparison with the current requirement of demonstrable ambiguity and Rec. 9B, because to one researcher a taxonomic application of a certain type can be viewed as demonstrably ambiguous, while another author may consider the same specimen not taxonomically ambiguous at all. It still remains uncertain who should be the judges in that case.

Here we propose an amendment to Art. 9.20 making more explicit the conditions under which the procedure of conservation should be undertaken. The thrust of our proposal is already implicit in the current wording of Art. 9.20 requiring conservation of a type under Art. 14 to resolve any conflict between an epitype and the type it supports. The purpose of conservation is to avoid disadvantageous nomenclatural changes and to retain those names that best serve stability of nomenclature (Art. 14.1 and 14.2). We propose that Art. 9.20 make it explicit that any conflict involving an epitype is to be resolved in whatever way best serves nomenclatural stability.

(315) Amend Art. 9.20 as follows (new text in bold):

"*9.20*. The author who first designates (Art. 7.10, 7.11, and F.5.4) an epitype must be followed; a different epitype may be designated only if the original epitype is lost or destroyed (see also Art. 9.17). A lectotype or neotype supported by an epitype may be superseded in accordance with Art. 9.19 or, in the case of a neotype, in accordance with Art. 9.18. If it can be shown that an epitype and the type it supports differ taxonomically and that neither Art. 9.18 nor 9.19 applies, the name may be proposed for conservation with a conserved type **if this will best serve nomenclatural stability** (Art. 14.9; see also Art. 57)."

In our opinion, the procedure of epitypification, as it is currently prescribed in the *Code* and applied now, can be dangerous for nomenclatural stability. In particular, it can be used as a tool for nomenclatural and taxonomic "resurrection" of long-forgotten and/or taxonomically obscure names that are not in current use and may compete with currently accepted names. Many of such long-forgotten and obscure names should better remain in oblivion, for the sake of nomenclatural stability. We have already stated that "At least a new Recommendation not encouraging restoration of taxonomically obscure and nomenclaturally long-forgotten names through their epitypification should be considered, especially in cases when such resurrection affects well-established and widely accepted names" (Mosyakin & McNeill, l.c.: 136). Here we propose a new Recommendation in Rec. 9B.

(316) Add a new Recommendation in Rec. 9B:

"*9B.3*. Neotypes and/or epitypes should not be designated for long-forgotten and/or taxonomically obscure names that are not in current use, especially if such names may compete in terms of priority with currently accepted names."

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(317–318) Proposals to allow new combinations, names at new rank and replacement names to be effectively and validly published by registration only

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A great number of combinations are still needed if we want to move from the traditional morphology-based classification system to one of monophyletic groups. Vorontsova & Simon (in Taxon 61: 735–746. 2012) estimated that 10%–20% of names for species of *Poaceae* would have moved to a different genus by the time the realignment is complete. The discovery of phylogenetic relationships between taxa and their place in the tree of life is ongoing and such results are often published in high-impact journals. Unfortunately, the authors often do not make any or only some of the new combinations needed to implement their newly proposed taxonomy and some journals do not even allow the publication of new combinations as part of included papers. We largely agree with the idea behind such a policy that there should be no mixing of taxonomy and nomenclature. However, the necessary nomenclatural paper often does not follow the taxonomic one for a variety of reasons. As the publication of a new combination, name at new rank or replacement name is largely a technical matter of no intrinsic scientific merit, we feel that a more contemporary approach is needed and, therefore, no longer see a need for such nomenclatural papers or supplements. For many years now it has already been possible to register and publish new names using the Index Fungorum e-publications system (http://www.indexfungorum.org/names/IndexFungorumRegister.htm), which allows for the publication of new combinations, names at new rank and replacement names by registration with the additional step of creating a PDF that complies with the requirements of effective publication. It seems to us unnecessary to have this additional step of creating a PDF and we propose, therefore, the publication of new combinations, names at new rank and replacement names by registration alone at recognized nomenclatural repositories as defined under Art. 42 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018).

On the one hand, there is a continuous call that, to accelerate taxonomy, nomenclature must be made more straightforward, like allowing English as the language of a description or diagnosis and allowing effective publication online, which were implemented in 2012. On the other hand, we foresee that the strongest opposition to this proposal will be that it will create large numbers of "unnecessary" combinations. However, we have seen in recent years numerous papers with many hundreds and even thousands of combinations. The current system does not prevent this either, but our proposal will make it a lot easier for taxonomists to do the necessary nomenclature, where they would otherwise not feel inclined to spend time publishing nomenclatural papers, and will therefore allow for their taxonomy to be used more quickly. The main criticism that has been expressed about the Index Fungorum e-publications system is that the names are not supported by evidence. This evidence is of course taxonomy and we do feel strongly that although taxonomy and nomenclature are complementary, they should continue to be seen as different disciplines because mixing them is often the source of errors and misinterpretations. It may also strengthen the relationship between taxonomists and nomenclaturalists and shine a light on the importance of nomenclature and the work we do. We propose the two main articles below and anticipate that the Editorial Committee will make the necessary cross-references elsewhere. The date of publication would be the date the name first appears on the repository website. As Art. 31.1 already states "the date on which the printed matter or electronic material became available", we assume this is sufficient to include this new case.

(317) Add a new Article to Art. 29 to allow for effective publication by registration only:

"*29.1bis*. On or after 1 January 2026, publication is also effected for new combinations, names at new rank (Art. 6.10), and replacement names (Art. 6.11) by registration of the new combination, name at new rank, or replacement name at a recognized nomenclatural repository (Art. 42). The date of effective publication of such registered names will be the date they first appear on the repository website."

(318) Add a new Article to Art. 41 to allow for valid publication of a new combination, name at new rank or replacement name by registration only:

"*41.5bis*. New combinations, names at new rank, or replacement names that are effectively published under Art. 29.1bis are also considered to be simultaneously validly published. Any errors or omissions are correctable after registration, not affecting the date of valid publication. However, because only new combinations, names at new rank, or replacement names can be validly published by this procedure, correction as the name of a new taxon is not permitted."

(319) Proposal to allow current practice on rank interpretation to continue

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There is often great uncertainty on how to convert Greek and Latin letters and numbers to ranks currently recognized in the *Code* (Turland & al. in Regnum Veg. 159. 2018). Not only can it be difficult to agree on which rank is intended but also disagreements exist on whether indication of rank in one place can be extrapolated throughout a work. Article 37.4 allows for a rank to be considered to be variety if only one rank is used throughout. In our experience, however, very few works published in the late eighteenth and nineteenth centuries contain only one rank. Often, especially in early publications, one rank is seemingly used. However, if the work is meticulously scrutinized, at least one or more instances can be detected where a different rank indication is used. If currently we would follow the *Code* to the letter, a large number of infraspecific names would need to change to being unranked. Another controversial issue that is currently not explicitly addressed in the *Code* is whether, if a letter or number is used as a rank indication and said to be a particular rank, that rank indication can then be used throughout the work or solely for that particular name. We therefore propose a new Article to retain current practice.

(319) Add a new Article after Art. 37.4 to clarify infraspecific ranks:

"*37.4bis*. If in one whole publication (Art. 37.5) no general statement is made by the author on the different infraspecific ranks used in that publication, statements on ranks associated with individual infraspecific names can be used instead to assign rank throughout the publication as long as they do not result in misplaced terms contrary to Art. 5 (see Art. 37.6). If no statement is made or the words "variety" or "form" or their linguistic equivalents are merely used informally rather than as formal rank-denoting terms, upper-case Latin letters must be interpreted as denoting subspecies, lower-case Greek letters as varieties, and lower-case Latin letters as forms as long as they do not result in misplaced terms or contradict any general statement made in the whole publication."

(320–324) Proposals to clarify the term "description", define "validating description" and clarify two Examples (Article 38)

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It is well known that a description is required to publish the name of a new taxon under Art. 38.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018). These proposals offer a revised definition of "description" to address nomina subnuda, i.e. names whose protologues include descriptive statements that are not adequate to validly publish the name, and propose changes to Art. 38 Ex. 3 and 7 involving nomina subnuda.

Perry (in Taxon 53: 1102–1105. 2004) published 11 proposals to address nomina subnuda, about half of which were accepted. Her proposal 302 defined description as "any statement describing a feature or features of a taxon" and added a new requirement that after 2006 the statement had to include a diagnosis. Although this proposal was rejected (McNeill & al. in Taxon 54: 1061 [Art. 32 Prop. B]. 2005), the *Vienna Code* (McNeill in Regnum Veg. 146. 2006) included a similar but subtly different definition of description that omitted the word "describing" in Perry's proposed definition; the current definition in the Glossary of the *Shenzhen Code* states "*description*. [Not defined] – a published statement of a feature or features of an individual taxon; […]." (The Glossary in the *Vienna Code* had stated "a written statement of a feature or features of a taxon required for valid publication of its name […].")

Perry's proposal 305, adding what is now Art. 38.3 and Art. 38 Ex. 7, was accepted (McNeill & al., l.c. 2005 [Art. 32 Prop. E]). Example 7 involves *Musa basjoo*, which was published by Siebold

(in Verh. Bat. Genootsch. Kunsten 12: 18. 1830) including numerous statements involving properties specified in Art. 38.3 ("purely aesthetic features, economic, medicinal or culinary use, cultural significance, cultivation techniques, geographical origin, or geological age") that are not acceptable as a description or diagnosis. Example 7 quotes Siebold as stating "Ex foliis linteum […] conficitur" (linen is made from the leaves) and concluded that "because there is no descriptive information on the "leaves", the only character mentioned, it does not satisfy the requirement of Art. 38.1(a)".

In our view, Perry implicitly treated a leaf as a feature, but the Example was correct based on the language of her proposal because Siebold did not "describe" the leaf as required by her proposed definition. However, the definition of "description" in the *Code* merely requires a statement of a feature, not a description of the feature.

To support this Ex. 7, we suggest that the definition of description be revised to reflect Perry's original proposal without the requirement of a diagnostic statement.

A second point related to Ex. 7 is less apparent. Siebold implicitly stated that the leaves are strong enough to make linen. Users may disagree whether a protologue implicitly stating that the plant has strong leaves is sufficient to validly publish the name. However, the Example can be supported by requiring a description to contain some explicit information about the plant's features, excluding those addressed in Art. 38.3.

(320) Add a new Article in Art. 38, incorporating and amending the definition of "description" from the Glossary, and amend Art. 38 Ex. 7 as follows (new text in bold, deleted text in strikethrough):

"*38.n*. A description is a statement explicitly describing one or more features of an individual taxon. A description need not be diagnostic."

"*Ex. 7. "Musa basjoo"* (Siebold in Verh. Bat. Genootsch. Kunsten 12: 18. 1830) appeared with "Ex insulis Luikiu introducta, vix asperitati hiemis resistens. Ex foliis linteum, praesertim in insulis Luikiu ac quibusdam insulis provinciae Satzuma conficitur. Est haud dubie linteum, quod Philippinis incolis audit Nippis." This statement gives information about the economic use (linen is made from the leaves), hardiness in cultivation (scarcely survives the winter), and geographical origin (introduced from the Ryukyu Islands).~~,~~ ~~but b~~**B**ecause there is no **explicit** descriptive information **(e.g. shape or texture)** on the "leaves"~~,~~ **(**the only ~~character~~ **feature** mentioned**)**, it does not satisfy the requirement of Art. 38.1(a) for a "description or diagnosis". *Musa basjoo* Siebold & Zucc. ex Iinuma was later validly published by Iinuma (Sintei Somoku Dzusetsu [Illustrated Flora of Japan], ed. 2, 3: ad t. 1. 1874) with floral details and **other descriptive material**~~a description in Japanese~~."

If the above proposal is rejected, we recommend that the Editorial Committee either delete Art. 38 Ex. 7 or modify the definition of description in the Glossary to better support the Example.

Another interesting point not addressed in the previous proposal is that the name of a taxon itself may convey descriptive information (e.g. "*viridiflora*"). Article 38 Ex. 3 implies that a description that is simply a translation of the specific epithet is not sufficient to achieve valid publication of the name of a new taxon. We wonder if many would consider such a description to be adequate if different from the name itself (which might not even be descriptive). In other words, contrast a nomen nudum, "*Echinocereus viridiflorus*", with a protologue that simply states "*Echinocereus smithii*. Green flowers." A proposal that the latter either is or is not sufficient to validly publish the name is likely to be destabilizing. For that reason, we merely propose that a name by itself is not sufficient to validly publish the name of a new taxon.

(321) Add a new sentence to the definition of "description" in the Glossary (new text in bold):

"*description*. [Not defined] – a published statement of a feature or features of an individual taxon; a description (or a diagnosis) is required for valid publication of a name of a new taxon (Art. 38.1 (a) and 38.3); a validating description need not be diagnostic (Art. 38 Note 2). **A name, by itself, may convey some descriptive information about the taxon to which it is applied but is not, by itself, sufficient to serve as a description.**"

Hassemer & al. (in Taxon 69: 1–4. 2020) addressed many kinds of features that are adequate to describe a taxon. We draw upon their definition to offer the following proposal.

(322) Amend the definition of "description" in the Glossary as follows (new text in bold, deleted text in strikethrough):

"description [in boldface]. ~~[Not defined] a published~~ **A** statement of a feature or features of an individual taxon~~;~~**, which may include morphological, anatomical, biochemical, karyological, molecular, or similar features of the taxon, but cannot be limited to those properties noted in Art. 38.3. A** ~~a~~ description (or a diagnosis) is required for valid publication of a name of a new taxon (Art. 38.1(a) and 38.3); a validating description need not be diagnostic (Art. 38 Note 2)."

Article 38 Ex. 3 states "In Don, *Sweet's Hortus britannicus*, ed. 3 (1839), for each listed species the flower colour, the duration of the plant, and a translation into English of the specific epithet are given in tabular form. In many genera the flower colour and duration may be identical for all species and clearly their mention is not intended as a validating description or diagnosis. Names of new taxa appearing in that work are not therefore validly published, except in some cases where reference is made to earlier descriptions or diagnoses." (Note that Ex. 3 does not state that Don included an identical description for two or more species in the same genus but instead states that, in many unspecified genera, the flower colour and duration may be identical for all species.) Perry's (l.c.) proposal 307 would have added a new rule that "When, in a list of taxa, one or more features of each taxon are given in tabular form and their expression is reported to be identical for two or more taxa within the next higher group (e.g., species of a genus), the requirement of Art. 32.1(c) for a "description or diagnosis" is not satisfied by this descriptive information for any of the listed taxa." However, that proposal was withdrawn (McNeill & al., l.c. 2005 [Art. 32 Prop. G]). We are concerned that there are other validly published names that could be considered not validly published by analogy with Art. 38 Ex. 3; a brief description provided in the protologues of these other names might also apply to other taxa. A review of *Sweet's Hortus britannicus* reveals important information that should be included in the Example to limit its application.

(323) Amend Art. 38 voted Ex. 3 as follows (new text in bold, deleted text in strikethrough):

"**Ex. 3*. ~~In~~ Don, *Sweet's Hortus britannicus*, ed. 3 (1839)~~,~~ **is a catalogue of plants in tabular form.** ~~for each listed~~ **Each** species

appears on a single line with one of various abbreviations for its habit, ~~the~~ flower colour, **and** ~~the~~ duration of the **flowers** ~~plant~~, and ~~a translation into~~ **the** English **name** ~~of the specific epithet are given in tabular form~~. In many **cases, the same abbreviations are listed for more than one species in a genus** ~~genera the flower colour and duration may be identical for all species and clearly their mention is not intended as a validating description or diagnosis~~. Names of new taxa appearing in that work are not therefore validly published, except in ~~some~~ **those** cases where reference is made to **an** earlier **validating** ~~descriptions or diagnoses~~ **description or diagnosis**. **This voted Example is limited to Don's publication and other similar catalogues.**"

The *Shenzhen Code* uses the term "validating description" in numerous places without defining it. See, e.g., Art. 38 Note 1, Art. 7.8 and 46.2. A review of these provisions makes it clear that the validating description is either the description in the protologue or the previously and effectively published description referenced in the protologue. We propose the following amendment to Art. 38 to define it.

(324) Add a new sentence to Art. 38.1 (new text in bold):

"*38.1*. In order to be validly published, a name of a new taxon (see Art. 6.9) must *(a)* be accompanied by a description or diagnosis of the taxon (see also Art. 38.7 and 38.8) or, if none is provided in the protologue, by a reference (see Art. 38.13) to a previously and effectively published description or diagnosis (except as provided in Art. 13.4 and H.9; see also Art. 14.9 and 14.14); and *(b)* comply with the relevant provisions of Art. 32–45 and F.4–F.5. **The description or diagnosis in the protologue (or referenced in the protologue) is the validating description or diagnosis.**"

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(325) Proposal to amend Article 38.4, to extend its application to a reference to a previously and effectively published description or diagnosis

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Article 38 of *Shenzhen Code* ("*Code*"; Turland & al. in Regnum Veg. 159. 2018) outlines the requirements for the valid publication of names of new taxa. Article 38.1 specifies two options for providing a validating descriptive statement for a name of a new taxon: "In order to be validly published, a name of a new taxon (see Art. 6.9) must *(a)* be accompanied by a description or diagnosis of the taxon (see also Art. 38.7 and 38.8) or, if none is provided in the protologue, by a reference (see Art. 38.13) to a previously and effectively published description or diagnosis (except as provided in Art. 13.4 and H.9; see also Art. 14.9 and 14.14) […]." Articles 38.2 and 38.3 further specify the requirements for a diagnosis or a description. However, no minimal requirements for a description are specified in the *Code*, and certain descriptive statements have been a matter of debate of taxonomists and nomenclaturists for a long time. Since the *Melbourne Code* (McNeill & al. in Regnum Veg. 154. 2012), there has been a possibility of submitting requests for rulings on whether or not a descriptive statement satisfies the requirement for a "description or diagnosis" for valid publication of the name of a new taxon, as outlined in Art. 38.4. This option allows resolution of longstanding nomenclatural conflicts and contributes to the stability of botanical nomenclature. Over 60 such requests have been submitted since this option became available. A proposal was made to extend the application of Art. 38.4 to decisions on illustrations with analysis (Pastore & al. in Taxon 70: 456. 2021), further emphasizing the demand for this kind of ruling in the botanical community.

Article 38.4 provides an option for requests to be made on descriptive statements included in a potential protologue of a new taxon. However, the current redaction of the *Code* does not provide the option for ruling on whether a reference to a previously published description satisfies the requirements for a valid publication. Requirements for reference to a previously and effectively published description are specified in Art. 38.13 and 38.14. They are well defined for names published on or after 1 January 1953. However, for names published before that date, both direct and indirect references are acceptable and the only formal requirement for an indirect reference is for it to be "clear" as specified in Art. 38.14: "An indirect reference is a clear (if cryptic) indication, by an author citation or in some other way, that a previously and effectively published description or diagnosis applies." It allows for various interpretations of the same reference by different authors, potentially leading to different opinions on the validity of a given name. It is therefore proposed to amend Art. 38.4 to extend its application to a reference to a previously and effectively published description or diagnosis.

(325) Amend Art. 38.4 as follows (new text in bold):

"*38.4*. When it is doubtful whether a descriptive statement satisfies the requirement of Art. 38.1(a) for a "description or diagnosis", **or whether a reference to a previously and effectively published description or diagnosis satisfies the requirements of Art. 38.13 and 38.14**, a request for a decision may be submitted to the General Committee, which will refer it for examination to the specialist committee for the appropriate taxonomic group (see Div. III Prov. 2.2, 7.9, and 7.10). A Committee recommendation as to whether or not the name concerned is validly published may then be put forward to an International Botanical Congress and, if ratified, will become a binding decision with retroactive effect. These binding decisions are listed in App. VI."

(326) Proposal to make clearer what details are needed to indicate or designate a type (Article 40 Note 2)

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Article 40.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) requires that the type of the name be indicated to validly publish the name of a new taxon. The second sentence of Art. 40.3 adds that "For the purpose of Art. 40.1, mention of a single specimen or gathering (Art. 40.2) or illustration, even if that element is not explicitly designated as type, is acceptable as indication of the type of the name of a new species or infraspecific taxon (but see Art. 40.6)."

Article 40 Note 2 follows Art. 40.3 and states "Mere citation of a locality does not constitute mention of a single specimen or gathering. Concrete reference to some detail relating to the actual type is required, such as the collector's name, collecting number or date, or unique specimen identifier." A reference to the herbarium is not addressed, and this should also be sufficient, at least in cases where there is only one specimen at that herbarium that predates the protologue. We also think this provision should not be limited to mention of a single specimen but should also apply for purposes of indicating the type.

It would also be helpful to apply these same rules for the purposes of designating a type in Art. 7.11 and indicating a holotype under Art. 9.1. Rather than make this same statement in three places, we propose that this be added to Art. 40 Note 2 with appropriate cross-references.

Finally, Note 2 should be converted to an Article because it contains provisions not covered by other Articles and, as explained in the Preface of the *Shenzhen Code* (p. xxiv), "Notes have binding effect but, unlike Articles, do not introduce any new provision or concept." This Note appears to introduce a new concept.

(326) Convert Art. 40 Note 2 to an Article and amend it as follows (new text in bold, deleted text in strikethrough) and add cross-references to it in Art. 9.1 and Art. 7.11:

"*40.n*. Mere citation of a locality does not constitute mention of a single specimen or gathering**, nor does it constitute an indication of the type**. Concrete reference to some detail relating to the actual type is required, such as the collector's name, collecting number or date, ~~or~~ unique specimen identifier**, or the herbarium, collection, or institution in which the type is conserved**. **A similar detail is required to indicate a holotype under Art. 9.1 or designate a type (lectotype, neotype, or epitype) under Art. 7.11.**"

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(327) Proposal to amend Recommendation 40A.4 to encourage explicit and full citation of data on the label of the type (holotype) specimen of the name of a new species or infraspecific taxon

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The present proposal was first considered after our analysis (see Mosyakin & al. in Phytotaxa 371: 127–132. 2018) of the nomenclatural situation regarding the valid versus not valid original publication of the name *Festuca ×polovina* Bednarska (in Ukrayins'k. Bot. Zhurn. 66: 31. 2009), a hybrid of *F. polesica* Zapał. (in Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 1904: 303. 1904) and *F. ovina* L. (Sp. Pl.: 73. 1753). It was initially assumed that the name was not validly published because the author of the original description failed to indicate the type (holotype) specimen (Art. 40.1 of the *Shenzhen Code*: Turland & al. in Regnum Veg. 159. 2018), and because of that Bednarska & Nachychko (in Phytotaxa 356: 174–176. 2018) presumably validated that name by citing the holotype deposited at LWKS. However, if we assume that in 2009 the name was not validly published, then it was validated in 2010 by Fedoronchuk & al. (in Ukrayins'k. Bot. Zhurn. 67: 217–224. 2010) when these authors cited the type (in fact, syntypes at LWKS, part of the type gathering, see below and Art. 40.1).

Following the advice of the editors and one reviewer, in 2018 Mosyakin & al. (l.c.) concluded that the name *Festuca ×polovina* was validly published in 2009 because Bednarska (l.c.) indicated in the protologue that the holotype is deposited in the LWKS herbarium and mentioned in the text of the article the geographic origin of the taxon (Western Polissya, the northwestern physiographic region of Ukraine), and by this indication she presumably fulfilled the requirements of Art. 40.6 and 40.7. Fedoronchuk & al. (l.c.) cited the label of the type in LWKS but did not mention the existence of three other duplicates in the same herbarium and therefore in fact cited syntypes of the type gathering. The specimen LWKS0030041 (cited as the "holotype" by Bednarska & Nachychko, l.c.) has been designated by Mosyakin & al. (l.c.) as the lectotype of the name *F. ×polovina*.

However, at present, the name *Festuca ×polovina* Bednarska (l.c.) is treated in the International Plant Names Index (IPNI: https://ipni.org/n/77100837-1, all online resources accessed 31 Mar 2023) as a name not validly published, with the following explanation: "Status: nom. inval., contrary to Art. 40, Note 2. ICN (2018)". At the same time, the name *F. ×polovina* Bednarska (in Bednarska & Nachychko, l.c.: 174) is cited in IPNI (https://ipni.org/n/77186030-1) as an isonym. In the Plants of the World Online database (POWO: https://powo.science.kew.org/taxon/77100837-1), the name is cited as validly published in 2009. At present, we think that the name was validated in 2010 by Fedoronchuk & al. (l.c.) and properly lectotypified in 2018 by Mosyakin & al. (l.c.).

All these conflicting and partly confusing opinions on the date and conditions of valid publication of the name *Festuca ×polovina* were caused not only by the unintentional omission of a full and direct citation of the type specimen in the 2009 protologue (for which the authors apologize), but also by some lack of clarity in the current wording of some provisions of Art. 40. To avoid such problems and confusion for the future, Mosyakin & al. (l.c.) already concluded that a proposal to amend the *Code* is desirable for encouraging explicit citation and unambiguous indication of types (in particular, holotypes) for names of newly described taxa. Following that conclusion, the relevant amendment of Rec. 40A.4 is proposed here. A similar recommendation (Rec. 73C. Data on the holotype) on the precise citation of the type specimen is present in the *International Code of Zoological Nomenclature* (*ICZN*: Ride & al., Int. Code Zool. Nomencl., ed. 4. 1999 onward; https://www.iczn.org/the-code/the-code-online/).

(327) Amend Rec. 40A.4 as follows (new text in bold):

"*40A.4*. Details of the type specimen of the name of a new species or infraspecific taxon should be published in the Latin alphabet. **The author(s) should provide in the protologue the full and explicit citation of the data on the label accompanying the type (holotype) specimen, including the exact locality (preferably with geographic coordinates, if available), the name(s) of the collector(s), collecting number and date, and other relevant information.**"

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(328) Proposal to amend Article 41.8 and add a new Article to end the new combination/name of new taxon lottery

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Since the removal, after the International Botanical Congress in Melbourne in 2011, of Art. 33.8 from the *Vienna Code* (McNeill & al. in Regnum Veg. 146. 2006), there has been a steady drip of names, old and new, that were considered not to be validly published under that Article, which are now considered to be names of new taxa, even though they were published as new combinations. The Article stated:

"*33.8*. On or after 1 January 1953, if an author claims to be publishing a new combination, new generic name with a basionym, or avowed substitute, but fails to provide the full information required under Art. 33.4, as qualified by Art. 33.5 and 33.7, the name is not validly published even though the author may have at the same time provided other information that would have resulted in valid publication as the name of a new taxon."

Although removal of this Article seemed sensible to allow such names to be considered as validly published, it has inadvertently created a lottery as to which of the avowed combinations are to be considered as validly published new combinations and which are to be names of new species or infraspecific taxa. This all hinges on the following clause in Art. 41.8 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018): "a full and direct reference to a work other than that in which the basionym or replaced synonym was validly published". The inclusion of this clause means that if a protologue contains a full and direct reference to any work, then the avowed combination is to be considered a validly published new combination, but if there is no full and direct reference, then it is to be considered a name of a new taxon with the same type as the avowed basionym. We believe this clause to be confusing and consider its consequences, the creation of names of new taxa that are homotypic with existing names bearing the same epithet, to be undesirable.

Because many journals now use APA in-text citation style with end-text references, this issue is becoming more common. It is our experience that in many such papers, one or more full citations to a basionym or replaced synonym are missing, resulting in Art. 41.8 having to be applied. This is exacerbated by a general disagreement on what in Art. 41.8 is meant by "a work other than that in which the basionym or replaced synonym was validly published", in particular with regard to Art. 41.8 clauses (c) and (d). Does this refer to a work in which the basionym appears, or any work cited with the new combination, or just any work cited in the paper? Specifically, is the place of publication cited with a synonym sufficient, or would that necessarily create a replacement name? We therefore feel that it would be better to remove clauses (c) and (d) from Art. 41.8 and add them to a new Article in which the offending clause is removed, thus ending any confusion over its definition and ending the lottery on whether a name is to be a new combination or homotypic name of a new taxon.

Our proposed amendment would allow for previously published avowed combinations like *Minuartia mesogitana* subsp. *turcomanica* (Schischk.) McNeill (in Rechinger, Fl. Iranica 163: 50. 1988) to be considered as validly published new combinations, as is universally assumed, even though there is no basionym or basionym reference cited. This name was published with a type indication and Latin description, but prior to the *Melbourne Code* (McNeill & al. in Regnum Veg. 154. 2012) under 33.8 of the *Vienna Code*, the name was considered as not validly published. Under the current *Code*, because there is no "full and direct reference to a work other than that in which the basionym or replaced synonym was validly published", the name is considered validly published as that of a new subspecies, *M. mesogitana* subsp. *turcomanica* McNeill, and is not therefore to be considered a homonym of the earlier homotypic *M. mesogitana* var. *turcomanica* (Schischk.) McNeill (in Notes Roy. Bot. Gard. Edinburgh 24: 388. 1963). This is all very baffling to the general user.

A recent example is *Lecocarpus lecocarpoides* subsp. *brachyceratus* Tye & P. Jaram. (in Bot. J. Linn. Soc. 200: 280. 2022), which was intended as a new combination based on *Acanthospermum brachyceratum* S.F. Blake. Unfortunately, the reference cited for the basionym gives the page numbers of the entire article in which two new species are described. Therefore, the name would not be validly published (Art. 41.5 and Note 1) and, because no other work is cited with the protologue, Art. 41.8 does not apply either. However, the name is considered to be validly published as that of a new subspecies because the authors provided a holotype citation and English description in the protologue. Again, a homotypic name of a new taxon is created, rather than the intended new combination. Since English descriptions were voted to be allowed for valid publication at the Nomenclature Section of the Melbourne Congress, there has been a substantial increase in the number of names that are accidentally validated as names of new taxa in this way.

It is hard to assess the impact of the removal of the *Vienna Code* Art. 33.8 in allowing names that were previously not validly published to become validly published, because names were not routinely flagged as such when they were added to the International Plant Names Index (IPNI: https://www.ipni.org/). However, IPNI does flag cases where Art. 41.8 does not apply and the name is validly published as that of a new taxon. It should therefore be easy to alter these names in IPNI should our proposal be accepted. It is also worth noting that most of the names that would be affected by this proposal are generally cited as new combinations in the botanical literature, because that is how they were intended to be published. The proposed amendment will therefore have little impact on general usage.

We ask the Editorial Committee to make the necessary cross-references, especially "(but see Art. 41.8bis)" to Art. 41.5 and 41.6, rather than formally proposing such changes here.

(328) Delete clauses (c) and (d) from Art. 41.8 (deleted text in strikethrough) and add a new Art. 41.8bis:

"*41.8*. On or after 1 January 1953, in any of the following cases, a full and direct reference to a work other than that in which the basionym or replaced synonym was validly published is treated as an error to be corrected, not affecting the valid publication of a new combination, name at new rank, or replacement name:

(a) when the actual basionym or replaced synonym was validly published earlier than the name or later isonym cited as such, but in the cited publication, in which all conditions for valid publication of the name as cited are fulfilled, there is no reference, in association with that name, to the place of valid publication of the actual basionym or replaced synonym;

(b) when the failure to cite the place of valid publication of the basionym or replaced synonym is explained by the later nomenclatural starting-point for the group concerned (Art. 13.1), or by the backward shift of the starting date for some fungi~~;~~

~~*(c)* when the resulting new combination or name at new rank would otherwise be validly published as a (legitimate or illegitimate) replacement name; or~~

~~*(d)* when the resulting new combination, name at new rank, or replacement name would otherwise be the validly published name of a new taxon~~."

"*41.8.bis*. On or after 1 January 1953, in any of the following cases, the omission of a basionym or replaced synonym (Art. 41.5), omissions in the full and direct reference citation of a basionym or replaced synonym (Art. 41.6), or citation of a work other than that in which the basionym or replaced synonym was validly published are treated as errors to be corrected, not affecting the valid publication of a new combination, name at new rank, or replacement name:

(a) when the resulting new combination or name at new rank would otherwise be validly published as a (legitimate or illegitimate) replacement name; or

(b) when the resulting new combination, name at new rank, or replacement name would otherwise be the validly published name of a new taxon."

(329–338) Proposals to permit DNA sequences to serve as types of names in prescribed circumstances

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Many microorganisms can be detected and characterized using traces of their DNA in environmental samples, such as soil, water, air or other organisms. Some or many of these may be new taxa. However, new taxa cannot be named under the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) unless they can be typified using either a specimen (Art. 8.1), a metabolically inactive culture (Art. 8.4) or an illustration (Art. 8.1, 40.4 and 40.5). Because of these provisions of the *Code*, taxa that can be detected and characterized using DNA sequences but that cannot be isolated, cultured or illustrated, are currently unnameable. This is an important challenge, given that naming, documenting and characterizing the Earth's biodiversity is a core activity of taxonomy, and environmental DNA (eDNA) is allowing the discovery and documentation of significant, and previously hidden, parts of that biodiversity.

Several previous proposals to amend the *Code* (Hawksworth & al. in Taxon 65: 899–900. 2016; Hawksworth & al. in IMA Fungus 9: (i)–(vii). 2018) have attempted to solve this problem. None has been successful. A proposal discussed at the Nomenclature Section of the Shenzhen International Botanical Congress (Hawksworth & al., l.c. 2016), after failing to gain sufficient votes for adoption, was referred to a Special-purpose Committee on DNA Sequences as Types, for consideration. The present proposals result from the deliberations of that Special-purpose Committee.

The Committee established the following important general principles, which inform its proposals:

(1) The remit of the Committee (and hence of the proposals) is to deal with the use of DNA sequences for fixing the application of names; questions about the merits or otherwise of DNA-based *taxonomy* are out of scope.

(2) Any option to name organisms based on DNA sequences should be restricted to taxonomic groups and circumstances where conventional typification (using specimens or illustrations) is not technically feasible, and should not apply to macroscopic organisms such as vascular plants, bryophytes, macro-fungi and macro-algae, or their fossils, where conventional typification is technically feasible. In these cases, DNA sequences may or may not have a role in discriminating and characterizing taxa, but they are excluded from being used to fix the application of names.

(3) The question of the adequacy of a given sequence for the purpose of fixing the application of a name (e.g. whether nuclear, chloroplast or mitochondrial sequences are allowable; how many base pairs or how many regions are adequate) is a scientific question, and is best dealt with using mechanisms outside the formal provisions of the *Code*.

(4) If sequences are used for establishing new names, they must be made freely available in designated online repositories.

The Committee discussed (Thiele & al. in Taxon 72: 965–973. 2023) the history of typification and the nature of types, and concluded that DNA sequences are more akin to descriptions than they are to specimens. The Committee considered two options to solve the problem described above (i.e. taxa that can be detected and characterized but that cannot be named): (1) broadening the definition of "type" to include DNA sequences (despite the fundamental differences between sequences and specimens) and (2) establishing a new concept in the *Code* of type-less names (taxa that can be named without a type, on the basis of a sequence).

This set of proposals deals with the first of these options; an alternative set of proposals (Thiele & al. in Taxon 72: 1146–1148. 2023) deals with the second. Some members of the Special-purpose Committee expressed a preference for the first option while others preferred the second; for this reason, the Committee has opted to provide both sets of proposals for consideration.

It was with some trepidation that the Committee considered extending such a well-established and foundational principle as the type concept. Nevertheless, the Committee believes that the proposed amendments below (or the alternative proposals in Thiele & al. in Taxon 72: 1146–1148. 2023) comprise an important evolution of the *Code*, which must adapt to the new technologies that have resulted in the discovery of many taxa that cannot presently be named.

The authors of these proposals are all members of the Special-purpose Committee on DNA Sequences as Types, but not all members of the Committee agreed to author these proposals.

Members of the Committee consider these proposals to be modest and to have the desired effect (allowing the naming of organisms that cannot currently be named under the *Code*) while at the same time being minimally disruptive for taxonomy and nomenclature. Adopting one or the other set of proposals will solve a real, present problem that limits our ability to taxonomically characterize and name the Earth's biodiversity, but will not "open the floodgates" to unrestricted and uncontrolled DNA-based taxonomy and nomenclature. If both sets of proposals are rejected, the problem will persist, and grow rapidly as the technologies that allow the discovery and characterization of the many taxa that cannot be isolated, cultured or otherwise prepared into specimens become more widespread and effective.

(329) Amend Art. 8.1 as follows (new text in bold):

"*8.1*. The type (holotype, lectotype, or neotype) of a name of a species or infraspecific taxon is either a single specimen conserved in one herbarium or other collection or institution, or a published or unpublished illustration (but see Art. 8.5; see also Art. 40.4, 40.5, and Art. 40 Ex. 6)**; a holotype may also be an effectively published DNA sequence (see Art. X.1)**."

This amendment expands the definition of types to include DNA sequences. Note that sequences may only be holotypes. Lectotypes and neotypes, by definition, cannot be sequences, because lectotypification and neotypification are only relevant for historical names that have been or will be typified by specimens (or illustrations), and Art. 40.5 as amended below restricts the use of DNA sequences as types to circumstances where conventional typification using specimens or illustrations is not technically feasible.

(330) Amend Art. 9.1 as follows (new text in bold, deleted text in strikethrough):

"*9.1*. A holotype of a name of a species or infraspecific taxon is the one specimen, ~~or~~ illustration (but see Art. 40.4)**, or DNA sequence (see Art. X.1)** either *(a)* indicated by the author(s) as the nomenclatural type or *(b)* used by the author(s) when no type was indicated. As long as the holotype is extant, it fixes the application of the name concerned (but see Art. 9.15)."

(331) Amend Art. 9.9 as follows (new text in bold, deleted text in strikethrough):

"*9.9*. An epitype is a specimen, ~~or~~ illustration**, or (solely for names with a DNA sequence as a holotype) a DNA sequence. An epitype is** selected to serve as an interpretative type when the holotype, lectotype, or previously designated neotype, or all original material associated with a validly published name, is demonstrably ambiguous and cannot be critically identified for purposes of the precise application of the name to a taxon. Designation of an epitype is not effected unless the holotype, lectotype, or neotype that the epitype supports is explicitly cited (see Art. 9.20)."

Note that, if this proposal is adopted, only holotypes or epitypes may be DNA sequences, and epitypification using a DNA sequence would only be available for names originally typified using a DNA sequence (i.e. names that cannot be adequately typified using a specimen or illustration). In all other cases, an epitype would be a specimen (or illustration). The intent is to allow a further sequence to be used to epitypify a name typified with a DNA sequence that is subsequently found to be inadequate for unambiguously fixing the application of a name. DNA sequences cannot be used for lectotypification and DNA sequences cannot be isotypes, syntypes or paratypes, because, by definition, these kinds of types will always be specimens (and DNA typification is restricted to cases where specimens cannot be obtained). Similarly, neotypification is only relevant when an existing type specimen or illustration has been lost, so the replacement can and should be a specimen or illustration.

(332) Amend Art. 9.21 as follows (new text in bold):

"*9.21*. Designation of an epitype is not effected unless the herbarium, collection, or institution in which the epitype is conserved is specified or, if the epitype is a published illustration, a full and direct bibliographic reference (Art. 41.5) to it is provided **or, if the epitype is a DNA sequence, both *(a)* the identifier issued for the epitype sequence by an approved online repository (see App. X and Art. X.1) is cited, and *(b)* selected informative portions of the epitype sequence are specified**."

(333) Amend Art. 29.1 as follows (new text in bold):

"*29.1*. Publication **(with the exception of DNA sequences used for typification; see Art. X.1)** is effected, under this *Code*, by distribution of printed matter (through sale, exchange, or gift) to the general public or at least to scientific institutions with generally accessible libraries. Publication is also effected by distribution on or after 1 January 2012 of electronic material in Portable Document Format (PDF; see also Art. 29.3 and Rec. 29A.1) in an online publication with an International Standard Serial Number (ISSN) or an International Standard Book Number (ISBN)."

(334) Amend Art. 38.1 and 39.2 as follows (new text in bold) and add a new Note after Art. 38.1:

"*38.1*. In order to be validly published, a name of a new taxon (see Art. 6.9) must *(a)* be accompanied by a description or diagnosis of the taxon (see also Art. 38.7 and 38.8) or, if none is provided in the protologue, by a reference (see Art. 38.13) to a previously and effectively published description or diagnosis (except as provided in Art. 13.4**, 39.2(b),** and H.9; see also Art. 14.9 and 14.14); and *(b)* comply with the relevant provisions of Art. 32–45 and F.4–F.5."

"*Note 1bis*. For the purposes of Art. 38.1, if the type of a name of a new taxon is a DNA sequence, the sequence itself is treated as a description or diagnosis."

"*39.2*. In order to be validly published, a name of a new taxon published on or after 1 January 2012 must be accompanied ***(a)*** by a Latin or English description or diagnosis, or by a reference (see Art. 38.13) to a previously and effectively published Latin or English description or diagnosis (for fossils see also Art. 43.1)**, or *(b)*, on or after 1 January 2026, by both *(1)* citation of an identifier issued for the holotype sequence by an approved online repository (see Art. X.1(b)(1) and App. X) and *(2)* specification of selected informative portions of the holotype sequence (Art. X.1(b)(2))**."

These amendments allow a DNA sequence to act as a description in cases where no other descriptive information is possible.

(335) Amend Art. 40.5 (new text in bold) and add a new Note as follows:

"*40.5*. For the purpose of Art. 40.1, the type of a name of a new species or infraspecific taxon of microscopic algae or microfungi (fossils excepted: see Art. 8.5) may be an effectively published illustration **or, on or after 1 January 2026, a DNA sequence,** if there are technical difficulties of specimen preservation or if it is impossible to preserve a specimen that would show the features attributed to the taxon by the author of the name."

"*Note x*. For the purposes of Art. 40.5, preservation of a specimen is regarded as technically unfeasible if and only if physical specimens or cultures cannot reasonably be obtained using technologies available at the time of publication. Preservation of a specimen is not considered unfeasible if a type specimen could not be obtained merely for reasons of inconvenience, lack of access, or if a specimen was lost or otherwise not collected when it could have been."

The intent of this amendment and Note is to restrict the scope of DNA typification to only cases where conventional typification using specimens is not technically feasible, in order to be minimally disruptive to established conventional practice for macroscopic organisms that can be conventionally typified. Note that, in some or

many cases, the addition of DNA sequences to protologues for macroscopic organisms may be highly desirable, but these will act as descriptive or diagnostic information rather than as types.

(336) Add the following new Articles in Chapter V Section 2 after Art. 40.5, as follows:

"*X.1*. In order to be validly published with a DNA sequence as type (see Art. 40.5), a name must *(a)* be published in an approved journal (see App. Y, Art. X.2(b)) and *(b)* be accompanied in the protologue by *(1)* citation of the identifier issued for the type sequence by an approved online repository (see App. X and Art. X.2(a)), *(2)* specification of selected informative portions of the type sequence, *(3)* a statement as to why it is believed that the taxon is novel and unnamed, and *(4)* an explanation of why a type specimen could not be isolated, cultured, or otherwise prepared."

"*X.2*. The General Committee, after seeking advice from relevant specialist Committees and international societies, has the powers to *(a)* appoint one or more localized or decentralized, open and accessible electronic repositories to issue the identifiers required by Art. 9.21(a) and X.1(b)(1) (see App. X), *(b)* ratify a list of approved journals for valid publication of names with DNA sequences as types (see App. Y), and *(c)* cancel or alter such appointments or ratifications at its discretion."

Articles X.1 and X.2 have the effect of restricting the range of journals that can be used to publish new names typified using DNA sequences. While such a provision has been discussed but not effected for names in general, the Committee felt that the new provisions proposed here would benefit from such a restriction. For example, this provision removes the need to prescribe in the *Code* the properties of DNA sequences (such as source, length, etc.) needed to meet quality requirements for typification, leaving such matters, in effect, to the editors and peer reviewers of these designated journals (chosen and managed by the General Committee as specified in Art. X.2). The Special-purpose Committee felt that quality assurance is a scientific issue and is best dealt with in this manner.

Requiring justification from the author(s) of a new name as to why a DNA sequence may be appropriately used to typify the new name (X.1(b)(3)) is intended to discourage authors from, for example, erecting a new species based on a novel DNA sequence in a genus that includes species that have not yet been sequenced (and hence could be the source of the sequence). Requiring justification for the impracticability of obtaining a type specimen (X.1(b)(4)) is intended to discourage authors from, for example, erecting a new species that is likely to be macroscopic and/or capable of being isolated or cultured.

(337) Amend Art. 44.2 as follows (new text in bold, deleted text in strikethrough):

"*44.2*. A name of a new species or infraspecific taxon of non-fossil algae ~~published on or after 1 January 1958~~ is not validly published unless ***(a)* on or after 1 January 1958** it is accompanied by an illustration or figure showing the distinctive morphological features, or by a reference to a previously and effectively published such illustration or figure**, or *(b)* on or after 1 January 2026 its holotype is a DNA sequence and it meets the requirements of Art. X.1**."

(338) Amend Div. III Prov. 7.9 as follows (new text in bold, deleted text in strikethrough):

"*7.9*. The General Committee is charged with**: *(a)*** receiving proposals to conserve, protect, or reject names, proposals to suppress works, and requests for decisions (Art. 14.12, F.2.1, 56.2, F.7.1, 34.1, 38.4, and 53.4) and ~~for~~ referring these proposals or requests to the specialist committee(s) concerned (receipt and referral of proposals and requests are automatic upon their publication)~~. The General Committee is also charged with~~**; *(b)*** considering recommendations of the specialist committees and either approving or overturning those recommendations or referring them back to the specialist committees for further consideration**; *(c)* maintaining a list of approved repositories for storing sequences and issuing sequence identifiers; and *(d)* maintaining a list of approved journals for valid publication of names with DNA sequences as types (Art. X.1 and X.2)**. The General Committee may also communicate an international standard format in addition to, or as a successor to, Portable Document Format (PDF) for effective publication of electronic material (Art. 29.3) and is empowered to ratify a list of institutional votes drawn up by the Committee on Institutional Votes (see Prov. 3.1)."

Through Prov. 7.9(c) the General Committee maintains a necessary degree of control over aspects of the use of DNA sequences for fixing the application of names that appropriately fall outside the provisions of the *Code* itself. By approving journals and maintaining App. Y, the General Committee will ensure that sufficient scientific rigour is maintained, by the journal editors, over matters such as sequence type, length and the scientific justifications required for Art. X.1(b)(2), (3) and (4).

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We thank John H. Wiersema, Nicholas J. Turland and Tom W. May for helpful suggestions that improved the manuscript, and all members of the Special-purpose Committee on DNA Sequences as Types, including those who chose not to co-author these proposals.

(339–348) Proposals to permit DNA sequences to be used for fixing the application of names in prescribed circumstances

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Many microorganisms can be detected and characterized using traces of their DNA in environmental samples, such as soil, water, air or other organisms. Some or many of these may be new taxa. However, new taxa cannot be named under the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) unless they can be typified using either a specimen (Art. 8.1), a metabolically inactive culture (Art. 8.4) or an illustration (Art. 8.1, 40.4 and 40.5). Because of these provisions of the *Code*, taxa that can be detected and characterized using DNA sequences but that cannot be isolated, cultured or illustrated, are currently unnameable. This is an important challenge, given that naming, documenting and characterizing the Earth's biodiversity is a core activity of taxonomy, and environmental DNA (eDNA) is allowing the discovery and documentation of significant, and previously hidden, parts of that biodiversity.

Several previous proposals to amend the *Code* (Hawksworth & al. in Taxon 65: 899–900. 2016; Hawksworth & al. in IMA Fungus 9: (i)–(vii). 2018) have attempted to solve this problem. None has been successful. A proposal discussed at the Nomenclature Section of the Shenzhen International Botanical Congress (Hawksworth & al., l.c. 2016), after failing to gain sufficient votes for adoption, was referred to a Special-purpose Committee on DNA Sequences as Types, for consideration. The present proposals result from the deliberations of that Special-purpose Committee.

The Committee established the following important general principles, which inform its proposals:

(1) The remit of the Committee (and hence of the proposals) is to deal with the use of DNA sequences for fixing the application of names; questions about the merits or otherwise of DNA-based *taxonomy* are out of scope.

(2) Any option to name organisms based on DNA sequences should be restricted to taxonomic groups and circumstances where conventional typification (using specimens or illustrations) is not technically feasible, and should not apply to macroscopic organisms such as vascular plants, bryophytes, macro-fungi and macro-algae, or their fossils, where conventional typification is technically feasible. In these cases, DNA sequences may or may not have a role in discriminating and characterizing taxa, but they are excluded from being used to fix the application of names.

(3) The question of the adequacy of a given sequence for the purpose of fixing the application of a name (e.g. whether nuclear, chloroplast or mitochondrial sequences are allowable; how many base pairs or how many regions are adequate) is a scientific question, and is best dealt with using mechanisms outside the formal provisions of the *Code*.

(4) If sequences are used for establishing new names, they must be made freely available in designated online repositories.

The Committee discussed (Thiele & al. in Taxon 72: 965–973. 2023) the history of typification and the nature of types, and concluded that DNA sequences are more akin to descriptions than they are to specimens. The Committee considered two options to solve the problem described above (i.e. taxa that can be detected and characterized but that cannot be named): (1) broadening the definition of "type" to include DNA sequences (despite the fundamental differences between sequences and specimens) and (2) establishing a new concept in the *Code* of type-less names (taxa that can be named without a type, on the basis of a sequence).

This set of proposals deals with the second of these options; an alternative set of proposals (Thiele & al. in Taxon 72: 1143–1145. 2023) deals with the first. Some members of the Special-purpose Committee expressed a preference for the first option while others preferred the second; for this reason, the Committee has opted to provide both sets of proposals for consideration.

It was with some trepidation that the Committee considered this option for fixing the application of names outside the well-established and foundational principle of the type concept. Nevertheless, the Committee believes that the proposed amendments below (or the alternative proposals in Thiele & al. in Taxon 72: 1143–1145. 2023) comprise an important evolution of the *Code*, which must adapt to the new technologies that have resulted in the discovery of many taxa that cannot presently be named.

An advantage of this option is that the important concept of typification, which has underpinned nomenclature for more than a century, is left unchanged. Types remain either specimens or (in some circumstances) illustrations, and all Articles of the *Code* that refer to types keep their traditional meaning. The proposed amendments establish a new mechanism for fixing the application of names using DNA sequences, and restrict the application of that mechanism to narrowly prescribed circumstances where conventional typification is unachievable.

The authors of these proposals are all members of the Special-purpose Committee on DNA Sequences as Types, but not all members of the Committee agreed to author these proposals.

Members of the Committee consider these proposals to be modest and to have the desired effect (allowing the naming of organisms that cannot currently be named under the *Code*) while at the same time being minimally disruptive for taxonomy and nomenclature. Adopting one or the other set of proposals will solve a real, present problem that limits our ability to taxonomically characterize and name the Earth's biodiversity, but will not "open the floodgates" to

unrestricted and uncontrolled DNA-based taxonomy and nomenclature. If both sets of proposals are rejected, the problem will persist, and grow rapidly as the technologies that allow the discovery and characterization of the many taxa that cannot be isolated, cultured or otherwise prepared into specimens become more widespread and effective.

(339) Amend Principle II as follows (new text in bold):

"The application of names of taxonomic groups is determined by means of nomenclatural types **where typification is technically feasible, and by means of a description based on a reference DNA sequence where it is not**."

The Special-purpose Committee recognizes that amending a Principle of the *Code* is a major step. Principle II is in effect a statement of the resolution (in favour of specimens) of an important historical debate as to whether specimens or descriptions are the most effective way to fix the application of taxonomic names (see Thiele & al. in Taxon 72: 965–973. 2023). Given that DNA sequences are more akin to descriptions than they are to specimens, some members of the Committee felt that "simply" including DNA sequences under the definition of "type", while potentially pragmatic, brings with it the danger of mixing concepts that are fundamentally different in kind. This amendment to Principle II preserves the traditional definition of type while allowing for the naming of taxa that cannot be typified.

(340) Amend the title of Chapter II as follows (new text in bold, deleted text in strikethrough):

"STATUS, ~~TYPIFICATION,~~ **APPLICATION,** AND PRIORITY OF NAMES"

This amendment gives clarity to this chapter's scope, which, if these amendments are adopted, will carry a new Section with provisions for type-less names, as well as the existing Section 2, which deals with typification.

(341) Amend Art. 6 Note 1 as follows (new text in bold):

"*Note 1*. For nomenclatural purposes, valid publication creates a name, and sometimes also an autonym (Art. 22.1 and 26.1), but does not itself imply any taxonomic circumscription beyond inclusion of the type **or reference DNA sequence** (see Art. X.1) of the name (Art. 7.1)."

This is the first of several instances where the phrase "or DNA reference sequence" should be added after "type". If this proposal is accepted, the Editorial Committee is asked to deal with subsequent instances, including but not limited to Art. 9, 10, 22, 26, 40, 48 and 52.

(342) Amend Art. 7.1 as follows (new text in bold):

"*7.1*. The application of names of taxa at the rank of family or below is determined by means of nomenclatural types (types of names of taxa)**, except as provided by Art. X.1**. The application of names of taxa at the higher ranks is also determined by means of types when the names are formed from a **typified** generic name (see Art. 10.10) **or by reference sequences when the names are formed from type-less generic names (see Art. X.7)**."

(343) Add a new Section "Type-less names" to Chapter II with the following new Articles and Note:

"*X.1*. On or after 1 January 2026, when typification is not technically feasible, a name of a taxon other than a vascular plant or bryophyte may be published without a type, the application of the name instead being fixed using a DNA reference sequence (Art. X.9)."

"*Note 1*. For the purposes of Art. X.1, typification is regarded as technically not feasible if and only if physical specimens, illustrations, or cultures cannot reasonably be obtained using technologies available at the time of publication. Preservation of a specimen or culture is not considered unfeasible if a type specimen or culture could not be obtained merely for reasons of inconvenience, lack of access, or if a specimen or culture was lost or otherwise not collected or prepared when it could have been."

"*X.2*. A reference sequence of a type-less name is that sequence to which the name of the taxon is permanently attached, whether as the correct name or as a synonym. The reference sequence is not necessarily the most typical or representative sequence of a taxon."

"*X.3*. The reference sequence of a new combination or name at new rank (Art. 6.10) based on a type-less name is the reference sequence of the basionym even though it may have been applied erroneously to a taxon now considered not to include that reference sequence (but see Art. 48.1)."

"*X.4*. The reference sequence of a replacement name (Art. 6.11) for a type-less name is the reference sequence of its replaced synonym even though it may have been applied erroneously to a taxon now considered not to include that reference sequence (but see Art. 41 Note 3 and 48.1)."

"*X.5*. The reference sequence of an autonym of a type-less name is the same as that of the name from which it is derived."

"*X.6*. The reference sequence of a name of a genus or of any subdivision of a genus erected to accommodate only species with type-less names at time of publication is the reference sequence of a name of one of those species. For purposes of designation or citation of a reference sequence, the species name alone suffices, i.e. it is considered as the full equivalent of its reference sequence (see also Rec. 40A.3)."

"*X.7*. The reference sequence of a name of a family or of any subdivision of a family is the same as that of the generic name from which it is formed (see Art. 18.1), if the generic name has a designated reference sequence (Art. X.8). For purposes of designation or citation of a reference sequence, the generic name alone suffices."

"*X.8*. In order to be validly published a type-less name must *(a)* be published in an approved journal (see App. Y, Art. X.9(b)) and *(b)* be accompanied in the protologue by *(1)* citation of the identifier issued for the reference sequence by an approved online repository (see App. X and Art. X.9(a)), *(2)* specification of selected informative portions of the reference sequence, *(3)* a statement as to why it is believed that the taxon is novel and unnamed, and *(4)* an explanation of why a type specimen could not be isolated, cultured, or otherwise prepared."

"*X.9*. The General Committee, after seeking advice from relevant specialist Committees and international societies, has the powers to *(a)* appoint one or more localized or decentralized, open and accessible electronic repositories to issue the identifiers required by Art. X.8(b)(1) (see App. X), *(b)* ratify a list of approved journals for valid publication of names with DNA sequences as types (see App. Y), and *(c)* cancel or alter such appointments or ratifications at its discretion."

Articles X.1–X.7 are the equivalents, for type-less names, of Art. 7 for typified names. Articles X.8 and X.9 have the effect of restricting the range of journals that can be used to publish new names typified using DNA sequences. While such a provision has been discussed but not effected for names in general, the Committee felt that the new provisions proposed here would benefit from such a restriction, and that quality assurance is a scientific issue best dealt with in this manner.

Requiring justification from the author(s) of a new name as to why a DNA sequence may be appropriately used to typify the new name (Art. X.8(b)(3)) is intended to discourage authors from, for example, erecting a new species based on a novel DNA sequence in a genus that includes species that have not yet been sequenced (and hence could be the source of the sequence). Requiring justification for the impracticability of obtaining a type specimen (Art. X.8(b)(4)) is intended to discourage authors from, for example, erecting a new species that is likely to be macroscopic and/or capable of being isolated or cultured.

(344) Add a new Note after Art. 38.1:

"*Note 1bis*. For the purposes of Art. 38.1, if a name is type-less, the reference sequence itself is treated as a description."

(345) Amend Art. 39.2 as follows (new text in bold):

"*39.2*. In order to be validly published, a name of a new taxon published on or after 1 January 2012 must be accompanied ***(a)*** by a Latin or English description or diagnosis, or by a reference (see Art. 38.13) to a previously and effectively published Latin or English description or diagnosis (for fossils see also Art. 43.1)**, or, *(b)* on or after 1 January 2026, by both *(1)* citation of an identifier issued for the reference sequence by an approved online repository (see App. X and Art. X.9(a)) and *(2)* specification of selected informative portions of the reference sequence (see Art. X.8)**."

(346) Amend Art. 40.1 as follows (new text in bold, deleted text in strikethrough):

"*40.1*. Publication ~~on or after 1 January 1958~~ of the name of a new taxon at the rank of genus or below is valid only when ***(a)* on or after 1 January 1958,** the type of the name is indicated (see Art. 7–10; but see Art. H.9 Note 1 for the names of certain hybrids) **or *(b)* on or after 1 January 2026, a reference sequence is designated for a name that meets the requirements of Art. X.1**."

(347) Amend Art. 44.2 as follows (new text in bold, deleted text in strikethrough):

"*44.2*. A name of a new species or infraspecific taxon of non-fossil algae ~~published on or after 1 January 1958~~ is not validly published unless ***(a)* on or after 1 January 1958** it is accompanied by an illustration or figure showing the distinctive morphological features, or by a reference to a previously and effectively published such illustration or figure**, or *(b)* on or after 1 January 2026 a reference sequence is designated for a name that meets the requirements of Art. X.1**."

(348) Amend Div. III Prov. 7.9 as follows (new text in bold, deleted text in strikethrough):

"*7.9*. The General Committee is charged with**: *(a)*** receiving proposals to conserve, protect, or reject names, proposals to suppress works, and requests for decisions (Art. 14.12, F.2.1, 56.2, F.7.1, 34.1, 38.4, and 53.4) and ~~for~~ referring these proposals or requests to the specialist committee(s) concerned (receipt and referral of proposals and requests are automatic upon their publication)~~. The General Committee is also charged with~~**; *(b)*** considering recommendations of the specialist committees and either approving or overturning those recommendations or referring them back to the specialist committees for further consideration**; *(c)* maintaining a list of approved repositories for storing sequences and issuing sequence identifiers; and *(d)* maintaining a list of approved journals for valid publication of names with reference DNA sequences (Art. X.8 and X.9)**. The General Committee may also communicate an international standard format in addition to, or as a successor to, Portable Document Format (PDF) for effective publication of electronic material (Art. 29.3) and is empowered to ratify a list of institutional votes drawn up by the Committee on Institutional Votes (see Prov. 3.1)."

Through Prov. 7.9(c) the General Committee maintains a necessary degree of control over aspects of the use of DNA sequences for fixing the application of names that appropriately fall outside the provisions of the *Code* itself. By approving journals and maintaining App. Y, the General Committee will ensure that sufficient scientific rigour is maintained, by the journal editors, over matters such as sequence type, length and the scientific justifications required for Art. X.8(b)(2), (3) and (4).

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We thank John H. Wiersema, Nicholas J. Turland, Tom W. May and Anna M. Monro for helpful suggestions that improved the manuscript, and all members of the Special-purpose Committee on DNA Sequences as Types, including those who chose not to co-author these proposals.

(349) Proposal to amend the Preamble by adding a "Non-Discrimination Statement"

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Authors of several recent discussion articles, and even of some formal proposals to amend the *International Code of Nomenclature for algae, fungi, and plants* ("*Code*": Turland & al. in Regnum Veg. 159. 2018), favoured and advocated various changes in biological nomenclature, in particular: rejection or replacement of scientific names of organisms considered by some to be "culturally offensive and inappropriate" (Hammer & Thiele in Taxon 70: 1392–1394. 2021; Smith & al. in Taxon 71: 933–935. 2022; Thiele & al. in Taxon 71: 1151–1154. 2022; Roksandic & al. in Nat. Ecol. Evol. 2023, https://doi.org/10.1038/s41559-023-02104-x); rejection or replacement of names reflecting the "symbols of colonial and imperialist power" (Smith & al., l.c.: 934; see also Smith & Figueiredo in Taxon 70: 1395–1396. 2021; in Taxon 71: 1–5. 2022) or part of the "epistemic empire, which is bound to be biased against non-Western knowledge systems" (Mabele & al. in Nat. Ecol. Evol. 2023, https://doi.org/10.1038/s41559-023-02105-w); cancellation of *all* eponyms (Guedes & al. in Nat. Ecol. Evol. 2023, https://doi.org/10.1038/s41559-023-02022-y) or only *some* eponyms (Thiele in Nat. Ecol. Evol. 2023, https://doi.org/10.1038/s41559-023-02106-9); and replacement of current scientific names with "indigenous" ones (Gillman & Wright in Commun. Biol. 3: art. 609. 2020; Wright & Gillman in Taxon 71: 6–10. 2022). In many cases these authors linked their proposals, claims and demands to some political, social, cultural or ethical arguments and agendas, including decolonization, diversity, equity and representation. These proposals were discussed in several other publications (Palma & Heath in Bionomina 22: 32–38. 2021; Mosyakin in Taxon 71: 249–255. 2022; in Taxon 71: 1141–1150. 2022; Ceríaco & al. in Zool. J. Linn. Soc. 197: 283–286. 2023; Pethiyagoda in Megataxa 10: 20–25. 2023; Antonelli & al. in Nat. Ecol. Evol. 2023, https://doi.org/10.1038/s41559-023-02108-7, and references therein).

I think that we should resist the attempts to "overhaul" (see, e.g., Mabele & al., l.c.) our *Code* (as well as other nomenclatural *Codes*) and its fundamental principles and traditions, especially when such attempts are based not on scientific or at least pragmatic but on politically motivated and often discriminatory reasoning.

In particular, I have already presented arguments (Mosyakin in Taxon 72: 469–482. 2023) supporting an opinion that at least some proposals, despite being seemingly aimed at better representation of some groups of people and their cultural values (e.g. indigenous peoples; see Gillman & Wright, l.c.; Wright & Gillman, l.c. 2022), will, if accepted, in fact introduce in nomenclature the system of discrimination based on national, racial or ethnocultural identities of other groups of people and/or their representatives, despite the contrary apologetic arguments (Wright & Gillman in Taxon 72: 483–485. 2023), which I consider unconvincing.

However, the global community of taxonomists of plants and fungi, and all users of the names governed by this *Code*, should be aware that the *Code* contains no provisions that discriminate against authors and users of scientific names because of their race, colour, ethnicity, national origin, disability, age, sex and sexual orientation, gender identity, religion, social status, cultural identity and political beliefs. It should also be clearly stated that the authors and editors of this *Code* respect and ensure the equal rights of all authors and users of scientific names, and also demonstrate their intolerance to any forms of unlawful discrimination.

Consequently, I think that it will be useful to add to the Preamble a "Non-Discrimination Statement", in addition to the already proposed "Potentially sensitive content disclaimer and limitation of liability" (Mosyakin in Taxon 72: 442–443. 2023). These additions will reflect the fundamental democratic and humanistic principles respected, followed and observed by the authors and editors of this *Code* and recommended to all users of scientific names governed by the *Code*.

Non-discrimination provisions are present in the *Universal Declaration of Human Rights* (1948, https://www.un.org/en/about-us/universal-declaration-of-human-rights, all online resources accessed 28 Jun 2023), other international documents, constitutions and laws of many countries. Non-discrimination statements are now commonly adopted and displayed by numerous governmental agencies, public and other companies, universities, organizations, associations and other institutions; they are also present in many publications and online resources (e.g. EU Charter of Fundamental Rights, Art. 21. Non-discrimination: http://fra.europa.eu/en/eu-charter/article/21-non-discrimination; U.S. Department of Agriculture: https://www.usda.gov/non-discrimination-statement; Botanic Gardens Conservation International [BGCI]: https://www.bgci.org/legal-and-policies/equality-diversity-and-inclusion-policy/; Royal Botanic Gardens, Kew: https://www.kew.org/about-us/equality-diversity-inclusion; Field Museum [Chicago]: https://www.fieldmuseum.org/about/non-discrimination-statement).

Therefore, the following amendment is proposed.

(349) Amend the Preamble by adding after Pre. 14 the following text:

"**Non-Discrimination Statement**

Authors and editors of this *Code* recognize the importance of principles of human rights, equal rights and opportunities, diversity, inclusivity, and representation, especially with regard to authors and users of scientific names governed by this *Code*.

Authors and users of scientific names governed by this *Code* shall not be discriminated against on the basis of their race, colour, ethnicity, national origin, disability, age, sex and sexual orientation, gender identity, religion, social status, cultural identity, and/or

political beliefs, and shall have equal rights under this *Code*, including the rights to propose amendments to this *Code*.

Preferential or discriminatory treatment, rejection or censoring of names governed by this *Code* because of the aforementioned characteristics of their authors, or because of actual or assumed association of such names with any cultural, religious, political, social, ethnic, national, or racial concepts, beliefs, or ideologies, is not allowed, except for the cases explicitly regulated by this *Code* (e.g. the preferential status of the Latin alphabet and the Latin and English languages in nomenclature)."

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(350–351) Proposal on a new taxonomic rank, supergenus

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The secondary ranks of taxa are specified in Art. 4.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), and Art. 4.2 states: "If a greater number of ranks of taxa is desired, the terms for these are made by adding the prefix "sub-" to the terms denoting the principal or secondary ranks." These ranks have their own endings in names above the rank of genus, which makes it easy to recognize which taxonomic rank we are dealing with (e.g. Art. 19.1 and 19.3). In addition, Art. 4.3 states that "Further ranks may also be intercalated or added, provided that confusion or error is not thereby introduced."

In taxonomic revisions, in the case of division of a genus into smaller genera, which need to be given new generic names, it may be desirable to combine them all into a higher-ranked unit, but preferably one that would keep the generic name unchanged in relation to one previously well-known generic name. Therefore, we propose the taxonomic rank of "supergenus" as a new rank between subtribus and genus. This rank has not yet been recognized in the *Code*. We also propose that a supergenus should bear the previous generic name unchanged, so that it can be undoubtedly determined for which genus a given supergenus is a superior rank. For example, if we decided to raise the generic name *Juncus* to the rank of tribe or subtribe, then it would have to change the ending and be called *Junceae* or *Juncinae*, respectively (instead of *Juncus*). To keep the previous generic name unchanged, the new supergenus rank with new naming rules for this rank is in our opinion the best solution to maintain nomenclatural stability, which could not be achieved so easily if the ending of the name were changed (e.g. Brožová & al. in Molec. Phylogen. Evol. 177: 107588. 2022). This is important especially in the context of new subsequent taxonomic revisions, where existing genera are divided into smaller ones, with new names that could mean "nothing" to anyone.

(350) Add a new Article after Art. 4.3:

"*4.3bis*. A rank of a taxon between subtribe (subtribus) and genus is supergenus."

(351) Add a new Article after Art. 19.3:

"*19.3bis*. The name of a supergenus is identical to the generic name from which the supergenus name is derived."

(352–357) Proposals to clarify typification when a name is validly published solely by reference to an earlier description or diagnosis (Articles 7.8, 9 Note 3, 40.3 and Recommendation 9A)

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Article 7.8 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) addresses the typification of a name that is validly published by reference to an earlier description or diagnosis. It states: "A name of a new taxon validly published solely by reference to a previously and effectively published description or diagnosis (Art. 38.1 (a)) (and not by a reproduction of such a description or diagnosis) is to be typified by an element selected from the entire context of the validating description or diagnosis, unless the validating author has definitely designated a different type, but not by an element explicitly excluded by the validating author (see also Art. 7.9)." In turn, Art. 9 Note 3 provides: "For names falling under Art. 7.8, only elements from the context of the validating description are considered as original material, unless the validating author has definitely designated a different type." The following independent proposals address different aspects of these two provisions.

In our view, Art. 7.8 should be limited to the original material for names published by reference to an earlier description and be moved to Art. 9. This is explained below. Article 7.8 states that the name "is to be typified by" from the entire context of the earlier description. If the quoted language is applied literally, neither neotypes nor epitypes could be designated for names falling under Art. 7.8. Similarly, because Art. 7.8 allows the validating author to designate a different type, it does not impose a restriction on what may be designated as the holotype.

Authors of names under Art. 7.8 are required to have "definitely designated" a type while authors of other names may have "indicated" a type (Art. 9.1). In our view, Art. 7.8 should not place any restrictions on the way a holotype is established. If so treated, the sole reason for the "unless" language is to establish which set of elements is original material for names falling under Art. 7.8.

(352) Delete Art. 7.8 and convert Art. 9 Note 3 into an Article as follows (new text in bold, deleted text in strikethrough):

"~~*Note 3.*~~ ***9.n.*** For ~~names falling under Art. 7.8~~ **a name of a new taxon validly published solely by reference to a previously and effectively published description or diagnosis (Art. 38.1(a)) (and not by a reproduction of such a description or diagnosis)**, only elements from the **entire** context of the validating description **or diagnosis** are considered as original material **(but not including elements explicitly excluded by the validating author)**, unless the validating author has definitely designated a different type."

The proposals below address further changes desirable for Art. 9 Note 3; if the previous proposal is rejected, they apply to Art. 7.8 as well.

The most important issue is clarifying the meaning of "the entire context of the validating description". At the Melbourne Congress of 2011, Sennikov (Prop. 155; in Taxon 59: 1291. 2010) proposed that "Instead of a rather loose 'context' of the validating description, it could be more explicitly said 'material associated with' the validating description. The intended meaning is the same." However, the proposal was rejected (Art. 7 Prop. D; McNeill & al. in Taxon 60: 1512. 2011).

The term "context" first appeared as Art. 32.2 of the Sydney *Code* (Voss & al. in Regnum Veg. 111. 1983) in a form quite similar to the current language, along with a single Example. Article 32 Ex. 3 of the Sydney *Code* stated "Since the name *Adenanthera bicolor* Moon (1824) is validated solely by reference to Rumphius, Herbarium Amboinense 3: t. 112, the type of the name, in the absence of the specimen from which it was figured, is the illustration referred to. It is not the specimen, at Kew, collected by Moon and labelled *'Adenanthera bicolor'*." This Example remains as Art. 7 Ex. 9 of the *Shenzhen Code* in a revised form; it concludes "In the absence of the material on which the validating description was based, the lectotype can only be the associated illustration (Rumphius, Herb. Amboin. 3: t. 112. 1743)." This wording suggests that the "entire context" would include this uncited specimen if it existed.

It is also important to note that the Sydney *Code* did not use, or define, the term "original material", which is critical for designating a lectotype. The Sydney *Code* did have a "Guide for the determination of types" at the end stating in part that the lectotype is to be chosen from elements studied by the author up to the time the name was published. This statement suggests that elements studied by the author of the description were original material for names falling under the predecessor of Art. 7.8. We also note that Art. 7.8 has not been revised to reflect the rules now providing a comprehensive definition of "original material" in Art. 9.4.

It is hardly desirable that the type be restricted to a cited illustration and exclude the specimen on which it was based simply because it was not cited. Such a reading would be inconsistent with Art. 9.4. In addition, the primary reason to revise the "use test" for holotypes in Art. 9 Note 1 was to avoid that very result for Linnaean names.

(353) Amend Art. 9 Note 3 as follows (new text in bold, deleted text in strikethrough):

"*Note 3*. For names falling under Art. 7.8, ~~only elements from~~ the **original material is determined under Art. 9.4 as if the author** ~~context~~ of the validating description **or diagnosis** ~~are considered as~~

~~original material~~ **had validly published the name by publishing the description or diagnosis**, unless the validating author has definitely designated a different type."

Another possibility is that the validating author cites one or more elements but does not definitely designate a different type. In our view, a later author should not ignore these cited elements and designate a neotype if there are no elements in the entire context of the earlier description. We offer the following Recommendation to that effect.

(354) Add a new Recommendation to Rec. 9A as follows:

"*9A.n*. For names falling under Art. 7.8, if there are no extant elements in the context of the validating description or diagnosis and the validating author did not definitely designate a different type, later authors should consider any specimens and illustrations cited in the protologue when designating a type."

The phrase "has definitely designated a different type" can be improved. Because it seems impossible for the author of the description to designate a type, a better statement is the designation of a different element as the type.

Another question is what it means to have "definitely designated" a type. Proposal 106 (Wisnev in Taxon 70: 1383–1384. 2021) would revise Art. 7.8 (but not Art. 9 Note 3) to make it "clear that the usage test and indication of a type (in each case by the validating author) are insufficient to establish a type". We suggest that the same language in Prop. 106 be used for Art. 9 Note 3.

If the validating author "definitely designated" a different element, what happens if that element is lost or missing? (It appears that such a type cannot be superseded under Art 9.19(c), even if completely contrary to the earlier description, because the type is cited in the protologue; see Art. 9 Note 7). Presumably, the original material is determined under Art. 9.4 without regard to Art. 7.8.

To address these various matters, the following is proposed.

(355) Amend Art. 9 Note 3 as follows (new text in bold, deleted text in strikethrough):

"*Note 3*. For names falling under Art. 7.8, only elements from the context of the validating description are considered as original material**. However**, **if** ~~unless~~ the validating author has ~~definitely~~ designated a different **element as the** type **in the protologue (indication or usage by the validating author is insufficient to establish a type), the original material is determined in accordance with Art. 9.4 without regard to the previous sentence**."

The term "validating author" is used only in Art. 7.8 and Art. 9 Note 3, but is not defined. Since those provisions use the term "validating description or diagnosis" and "validating description", respectively, some may at first incorrectly think the validating author is the author of the validating description or diagnosis. It is worth noting that the "validating author" may not even be the author of the name. See Art. 46 Ex. 22.

While other Articles do not use the term "validating author", Art. 46 uses the term "publishing author" (in Art. 46.5 and Art. 46 Ex. 39) to refer to the author of the publication in which the name appears. It would seem preferable to use that term in Art. 7.8 as well. The proposal below addresses this change.

(356) Replace "validating" with "publishing" in Art. 9 Note 3 as follows (new text in bold, deleted text in strikethrough):

"*Note 3*. For names falling under Art. 7.8, only elements from the context of the validating description are considered as original material, unless the ~~validating~~ **publishing** author has definitely designated a different type."

If all of the foregoing proposals are accepted, Art. 7.8 and Art. 9 Note 3 will be deleted, and a new Article in Art. 9 would read as follows:

"*9.n*. For a name of a new taxon validly published solely by reference to a previously and effectively published description or diagnosis (Art. 38.1(a)) (and not by a reproduction of such a description or diagnosis), original material is determined under Art. 9.4 as if the author of the validating description or diagnosis had validly published the name by publishing the description or diagnosis (but not including elements explicitly excluded by the publishing author). However, if the publishing author has designated a different element as the type in the protologue (indication or usage by the validating author is insufficient to establish a type), the original material is determined in accordance with Art. 9.4 without regard to the previous sentence."

Article 40.3 provides that the "mention of a single specimen" is sufficient to indicate a type for purposes of validly publishing the name of a new taxon. It is not clear how to apply this rule for a name falling under Art. 7.8. It would seem appropriate to consider elements from both the validating description or diagnosis and the validating protologue.

(357) Add a new sentence at the end of Art. 40.3 (new text in bold):

"*40.3*. For the name of a new genus or subdivision of a genus, reference (direct or indirect) to a single species name, or citation of the holotype or lectotype of a single previously or simultaneously published species name, even if that element is not explicitly designated as type, is acceptable as indication of the type (see also Art. 10.8; but see Art. 40.6). For the purpose of Art. 40.1, mention of a single specimen or gathering (Art. 40.2) or illustration, even if that element is not explicitly designated as type, is acceptable as indication of the type of the name of a new species or infraspecific taxon (but see Art. 40.6). **For names falling under Art. 7.8, the determination of whether a single element is mentioned is made by considering both the earlier description or diagnosis and the validating protologue.**"

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(358–359) Two proposals clarifying some acts of typification

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When it comes to the designation of a lectotype, neotype or epitype of the name of a species or infraspecific taxon or an equivalent type for a name of a genus or subdivision of a genus, it can be inferred under Art. 7.3 of the *International Code of Nomenclature for algae, fungi, and plants* (Turland & al. in Regnum Veg. 159. 2018) that any effective typification of a basionym carries forward to any combination or name at new rank based on it. Can it be assumed that this would also operate in reverse, such that an explicit typification citing only a new combination or name at new rank would have backwards application to its basionym? Likewise for a replacement name, Art. 7.4 dictates that typification of a replaced synonym would carry forward to any of its replacement names. But what about the reverse situation, does the explicit typification of a replacement name also backwards apply to its replaced synonym?

Although the *Code* is not explicit on this issue, for the homotypic relationships indicated in Art. 7.3 and 7.4 to hold up, it seems desirable that it do so. Note that this relationship would not apply to any name homotypic with the name being typified, only those with a common basionym or replaced synonym. Names independently made homotypic through type designation necessarily retain their designated types.

A similar issue has been addressed for names with conserved types by Prop. 194 (Wiersema in Taxon 71: 1345–1346. 2022), which would preserve the homotypy between conserved names and their basionyms or replaced synonyms.

Therefore, we propose the following Note under Art. 7.11.

(358) Add a new Note after Art. 7.11:

"*Note 2bis*. The effective typification of a name necessarily establishes the same typification for all names sharing the same basionym (Art. 7.3) or replaced synonym (Art. 7.4) and that basionym or replaced synonym."

Article 38.12 provides for the valid publication of a new species name by reference to a description or diagnosis of a genus: "A name of a new species may be validly published by reference (direct or indirect; […]) to a description or diagnosis of a genus, if the following conditions are satisfied: *(a)* the name of the genus was previously and validly published simultaneously with its description or diagnosis and *(b)* neither the author of the name of the genus nor the author of the name of the species indicates that more than one species belongs to the genus in question." Given the stipulations of (a) and (b) of this provision, the resulting generic and species names are thereby coextensive, and under Art. 7.8 the typification of the species name, unless a different type was definitely designated, is derived entirely from the context of the genus name. Under this circumstance, it seems perfectly reasonable to consider the species as an "original" type of the genus, not requiring a later typification act to establish its status as type. An exception in our proposed rule is made where the type of the species name has been independently designated, as permitted under Art. 7.8, but because the vast majority of the names involved were published well before 1958, when type indication became mandatory, exceptions like this would be extremely rare.

To allow this interpretation, the following proposal is made.

(359) Add a new Article to follow Art. 10.8:

"*10.8bis*. When the name of a new species was validly published solely by reference to a description or diagnosis of a genus under Art. 38.12, making that genus monotypic (see Art. 38.6), the type of the generic name is the same as that of the species name, unless a different type has definitely been designated for the species name."

If this proposal is accepted, a cross-reference to the resulting Article should be added to Art. 10.2 and likely also Art. 38.12 and its Ex. 21, with some modification to the Example also possibly desirable.

(360) Proposal to add a new Recommendation that duplicate material on which the name of a taxon is to be based be conserved in different herbaria, collections or institutions

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It is not uncommon to encounter protologues wherein authors of new taxa cite the holotype and isotype specimens as conserved in a single herbarium and often do not provide any identifier number. To illustrate the situation, the protologue of *Ischaemum janarthanamii* Bokil & al. (in Ann. Bot. Fenn. 57: 323. 2020) cited "TYPE: India. Goa: South Goa, Devsada near Dharbandora, 85 m a.s.l., 15°22′ 32.2″N ,74°07′37.2″E, 10 October 2017, *M.N. Datar & S.A. Bokil 530* (holotype AHMA; isotypes AHMA, BSI)." There is no citation of herbarium accession numbers and/or barcodes for the relevant type specimens except for the herbarium accession number "AHMA31964" in Table 1 referring to material of *I. janarthanamii* from "Goa, India" without specifying whether this refers to the holotype or isotype (or the paratype, also from Goa and conserved in AHMA). Because the herbarium AHMA has both the holotype and an isotype and the type specimens do not show any identifying number, it is necessary for the relevant sheets to bear annotations on their type status, without which one may find it hard to distinguish the holotype sheet from the isotype sheet housed together in the same herbarium. Such a situation does exist in many herbaria. Furthermore, for various reasons (including fire), specimens (including types) in a herbarium may be lost. The present proposal therefore recommends that the authors of new taxa should avoid conserving holotype and isotypes in the same herbarium, collection or institution. The same considerations could also apply, in many circumstances, to duplicates of neotypes or epitypes.

(360) Add a new paragraph under Rec. 7A:

"*7A.2*. It is strongly recommended, insofar as possible, that duplicate material on which the name of a taxon is to be based, especially of the holotype but also of a neotype or epitype, be conserved in different herbaria, collections, or institutions, preferably in different areas of the world."

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(361) Proposal regarding whether elements cited with doubt are original material (Article 9.4)

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Article 9.4 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) treats specimens cited in the protologue as original material, and cited illustrations are likely original material under Art. 9.4(a). However, the treatment of an element cited with doubt (e.g. with a "?") is not addressed, and these elements have not been treated consistently in the past. For example, elements cited with doubt were designated as lectotypes for the Linnaean names *Bromelia karatas* L. (Monteiro & Forzza in Taxon 65: 1102. 2016)

and *Phytolacca asiatica* L. (Ridsdale in Manilal, Bot. Hist. Hort. Malab.: 189. 1980). In complete contrast, neotypes were designated for *Cordia glabra* L. (Miller in Taxon 53: 801. 2004) and *Renealmia polystachia* L. (Smith & Downs, Fl. Neotropica 14: 924. 1977) even though their protologues cited illustrations with doubt.

Article 52 Note 1 states that the "inclusion, with an expression of doubt, of an element in a new taxon, e.g. the citation of a name with a question mark […] does not make the name of the new taxon nomenclaturally superfluous." This Note makes sense in light of the fact that a name is only superfluous if the author "definitely included" the type of another name; a citation with doubt is not a definite inclusion. Similarly, Prop. 185 (Wiersema & al. in Taxon 71: 1339–1340. 2022) proposes that the inclusion of a name with doubt "is not in itself considered exclusion of its type" for purposes of Art. 48. While not expressly stated, this proposal and the suggested Example would provide that a name cited with doubt can be treated as the basionym. This also makes sense, because the author obviously "based" the new combination on that name by using the same epithet.

Because Art. 9.4 does not use "definitely cited", one can argue that the better answer is that a specimen cited with doubt is original material. In addition, illustrations cited with doubt would appear to meet the criteria set forth in Art. 9.4(a) that the author "associated" the element with the name. However, a new rule mandating that elements cited with doubt are original material could result in nomenclatural disruption if there are no other elements of original material. Likewise, a rule that elements cited with doubt cannot be original material would be problematic if the only other element(s) of original material would result in nomenclatural disruption. Finally, the adoption of either rule would require new typifications for those names that had previously been typified in a contrary manner.

Rather than implement a blanket rule, the approach used in Art. 6.13 should be implemented here. Article 6.13 allows certain names to be treated as either names of new taxa or replacement names, depending upon their later typification. This approach would preserve previous typifications and would allow future authors to best decide how to treat elements cited with doubt.

(361) Add the following sentence at the end of Art. 9.4:

"*9.4*. […]. If an author cites an element with an expression of doubt (e.g. the citation of a specimen or illustration with a question mark), the element may be treated as a syntype (if it is a specimen), an element under Art 9.4(a) (if it is an illustration) or not as original material. Decision on the status of such an element is to be effected by means of the appropriate type designation."

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(362) Proposal to specify that in lectotype designation precedence be given to a part of the holotype that is not in conflict with the validating description or diagnosis

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The procedure for choosing a lectotype is specified in Art. 9.12 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), which rules that "In lectotype designation, an isotype must be chosen if such exists, or otherwise a syntype or isosyntype if such exists. If no isotype, syntype or isosyntype is extant, the lectotype must be chosen from among the paratypes if such exist. If none of the above specimens exists, the lectotype must be chosen from among the uncited specimens and cited and uncited illustrations that comprise the remaining original material, if such exist."

However, Art. 9.12 does not provide for a situation where there is an existing holotype (e.g. one herbarium sheet) that is taxonomically mixed, consisting of (e.g.) two elements: one that fits the validating description or diagnosis and the other that is in conflict with it. Therefore, a part of the holotype that fits the validating description or diagnosis should take precedence in lectotype designation over any other existing elements listed in Art. 9.12, including isotypes, syntypes, etc. We propose to amend the Article accordingly.

(362) Amend Article 9.12 as follows (new text in bold, deleted text in strikethrough):

"*9.12*. In lectotype designation, **a part of the holotype (if it is taxonomically mixed) that is not in conflict with the validating description or diagnosis must be chosen if such exists, or otherwise** an isotype ~~must be chosen~~ if such exists, or otherwise a syntype

or isosyntype if such exists~~. If no isotype, syntype, or isosyntype is extant, the lectotype must be chosen from among the~~**, or otherwise a** paratype if such exist**s**. If none of the above specimens exists, the lectotype must be chosen from among the uncited specimens and cited and uncited illustrations that comprise the remaining original material, if such exist."

(363–368) Proposals regarding holotypes

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Article 9.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) states that the holotype "is the one specimen or illustration (but see Art. 40.4) either *(a)* indicated by the author(s) as the nomenclatural type or *(b)* used by the author(s) when no type was indicated". One immediate question is how to determine if the author used one specimen or illustration. In particular, should a single element cited in the protologue (without indication that it is the type) be treated as the holotype? The question was answered when Art. 9 Note 1 was revised in the *Shenzhen Code* to provide "If the author used only one specimen or illustration, either cited or uncited, when preparing the account of the new taxon, it must be accepted as the holotype, *but the possibility that the author used additional, uncited specimens or illustrations (which may have been lost or destroyed) must always be considered*" (emphasis added). Article 9 Ex. 2, apparently added to illustrate the new Note, makes it clear that it is almost impossible to meet the use test unless the author states that the element is the only one used.

Nonetheless, based on my discussions with other botanists, many users of the *Code* continue to believe that a single cited element is necessarily the holotype, even if not indicated as such by the author of the name. This view may well have originated in Art. 7 Note 1 of the Berlin *Code* (Greuter & al. in Regnum Veg. 118. 1988), which stated that "If the author included only one element, that one must be accepted as the holotype." While the word "included" was later changed to "used" in the *Saint Louis Code* (Greuter & al. in Regnum Veg. 138. 2000), that change hardly made it apparent that a single cited element is not necessarily the holotype.

I had assumed this new language in Art. 9 Note 1 arose through the normal amendment process, i.e. a proposal printed in *Taxon*, addressed in the Synopsis of Proposals and voted upon by the Nomenclature Section of an International Botanical Congress, and that the Editorial Committee in turn added Ex. 2 as permitted by Div. III Prov. 7.11. However, there is nothing in the Synopsis of Proposals by Turland & Wiersema (in Taxon 66: 207–274. 2017) mentioning a proposal to amend Art. 9 Note 1. (The Synopsis includes every proposal, showing new text in bold and deleted text in strikethrough.) For that reason, it must be assumed the new language was added by the Editorial Committee, presumably to support the newly added Example and explain the use test.

While the *Shenzhen Code* gives the Editorial Committee full power to add or delete Examples, its powers to amend the Articles and Notes are limited. Division III Prov. 7.11 states that "The Editorial Committee is charged with the preparation and publication of the *Code* in conformity with the decisions approved by the relevant International Botanical Congress. It is empowered to make any editorial modification *not affecting the meaning of the provisions concerned* […]" (emphasis added).

In my view, the new language in Art. 9 Note 1 affects the meaning of Art. 9.1(b). Turland & al. (in Taxon 69: 626–627. 2020) appeared to agree when they stated "In order to make clearer the circumstances under which a holotype can exist, the following amendments to Art. 9.1 and Art. 9 Note 1 are proposed. Note 1 is converted to an Article because it contains provisions not covered by other Articles and, as explained in the Preface of the *Shenzhen Code* (p. xxiv), 'Notes have binding effect but, unlike Articles, do not introduce any new provision or concept.'" Because this language was added in the manner above, it should be deleted.

Equally if not more important, I see no value in considering the possibility of lost or destroyed elements. If they are lost or destroyed, they cannot be designated as a type, and that possibility is best ignored entirely, as are other remote possibilities. For example, Art. 9 Ex. 1 states that the use test is met because the author stated it was the only specimen used. That statement does not preclude the possibility that the author used an illustration or that the author failed to remember another specimen was used. In my view, if the possibility of lost or destroyed elements is considered, these other possibilities should be considered as well, and the use test should simply be deleted altogether. The better answer is to ignore these unknown possibilities.

(363) Amend the second sentence of Art. 9 Note 1 as follows (deleted text in strikethrough):

"*Note 1*. […]. If the author used only one specimen or illustration, either cited or uncited, when preparing the account of the new taxon, it must be accepted as the holotype, but the possibility that the author used additional, uncited specimens or illustrations ~~(which may have been lost or destroyed)~~ must always be considered. […]."

In addition, if Prop. 008 (Turland & al., l.c. 2020) is accepted, delete "(which may have been lost or destroyed)" in the new Art. 9.1bis.

The above proposal raises another matter: the Editorial Committee may inadvertently amend the *Code* in a manner that changes the meaning of the rules without the knowledge of the botanical community at large. In fact, given the large number of proposals, many members of the Editorial Committee may be unaware as to whether or not some changes are purely editorial in nature. It cannot be known what other changes, if any, may have been made by the Editorial Committee in the past that affected the meaning of the rules.

In my view, the powers given to the Committee in Prov. 7.11, without a requirement of a full accounting of all changes, represent a poor practice.

(364) Amend Div. III Prov. 7.11 as follows (new text in bold):

"*7.11*. The Editorial Committee is charged with the preparation and publication of the *Code* in conformity with the decisions approved by the relevant International Botanical Congress. It is empowered to make any editorial modification not affecting the meaning of the provisions concerned, e.g. to change the wording of any Article, Note, or Recommendation and to avoid duplication, to add or remove non-voted Examples, and to place Articles, Notes, Recommendations, and Chapters of the *Code* in the most convenient place, while retaining the previous numbering insofar as possible. **The Editorial Committee shall prepare and publish online a document noting all changes added editorially.**"

As noted before, many continue to believe a single cited element is a holotype even if not indicated as such. In turn, I have already encountered at least five names where an author has, in a formal botanical treatment, asserted that such a single cited element in an earlier protologue is the "holotype". Based on Art. 9 Note 1, that assertion is incorrect. While Art. 9.10 generally permits the term holotype to be corrected to lectotype, Art. 9 Note 6 states that this misuse may be corrected only if the requirements of Art. 7.11 are met. Because Art. 7.11 requires a lectotype designation made on or after 1 January 2001 to specifically state "designated here", it is extremely unlikely that the use of holotype on or after that date can be corrected to lectotype.

These cases of incorrectly asserted holotypes must be republished as lectotypes or the names will technically remain type-less. It also appears that a number of brief papers have already been published to designate an element as the lectotype because it had incorrectly been stated to be the holotype; it is likely that more will be published in the future. As stated by Turland & al. (l.c. 2020) in connection with a proposal to permit a name to be validly published even if the author indicated a lectotype rather than holotype as required by Art. 40.6: "It would not serve nomenclatural stability to penalize authors and disallow valid publication of such names merely because an incorrect term was used to denote the type. This would be bureaucracy for its own sake […]."

If a later author states that the single specimen cited in an earlier protologue is the holotype contrary to Art. 9.1, that specimen is a syntype, and the only other element that might be designated as a lectotype is an isosyntype. The fact that there may have been lost or destroyed specimens is completely irrelevant – these obviously cannot be designated as lectotypes today. In contrast, if the only element cited is an illustration, then uncited materials may also be designated as the lectotype, assuming of course that there are any.

To minimize the need to publish a designation of a lectotype in these situations, the following proposal is offered.

(365) Amend Art. 9.10 and Art. 9 Note 6 as follows (new text in bold, deleted text in strikethrough):

"*9.10*. The use of a term defined in the *Code* (Art. 9.1, 9.3 and 9.5–9.9) as denoting a type, in a sense other than that in which it is so defined, is treated as an error to be corrected (for example, the use of the term lectotype to denote what is in fact a neotype). **The use of the term holotype on or after 1 January 2001 to denote a lectotype for a single specimen cited in a protologue of a name of a new taxon published prior to 1 January 1958 is to be corrected, notwithstanding the requirement of Art. 7.11 to include the phrase "designated here".**"

"*Note 6*. **Except as noted in Art. 9.10, a** ~~A~~ misused term may be corrected only if the requirements of Art. 7.11 (for correction to lectotype, neotype, and epitype) are met and Art. 40.6 (for correction to holotype) does not apply."

In addition, add "(but see Art. 9.10)" at the end of Art. 7.11.

For names published on or after 1 January 1990, a single element cited in the protologue is not the holotype: the name is not even validly published unless the word type or holotype (or an equivalent) is used (Art. 40.6). However, it is not clear if the single element cited in a publication on and after 1 January 1958 and before 1 January 1990 is the holotype. Starting in 1958, Art. 40.1 requires that the type be indicated to validly publish the name. However, Art. 40.3 states "For the purpose of Art. 40.1, mention of a single specimen or gathering (Art. 40.2) or illustration, even if that element is not explicitly designated as type, is acceptable as indication of the type of the name of a new species or infraspecific taxon (but see Art. 40.6)." Because that statement is for the purpose of Art. 40.1, it remains unclear whether such a mention is sufficient to indicate a holotype (as currently required by Art. 9.1) or to designate it (as required before the *Shenzhen Code*, and proposed to be reinstated by Prop. 007, Turland & al., l.c. 2020).

In my view, the rules should explicitly and unambiguously state whether these single cited elements are holotypes; providing an answer is more important than the answer itself. I am also of the view that it is not desirable to address an Art. 9.1 issue in Art. 40; users may simply be unaware of that other provision or, even if aware of it, not realize that it is intended by the author to address an Art. 9.1 issue. The following two proposals offer different answers to this question.

(366) Amend Art. 9.1 as follows (new text in bold):

"*9.1*. A holotype of a name of a species or infraspecific taxon is the one specimen or illustration (but see Art. 40.4) either *(a)* indicated by the author(s) as the nomenclatural type or *(b)* used by the author(s) when no type was indicated. **A single specimen or illustration cited in the protologue of a name of a new taxon published on or after 1 January 1958 and before 1 January 1990 is the holotype.** As long as the holotype is extant, it fixes the application of the name concerned (but see Art. 9.15)."

(367) If Prop. 366 is rejected, amend Art. 9.1 as follows (new text in bold):

"*9.1*. A holotype of a name of a species or infraspecific taxon is the one specimen or illustration (but see Art. 40.4) either *(a)* indicated by the author(s) as the nomenclatural type or *(b)* used by the author(s) when no type was indicated. **Except as provided in Art. 9.1(b), a single specimen or illustration cited in the protologue, without the use of the word "type" or "holotype" or one of**

their equivalents, is not the holotype. As long as the holotype is extant, it fixes the application of the name concerned (but see Art. 9.15)."

Article 40.3 states that "mention of a single specimen or gathering (Art. 40.2) or illustration, even if that element is not explicitly designated as type, is acceptable as indication of the type". In contrast, Art. 9.1 currently provides that the holotype must be "indicated", although Prop. 007 (Turland & al., l.c. 2020) proposes that it must be designated, which was the long-standing rule before the *Shenzhen Code*. The phrase "explicitly designated" in Art. 40.3 suggests that there is some unknown distinction between explicit designations and other designations.

(368) Delete the word "explicitly" in the second sentence of Art. 40.3 as follows (deleted text in strikethrough):

"*40.3*. […]. For the purpose of Art. 40.1, mention of a single specimen or gathering (Art. 40.2) or illustration, even if that element is not ~~explicitly~~ designated as type, is acceptable as indication of the type of the name of a new species or infraspecific taxon (but see Art. 40.6)."

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(369–373) Proposals to eliminate the future application of Article 20.2 to generic names matching technical terms in morphology

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Article 20.2 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) dates back to the earliest international rules of botanical nomenclature (*Règles internationales de la nomenclature botanique adoptées par le Congrès international de botanique de Vienne, 1905*; Briquet, Règles Int. Nomencl. Bot. 1906), the so-called Vienna Rules, where the first part of Art. 54 reads as follows:

"Art. 54. Names of genera must be rejected in the following special cases:

1. When they are formed from a technical term borrowed from morphology, unless they are accompanied by specific names."

This was slightly modified (as shown in underscore) in the ensuing Brussels Rules (Briquet, Règles Int. Nomencl. Bot., ed. 2. 1912), to read:

"Art. 54. Names of genera must be rejected in the following special cases:

1. When they coincide with a technical term concurrently used in morphology, unless they are accompanied by specific names."

This passage, with further modifications, later became part of Art. 67 of the Cambridge *Rules* (Briquet, Int. Rules Bot. Nomencl., ed. 3. 1935):

"Art. 67. Names of genera are illegitimate in the following special cases and must be rejected.

(2) When they coincide with a technical term currently used in morphology unless they were accompanied, when originally published, by specific names in accordance with the binary method of Linnaeus. On and after Jan. 1, 1912, all new generic names coinciding with such technical terms are unconditionally rejected."

Without further change, it became part of Art. 78 of the Stockholm *Code* (Lanjouw & al. in Regnum Veg. 3. 1952), and then Art. 68 of the subsequent Paris *Code* (Lanjouw & al. in Regnum Veg. 8. 1956), before landing, with considerable restructuring, in its current place under Art. 20 of the Montreal *Code* (Lanjouw & al. in Regnum Veg. 23. 1961):

"The name of a genus may not coincide with a technical term currently used in morphology unless it was published before 1 Jan. 1912 and was accompanied, when originally published, by a specific name published in accordance with the binary method of Linnaeus."

where it remained unchanged until becoming Art. 20.2 in the Leningrad *Code* (Stafleu & al. in Regnum Veg. 97. 1978):

"*20.2* The name of a genus may not coincide with a technical term currently used in morphology unless it was published before 1 Jan. 1912 and was accompanied, when originally published, by a specific name published in accordance with the binary system of Linnaeus."

Thereafter, it remained stable until the Vienna Nomenclature Section of 2005, where considerable discussion ensued, stimulated by the then-controversial case of whether to adopt the name *Cleistogenes* vs. *Kengia* and leading to a floor proposal by Zijlstra (see Flann

& al. in PhytoKeys 45: 78–79, 80–82. 2015), which resulted in two further changes to the Article in the *Vienna Code* (McNeill & al. in Regnum Veg. 146. 2006):

"*20.2*. The name of a genus may not coincide with a Latin technical term in use in morphology at the time of publication unless it was published before 1 January 1912 and accompanied by a specific name published in accordance with the binary system of Linnaeus."

with the addition of this case as one of five Examples (Ex. 5) under it.

No proposals or discussion of this Article arose at the Melbourne Nomenclature Section of 2011, but at the subsequent Shenzhen Nomenclature Section the discussion of this Article was revived via a proposal by Linda in Arcadia & Lücking (in Taxon 65: 903–905. 2016) to sunset this provision after 31 December 2011. The proposers argued at length that "Art. 20.2 is both unnecessary and subject to a broad range of interpretations" but acknowledged that "removing it entirely is impractical, as some names that have long been considered not validly published would become validly published, which would lead to instability", leading them to propose the 2011 end date. After extensive discussion of this proposal (Art. 20 Prop. A) in Shenzhen (see Lindon & al. in PhytoKeys 150: 101–106. 2020), including some friendly amendments to delete the Article altogether, it was rejected.

However, the resulting discussion gave rise later that week to Floor Prop. 7, by Funk & al., to delete Art. 20.2 outright and, by adding a new clause (c) to Art. 20.4 ("The following are not to be regarded as generic names"), to prohibit use of the words mentioned in Ex. 4 and Ex. 6 together with a list of other specified words widely used in pharmacopoeia or as descriptive morphological terms. The addition of some of these words was considered necessary because Art. 20.2 had likely originated out of "a concern that several terms used in the pharmacopoeia generally, and used in designation of species of drugs in the form of Latin polynomials, might be considered to have become accidentally but validly published generic names" (Greuter in Lindon & al., l.c.: 241). Nonetheless, Floor Prop. 7 was also rejected.

The failure of the proposals to eliminate Art. 20.2 entirely or sunset it was understandable, owing to limited evidence on the impact this might have on nomenclatural stability. Names formerly disregarded as being not validly published under this Article, were it to be eliminated, would now become validly published and could threaten currently accepted names. To have any chance for success, a proposal to remove this Article must undertake a complete analysis of the impact of such an action. Such an analysis is carried out here in furtherance of this objective.

Because, as pointed out above, this provision has existed since the earliest *Codes*, it is necessary to locate those situations where it has been applied for over a century. While this might seem difficult or even impossible to achieve, especially in the early 20th century literature, it is no longer so, for two principal reasons. One relates to the extensive electronic indexing of nearly all scientific literature over this period by internet search engines; the second to the unvarying use of the phrase "technical term" in the relevant Article of every *Code* since the 1905 Vienna Rules. It is now possible to methodically search the literature for this phrase and other useful keywords and isolate most, if not all, applications of this Article to generic "names". Searches of comments in nomenclatural databases like Index Nominum Genericorum (ING: https://naturalhistory2.si.edu/botany/ing/), the International Plant Names Index (IPNI: https://www.ipni.org/), and the International Fossil Plant Names Index (IFPNI: http://ifpni.org/) for these terms have also proven useful. A further review of all generic names in IFPNI, Index Fungorum (IF: https://www.indexfungorum.org/), and many in AlgaeBase (https://www.algaebase.org/) has uncovered many additional examples of potential "names" where this provision could have been applied. With this information in hand, we begin by proposing a change to Art. 20.2. In order to mitigate any negative nomenclatural consequences that might result from this change, some additional actions dependent on the results of our analysis will also be required, as proposed below.

(369) Rearrange and amend Art. 20.2 as follows (new text in bold, deleted text in strikethrough):

"*20.2*. The name of a genus **published before 1 January 1912** may not coincide with a Latin technical term in use in morphology at the time of publication unless it was ~~published before 1 January 1912 and was~~ accompanied by a species name published in accordance with the binary system of Linnaeus."

Data from the analysis are detailed in Table 1. The "names" (hereafter also called designations when considered not validly published) involved can be organized into four categories. The first (Table 1A) concerns those designations published before 1912 and not accompanied by a species name. One of these, "*Radicula*" (Hill, Brit. Herb.: 264. 1756), has exemplified this group in every *Code* since the 1935 Cambridge *Rules*. Several others have also been uncovered. Given the limited number of such cases detected, with over a century of elapsed time, no disruption to nomenclature would be expected by retaining this portion of the provision. Table 1B lists names and/or designations published after 1911 to which this Article has been applied at least by some, or could potentially be applied if the Article remained intact, to consider them as not validly published. Those cases mentioned in Ex. 4–6 or where substitute names have been published to replace earlier designations thought to be not validly published are underscored. For some "names" (e.g. *Cleistogenes*, *Colleteria*, *Scandentia*) the application of this rule to such cases has been challenged, and in the former case the rule itself was changed at the 2005 Vienna Nomenclature Section to support this challenge. Nevertheless, a binding decision on the valid publication status of all underscored names or designations in Table 1B, or any others at the discretion of the relevant Permanent Nomenclature Committees, would promote nomenclatural stability.

(370) Submit the generic names or designations in Table 1B to the General Committee, which will refer them for examination to the specialist committee for the appropriate taxonomic group (see Div. III Prov. 2.2, 7.9 and 7.10). In order to retain those names that best serve stability of nomenclature, a Committee recommendation as to whether or not any of these "names" or any spelled exactly alike should be treated as validly published may then be put forward to an International Botanical Congress and, if ratified, will become a binding decision with retroactive effect.

To account for the binding decisions under Prop. 370 above, which relate to a provision no longer present in the *Code* if Prop. 369 is accepted, a Note patterned after Art. F.8 Note 2 of the "San Juan Chapter F" (May & al. in IMA Fungus 10(21). 2019), which clarifies cases formerly considered under deleted Art. 59 of the *Vienna Code*, should be added to Art. 20:

Table 1. Actual (marked by underscore) or potential rejections of generic names/designations matching technical terms due to application of Article 20.2 and its precursors.

A. Generic designations published before 1912			
Designation	Publication	First validly published name	References
"*Medium*" Opiz [Angiosp.]	Berchtold & Opiz, Oekon.-Techn. Fl. Böhm. 2(2): 9. 1839 (https://babel.hathitrust.org/cgi/pt?id=uc1.31175016190921)		ING
"*Mucilago*" Battarra [Fungi]	Fungi Arimin.: 76. 1755 (https://bibdigital.rjb.csic.es/idviewer/10884/86)	***Mucilago*** Haller ex F.H. Wigg., Prim. Fl. Holsat.: 112. 1780 (https://archive.org/details/primitiaeflorae00webegoog/mode/2up)	ING; see Taxon 47: 110. 1998 (https://doi.org/10.2307/1224025)
"*Mucilago*" Adans. [Fungi]	Fam. Pl. 2: 7. 1763 (https://doi.org/10.5962/bhl.title.271)	***Mucilago*** Haller ex F.H. Wigg., Prim. Fl. Holsat.: 112. 1780 (https://archive.org/details/primitiaeflorae00webegoog/mode/2up)	
"*Ocellis*" Clem. [Fungi]	Gen. Fungi: 80, 175. 1909 (https://doi.org/10.5962/bhl.title.3602)		see Phytotaxa 189: 69. 2014 (https://doi.org/10.11646/phytotaxa.189.1.6)
"*Radicula*" Hill [Angiosp.]	Brit. Herb.: 264. 1756 (https://doi.org/10.5962/bhl.title.51133)	***Radicula*** Moench, Methodus: 262. 1794 (https://doi.org/10.5962/bhl.title.304)	see Sida 4: 280. 1972 (https://www.jstor.org/stable/41966420) & Shenzhen Code: Art. 20 Ex. 2 (https://www.iapt-taxon.org/nomen/pages/main/art_20.html)
"*Unifolium*" Zinn [Angiosp.]	Cat. Pl. Hort. Gott.: 104. 20 Apr–21 Mai 1757 (https://catalog.hathitrust.org/Record/011537260)	***Unifolium*** All., Fl. Pedem. 1: 124. 1785 (https://bibdigital.rjb.csic.es/idurl/1/13173)	ING
"*Volva*" Adans. [Fungi]	Fam. Pl. 2: 12. 1763 (https://doi.org/10.5962/bhl.title.271)		

B. Generic names or designations published after 1911			
Name/designation	Publication	Substitute name	Source where rejected
"*Aculeata*" W. Dong & al. [Fungi]	Mycol. Progr. 17: 622. 2018		
"*Agamus*" Vologdin [Foss.]	Dokl. Akad. Nauk S.S.S.R. 193: 1165. 1970		
"*Ala*" Szlach. [Angiosp.]	Fragm. Florist. Geobot. Suppl. 3: 113. 1995	***Alinorchis*** Szlach.	Polish Bot. J. 46: 129. 2002 (http://maxbot.botany.pl/cgi-bin/pubs/data/article_pdf?id=731)
"*Apodus*" Malloch & Cain [Fungi]	Canad. J. Bot. 49: 872. 1971		
"*Arbuscula*" H.A. Crum & al. [Bryoph.]	Bryologist 67: 163. 1964	≡ ***Thamnobryum*** Nieuwl. 1917	ING [but as a "Superfluous substitute name for *Thamnium* W. P. Schimper 1852"]
"*Arbuscula*" Bat. & Peres [Fungi]	Mycopathol. Mycol. Appl. 25: 162. 1965	***Neoarbuscula*** B. Sutton	Trans. Brit. Mycol. Soc. 81: 407. 1983 (www.cybertruffle.org.uk/cyberliber/59351/0081/002/0407.htm), ING & IF (but as later homonym of "*Arbuscula*" H.A. Crum)
"*Arcus*" Olshtynskaja [Algae]	Paleontol. Sborn. (Moscow & Leningrad) 15: 77. 1978	***Fossilarcus*** S. Blanco	Notul. Algarum 139: 1. 2020 (https://notulaealgarum.org/2020/documents/Notulae%20algarum%20No.%20139.pdf)
"*Armata*" W. Yamam. [Fungi]	Sci. Rep. Hyogo Univ. Agric., Ser. Agric. 3: 89. 1958		

(Continues)

Table 1. Continued.

B. Generic names or designations published after 1911			
Name/designation	Publication	Substitute name	Source where rejected
"*Bacca*" Engelh. [Foss.]	Abh. Hess. Geol. Landesanst. Darmstadt 7(4): 77. 1922		ING, IFPNI
"*Bicornis*" J. Fenner [Algae]	Aarhus Geosci. 1: 109. 1994	***Fennerbicornis*** S. Blanco	Notul. Algarum 139: 1. 2020 (https://notulaealgarum.org/2020/documents/Notulae%20algarum%20No.%20139.pdf)
"*Bicuspidata*" E.A. Assejeva [Foss.]	Teslenko, Sist. Evol. Drevn. Rast. Ukrainy: 11. 1982		ING
"*Bracteola*" Swallen [Angiosp.]	Amer. J. Bot. 20: 118. 1933	***Chrysochloa*** Swallen	Proc. Biol. Soc. Wash. 54: 44. 1941 (https://www.biodiversitylibrary.org/page/34599197)
"*Bulbilla*" Diederich & al. [Fungi]	Lichenologist 46: 340. 2014	**"*Adamflakia*"** Diederich & Lawrey	Bryologist 119: 347. 2016 (https://doi.org/10.1639/0007-2745-119.4.341) [but fide ING, the "replacement name" violates Art. 38.5, 40.3 & 40.6]
"*Bulbulus*" Swallen [Angiosp.]	Phytologia 11: 154. 1964	***Rehia*** Fijten	Blumea 22: 416. 1975 (https://repository.naturalis.nl/pub/525810)
"*Caeruleum*" K. Knudsen & Arcadia [Fungi]	Opusc. Philolichenum 11: 24. 2012		see Taxon 65: 903–905. 2016 (https://doi.org/10.12705/654.35)
"*Calyptra*" Theiss. & Syd. [Fungi]	Ann. Mycol. 15: 478. 1918		
Candida Berkhout, nom. cons. [Fungi]	Schimmelgesl. Monilia: 41. 1923		
"*Capillus*" T.A. Caires & al. [Algae]	Algae 33: 295. 2018	***Capilliphycus*** T.A. Caires & al.	Notul. Algarum 95: 1. 2019 (http://notulaealgarum.org/documents/Notulae%20algarum%20No.%2095.pdf)
"*Carbonicola*" Bendiksby & Timdal [Fungi]	Taxon 62: 950. 2013		see Taxon 65: 903–905. 2016 (https://doi.org/10.12705/654.35)
"*Caulorhiza*" Lennox [Fungi]	Mycotaxon 9: 154. 1979		
"*Cavernosa*" Stidolph [Algae]	Nova Hedwigia 50: 99. 1990	***Phycavernosa*** S. Blanco	Notul. Algarum 139: 5. 2020 (https://notulaealgarum.org/2020/documents/Notulae%20algarum%20No.%20139.pdf)
"*Clavata*" Stanevich [Foss.]	Jankauskas & al., Mikrofoss. Dokembr. S.S.S.R.: 56. 1989		
Cleistogenes Keng [Angiosp.]	Sinensia 5: 147. 1934	***Kengia*** Packer, nom. illeg.	Bot. Not. 113: 291. 1960 [see Shenzhen Code Art. 20 Ex. 5: https://www.iapt-taxon.org/nomen/pages/main/art_20.html]
Colleteria David W. Taylor [Angiosp.]	Syst. Geogr. Pl. 73: 203. 2003	***Wandersong*** David W. Taylor, nom. illeg.?	J. Bot. Res. Inst. Texas 8: 530. 2014 (https://www.jstor.org/stable/26549402)
"*Coma*" Nag Raj & W.B. Kendr. [Fungi]	Canad. J. Bot. 50: 614. 1972		
"*Constricta*" R. Heim & Mel.-Howell [Fungi]	Rev. Mycol. (Paris) 29: 324. 1965		

(Continues)

Table 1. Continued.

B. Generic names or designations published after 1911			
Name/designation	Publication	Substitute name	Source where rejected
"*Contexta*" M.B. Gnilovsk. [Foss.]	Izvestk. Vodor. Ordov. Vost. Kazakhst.: 108. 1972		
"*Corollina*" Maljavkina [Foss.]	Trudy Vsesoyuzn. Neft. Nauchno-Issl. Geol.-Razved. Inst., ser. 2, 33: 120. 1949		
"*Corona*" P. Leféb. & Chenev. [Algae]	Bull. Soc. Franç. Microscop. 7: 9. 1938	***Phycorona*** S. Blanco	Notul. Algarum 139: 5. 2020 (https://notulaealgarum.org/2020/documents/Notulae%20algarum%20No.%20139.pdf)
"*Crassa*" Gurgel & al. [Algae]	Phytotaxa 374: 10. 2018	***Crassiphycus*** Guiry & al.	Notul. Algarum 82: 1. 2018 (https://www.notulaealgarum.com/documents/Notulae%20algarum%20No.%2082.pdf)
"*Crassinervia*" Neuburg [Foss.]	Trudy Vsesoyuzn. Geol.-Razved. Ob'jed. S.S.S.R. 348: 37. 1934		[but see Taxon 62: 1351–1353. 2013 (https://doi.org/10.12705/626.38), a nom. cons. prop. involving this name]
"*Decussata*" (R.M. Patrick) Lange-Bert. [Algae]	Iconogr. Diatom. 9: 670. 2000	***Decussiphycus*** Guiry & Gandhi	Notul. Algarum 94: 1. 2019 (http://notulaealgarum.org/documents/Notulae%20Algarum%20No.%2094.pdf)
"*Delicata*" Krammer [Algae]	Lange-Bertalot, Diatoms Eur. 4: 164. 2003	***Delicatophycus*** M.J. Wynne	Notul. Algarum 97: 1. 2019 (https://www.notulaealgarum.org/documents/Notulae%20algarum%20No.%2097.pdf)
"*Dilatata*" J.M. Anderson & H.M. Anderson [Foss.]	Palaeofl. S. Africa, Prodr., Devon.: 154. 1985		ING
"*Exarata*" A.H. Gentry [Angiosp.]	Syst. Bot. 17: 503. 1992		IPNI (https://www.ipni.org/n/300319-2)
"*Flagellis*" E.A. Assejeva [Foss.]	Teslenko, Sist. Evol. Drevn. Rast. Ukrainy: 10. 1982		
"*Folium*" E. Hoffm. [Foss.]	Nova Acta Leop., ser. 2, 1: 61. 1932		ING [see *Shenzhen Code* Art 20 Ex. 6: https://www.iapt-taxon.org/nomen/pages/main/art_20.html]
"*Fossula*" Hasle & al. [Algae]	Diatom Res. 11: 296. 1996	***Fossulaphycus*** S. Blanco	Notul. Algarum 139: 2. 2020 (https://notulaealgarum.org/2020/documents/Notulae%20algarum%20No.%20139.pdf)
"*Funiculus*" V.P. Shuysky & D.I. Schirschova [Foss.]	Trudy Inst. Geol. Geofiz. Akad. Nauk SSSR, Sibirsk. Otd. 674: 100. 1987 (https://books.google.at/books?id=XvrRr3kAlhMC)		ING
"*Funiculus*" Moreira-Fern. & al. [Algae]	J. Phycol. 57: 1575. 2021		
"*Gemma*" V.A. Luchinina [Foss.]	Trudy Inst. Geol. Geofiz. Akad. Nauk S.S.S.R., Sibirsk. Otd. 510: 100. 1982		ING
"*Hirsutum*" Plumst. [Foss.]	Trans. Geol. Soc. South Africa 61: 60. 1958	***Gladiopomum*** Adendorff & al.	Palaeont. Afr. 38: 4. 2002 (https://wiredspace.wits.ac.za/bitstreams/679c7745-6f63-4f55-86d4-48b8d63a825f/download)
"*Involucrum*" Velen. & Viniklář [Foss.]	Rozpr. Státního Geol. Ústavu 5: 15, 75. 1931		ING
"*Lanceolata*" Ekanayaka & K.D. Hyde [Fungi]	Mycosphere 10: 422. 2019 (https://www.mycosphere.org/pdf/MYCOSPHERE_10_1_7.pdf)		[see Shenzhen Code Art. 20 Ex. 4: https://www.iapt-taxon.org/nomen/pages/main/art_20.html]

(Continues)

Table 1. Continued.

B. Generic names or designations published after 1911			
Name/designation	Publication	Substitute name	Source where rejected
"*Lanceolatus*" Plumst. [Foss.]	Trans. Geol. Soc. South Africa 55: 299. 1952		ING [see Shenzhen Code Art. 20 Ex. 4: https://www.iapt-taxon.org/nomen/pages/main/art_20.html]
"*Latibractea*" Hai-Ming Liu & al. [Foss.]	Chin. Sci. Bull. 58(Suppl. 1): 203. 2013		
"*Laticaulina*" Krassilov [Foss.]	Paleontol. Zhurn. 1970(3): 141. 1970		
"*Lignum*" Y.-S. Xing [Foss.]	Acta Geol. Sin. 1973(1): 28. 1973		IFPNI [see Table 1D and Prop. 373 above]
"*Lobata*" V.J. Chapm. [Algae]	Trans. Roy. Soc. New Zealand 80: 48. 1952		ING [see Shenzhen Code Art. 20 Ex. 4: https://www.iapt-taxon.org/nomen/pages/main/art_20.html]
"*Lobifolia*" Rassk. & Lebedev [Foss.]	Trudy Geol. Inst. Akad. Nauk S.S.S.R., ser. 2, 191: 61. 1968		ING, IFPNI
"*Multifurcatus*" Yi Wang [Foss.]	Alcheringa 27: 51. 2003 (https://doi.org/10.1080/03115510308619544)		ING
"*Obtusifolium*" S.W. Arnell [Bryoph.]	Ill. Moss Fl. Fennoscandia. I. Hepat.: 133. 1956		ING
"*Ovulum*" Jankauskas [Foss.]	Paleontol. Zhurn. 1975(1): 96. 1975		ING
"*Parallela*" E.A. Flint [Algae]	New Zealand J. Bot. 12: 358. 1974	***Flintia*** Molinari & Guiry	Notul. Algarum 168: 1. 2020 (https://www.notulaealgarum.com/documents/Notulae%20algarum%20No.%20168.pdf)
"*Paraphysis*" (DC.) Dostál [Angiosp.]	Acta Bot. Acad. Sci. Hung. 19: 76. 1973		ING
"*Pellucida*" Dulym. & al. [Fungi]	Mycol. Res. 105: 250. 2001		
"*Petalum*" G.V. Djupina [Foss.]	Trudy Inst. Geol. Geochim. Uralsk. Nauchn. Centr. Akad. Nauk S.S.S.R. 109: 136. 1974 (https://books.google.at/books?id=qORvDwAAQBAJ)	***Dyupetalum*** Janson. & Hills	Genera File Fossil Spores Suppl. 3: 3551. 1979, ING
"*Podocarpium*" (Benth.) Y.C. Yang & P.H. Huang [Angiosp.]	Bull. Bot. Lab. N. E. Forest. Inst. Harbin 4: 4. 1979	***Hylodesmum*** H. Ohashi & R.R. Mill	Edinburgh J. Bot. 52: 173. 2000 (https://doi.org/10.1017/S0960428600000123) [See discussion on p. 172 regarding the morphological term "podocarpium". Is a post-1911 later homonym that does not satisfy Art. 20.2 of a pre-1912 generic name that does satisfy the Article validly published? It is treated as such in App. IV, where ***Podocarpium podocarpum*** (DC.) Y.C. Yang & P.H. Huang is listed.]
"*Principia*" P.L. Brenckle [Foss.]	Geol. Palaeontol. (Marburg) 15: 59. 1982		
"*Pulvinata*" Ekanayaka & K.D. Hyde [Fungi]	Mycosphere 10: 350. 2019		

(Continues)

Table 1. Continued.

B. Generic names or designations published after 1911			
Name/designation	Publication	Substitute name	Source where rejected
"*Pulvinus*" J.A. West & al. [Algae]	Phycologia 46: 249. 2007	***Pulvinaster*** J.A. West & al.	Phycologia 46: 478. 2007 (https://www.researchgate.net/publication/256441611_2007_Pulvinaster_Corrigendum_Phycologia)
"*Pumilus*" Viala & Marsais [Fungi]	Compt. Rend. Hebd. Séances Acad. Sci. 198: 1557. 1934		
"*Purpurea*" F.F. Cai & Renhui Li [Algae]	Fottea 20: 87. 2020 (https://doi.org/10.5507/fot.2019.018)	***Purpureonostoc*** F.F. Cai & Renhui Li	Fottea 20: 111. 2020 (https://doi.org/10.5507/fot.2020.007)
Scandentia E.L. Cabral & Bacigalupo [Angiosp.]	Darwiniana 39: 30. 2001	***Denscantia*** E.L. Cabral & Bacigalupo, nom. illeg.	Darwiniana 39: 353. 2001 (https://www.redalyc.org/pdf/669/66939412.pdf)
"*Scutum*" Plumst. [Foss.]	Trans. Geol. Soc. South Africa 55: 285. 1952		ING, IFPNI
"*Semen*" Velen. & Viniklár [Foss.]	Fl. Cret. Bohem. 2: Czech 15, German 43. 1927 (https://www.digitalniknihovna.cz/knav/view/uuid:5b54fbf4-46c7-4ef9-993a-2abe167d015b)		ING
"*Serialis*" E.M. Friis & al. [Foss.]	Int. J. Pl. Sci. 180: 95. 2019		IFPNI
"*Setacea*" (De Toni) Necchi & Rossignolo [Algae]	Phycologia 55: 343. 2016	***Atrophycus*** Necchi & Rossignolo	Notul. Algarum 26: 1. 2017 (http://notulaealgarum.org/documents/Notulae%20algarum%20No.%2026.pdf)
"*Solitaria*" Arup & al. [Fungi]	Nordic J. Bot. 31: 55. 2013		
"*Solitaria*" (McNeill) Sadeghian & Zarre [Angiosp.]	Bot. J. Linn. Soc. 178: 667. 14 Jun 2015 (https://doi.org/10.1111/boj.12293)	***Shivparvatia*** Pusalkar & D.K. Singh	J. Jap. Bot. 90: 81. 20 Apr 2015 (https://doi.org/10.51033/jjapbot.90_2_10562) [Both names are based on ***Arenaria*** subg. ***Solitaria*** McNeill in Notes Roy. Bot. Gard. Edinburgh 24: 128. 1962, with different types but including the same 3 species.]
"*Spathulata*" (Boriss.) Á. Löve & D. Löve [Angiosp.]	Taxon 34: 163. 1985 (https://doi.org/10.1002/j.1996-8175.1985.tb04413.x)		ING
"*Spongiosus*" Lloyd ex Torrend [Fungi]	Brotéria, Sér. Bot. 18: 121. 1920		
"*Stilus*" Paddock [Algae]	Biblioth. Diatomol. 16: 95. 1988	***Phycostilus*** S. Blanco	Notul. Algarum 139: 5. 2020 (https://notulaealgarum.org/2020/documents/Notulae%20algarum%20No.%20139.pdf)
"*Stipella*" L. Léger & M. Gauthier [Fungi]	Compt. Rend. Hebd. Séances Acad. Sci. 194: 2263. 1932	"***Stypomyces***" Doweld	Index Fungorum 112. 2014 (http://www.indexfungorum.org/Publications/Index%20Fungorum%20no.112.pdf) [Published as a replacement name for **"*Stipella*"** L. Léger & M. Gauthier (non ***Stypella*** Möller), but only with reference to its earlier non-Latin description, also with two species combinations but no indication of type.]

(Continues)

Table 1. Continued.

B. Generic names or designations published after 1911			
Name/designation	Publication	Substitute name	Source where rejected
"*Stipella*" (Tzvelev) Röser & Hamasha [Angiosp.]	Pl. Syst. Evol. 298: 365. 2012 (https://doi.org/10.1007/s00606-011-0549-5)	***Stipellula*** Röser & Hamasha	Schlechtendalia 24: 91. 2012 (https://doi.org/10.25673/90109) [Not a replacement name, but nonetheless replaced the earlier invalid name, which was wrongly considered a later homonym of the similarly invalid **"*Stipella*"** L. Léger & M. Gauthier.]
"*Sympodia*" (R. Heim) W.B. Cooke [Fungi]	Gen. Homobasidiom.: 93. 1953		[see Donk, Generic Names Proposed for Agaricaceae: 280. 1962]
"*Tertiarius*" Håk. & Khursevich [Algae]	Diatom Res. 12: 21. 1997	***Paleotertiarius*** S. Blanco	Notul. Algarum 139: 2. 2020 (https://notulaealgarum.org/2020/documents/Notulae%20algarum%20No.%20139.pdf)
"*Tribrachiatus*" Shamrai [Foss.]	Izv. Vyssh. Uchebn. Zaved., Geol. & Razvedka 1963(4): 38. 1963		
"*Trilobata*" S.N. Naumova [Foss.]	Amiraslanov, Trudy XVII Sess. Mezhdunar. Geol. Kongr. 1: 358. 1940		
"*Trilobatum*" Xiaosi Fang [Foss.]	Bull. Inst. Geol., Chin. Acad. Geol. Sci. 14: 156. 1987		
"*Tuberculatis*" Clem. & Shear [Fungi]	Gen. Fung., ed. 2: 221. 1931		
"*Tubulosa*" E.A. Assejeva [Foss.]	Teslenko, Sist. Evol. Drevn. Rast. Ukrainy: 13. 1982		ING
"*Umbella*" Maslov [Foss.]	Trudy Vsesoyuzn. Neft. Nauchno-Issl. Geol.-Razved. Inst., ser. 2, 87: 37. 1956		
"*Umbellula*" E.F. Morris [Fungi]	Mycologia 47: 602. 1955		
"*Umbellula*" Korde [Foss.]	Trudy Paleontol. Inst. Akad. Nauk SSSR 139: 135. 1973	***Palaeoumbellula*** Molinari & Guiry	Notul. Algarum 183: 5. 2021 (https://www.notulaealgarum.com/2021/documents/Notulae%20algarum%20No.%20183.pdf) [Published as a replacement name for **"*Umbellula*"** Korde (non E.F. Morris), but because the type of the single species, also considered a replacement name, was not indicated (Art. 40) it was not validly published and thus the type of this genus was not indicated under Art. 40.3.]
"*Uniscidiatus*" (Kores) Szlach. [Angiosp.]	Polish Bot. J. 46: 20. 2001	***Acianthopsis*** Szlach., nom. illeg. (non M.A. Clem. & D.L. Jones 20 Jan 2002)	Polish Bot. J. 46: 143. 20 Feb 2002 (http://maxbot.botany.pl/cgi-bin/pubs/data/article_pdf?id=734)
"*Vesicula*" Chlonova [Foss.]	Trudy Inst. Geol. Geofiz. Sibirsk. Otdel. Akad. Nauk S.S.S.R. 1976(312): 65. 1977		IFPNI
Xenia Gerb. [Angiosp.]	Bot. Jahrb. Syst. 113: 552. 1992		[see Bradleya 12: 108. 1994 (https://doi.org/10.25223/brad.n12.1994.a8)]
C. Generic names at new rank not published after 1911			
Subdivisional Name	Publication	Replacement name	Source where replaced
Plagiochila sect. ***Connatae*** Lindenb.	Monogr. Hepat. Gen. Plagiochilae: XXIX. 1843	***Cryptolophocolea*** L. Söderstr.	Phytotaxa 97: 39. 2013 (https://doi.org/10.11646/phytotaxa.97.2.3)

(Continues)

Table 1. Continued.

C. Generic names at new rank not published after 1911			
Subdivisional Name	Publication	Replacement name	Source where replaced
Pallavicinia sect. ***Dentigerae*** R.M. Schust.	J. Hattori Bot. Lab. 70: 146. 1991	***Prionothallus*** Mamontov & al.	Arctoa 30: 167. 2021 (https://doi.org/10.15298/arctoa.30.17)
Typhonium sect. ***Diversifolia*** Srib. & J. Murata	J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 15: 294. 1994	***Diversiarum*** J. Murata & Ohi-Toma	Syst. Bot. 36: 254. 2011 (https://doi.org/10.1600/036364411X553333)
Caladenis subg. ***Elevata*** Hopper & A.P. Br.	Lindleyana 15: 124. 2000	***Caladeniastrum*** (Szlach.) Szlach.	Ann. Bot. Fenn. 40: 144. 2003 (https://www.jstor.org/stable/23726890)
Typhonium sect. ***Hirsuta*** Srib. & J. Murata	J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 15: 293. 1994	***Hirsutiarum*** J. Murata & Ohi-Toma	Syst. Bot. 36: 254. 2011 (https://doi.org/10.1600/036364411X553333)
Typhonium sect. ***Pedata*** Srib. & J. Murata	J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 15: 296. 1994	***Pedatyphonium*** J. Murata & Ohi-Toma	Syst. Bot. 36: 254. 2011 (https://doi.org/10.1600/036364411X553333)
Arenaria subg. ***Solitaria*** McNeill	Notes Roy. Bot. Gard. Edinburgh 24: 128. 1962	***Shivparvatia*** Pusalkar & D.K. Singh	J. Jap. Bot. 90: 81. 20 Apr 2015 (https://doi.org/10.51033/jjapbot.90_2_10562)
		"*Solitaria*" (McNeill) Sadeghian & Zarre	Bot. J. Linn. Soc. 178: 667. 14 Jun 2015 (https://doi.org/10.1111/boj.12293)

D. Other generic designations not now validly publishable	
Designation	Source where rejected
"Balsamum"	PhytoKeys 150: 264. 2020 (https://doi.org/10.3897/phytokeys.150.50687)
"Bulbus"	PhytoKeys 150: 264. 2020 (https://doi.org/10.3897/phytokeys.150.50687)
"Caulis"	see *Shenzhen Code* Art. 20 Ex. 6 (https://www.iapt-taxon.org/nomen/pages/main/art_20.html)
"Cortex"	PhytoKeys 150: 264. 2020 (https://doi.org/10.3897/phytokeys.150.50687)
"Flos"	PhytoKeys 150: 264. 2020 (https://doi.org/10.3897/phytokeys.150.50687)
"Folium"	see *Shenzhen Code* Art. 20 Ex. 6 (https://www.iapt-taxon.org/nomen/pages/main/art_20.html) [but see Table 1B]
"Herba"	PhytoKeys 150: 264. 2020 (https://doi.org/10.3897/phytokeys.150.50687)
"Lignum"	see Vienna & Brussels Rules (https://www.iapt-taxon.org/historic/1906.htm; https://www.iapt-taxon.org/historic/1912.htm) [but see Table 1B]
"Oleum"	PhytoKeys 150: 264. 2020 (https://doi.org/10.3897/phytokeys.150.50687)
"Radix"	see *Shenzhen Code* Art. 20 Ex. 6 (https://www.iapt-taxon.org/nomen/pages/main/art_20.html) [but see Fritsch, Problematica Silurica: 8. 1908; https://doi.org/10.5962/bhl.title.14914]
"Spina"	see *Shenzhen Code* Art. 20 Ex. 6 (https://www.iapt-taxon.org/nomen/pages/main/art_20.html)

(371) Add the following Note under Art. 20:

"*Note n*. Editions of the *Code* prior to the *Madrid Code* of 2025 included a provision precluding the valid publication after 1911 of the name of a genus that coincided with a technical term in use in morphology at the time of publication. While publication of such names is not recommended (see Rec. 20A.1(n)), in the interest of nomenclatural stability under the current *Code* binding decisions on the valid publication status for each case or any with identical spelling where this former provision applied are listed in App. VI and take retroactive effect."

Table 1C lists validly published names of subdivisions of genera for which a replacement name in lieu of a name at new rank has been published to avoid their transfer to generic rank in violation of Art. 20.2. With elimination of part of Art. 20.2, a new Recommendation against such transfers is desirable to guard against any future infringements of this type.

(372) Add the following new clause to Rec. 20A.1 (new text in bold):

"*20A.1*. Authors forming generic names should comply with the following:

[…]

(n) **Not publish names for genera that coincide with technical terms currently in use in morphology.**"

And finally, Table 1D lists several words derived from various sources (*Shenzhen Code* Art. 20 Ex. 6; Vienna Rules Art. 54 Ex. 1; Floor Prop. 7 in Shenzhen [Lindon & al. in PhytoKeys 150: 264. 2020]) that should continue to be protected against their inadvertent valid publication as generic names with elimination of part of Art. 20.2. A mechanism similar to that advocated by Floor Prop. 7 in Shenzhen is proposed.

(373) Delete Art. 20 Ex. 4–6; insert a new clause in Art. 20.4 (new text in bold):

"*20.4*. The following are not to be regarded as generic names: […]

(n) **Some words that have been widely used in pharmacopoeia or as descriptive morphological terms: *Balsamum, Bulbus, Caulis, Cortex, Flos, Herba, Lignum, Oleum, Radix, Spina*.**"

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We are grateful to Emma Wrankmore for providing feedback on generic designations associated with Art. 20.2 in IPNI, and to Michael Guiry, Paul Kirk and Alexander Doweld for their primary roles in providing to the scientific community data on algal, fungal and fossil names through AlgaeBase, Index Fungorum and the International Fossil Plant Names Index, respectively.

(374) Proposal to amend Article 38.3 to clarify what local, indigenous or traditional information is to be accepted in a validating description or diagnosis

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Information obtained from traditional knowledge of various peoples of the world was, and still is, widely used in taxonomy of plants and fungi. Ethnobotany and ethnobotanical linguistics are also important for exploration and conservation of biodiversity (e.g. Young, Ethnobotany. 2007; Berlin, Ethnobiological Classification: Principles of Categorization of Plants and Animals in Traditional Societies. 2014). Vernacular, folk and traditional plant names are often condensed forms of traditional knowledge, reflecting morphology, ecology, utility and other qualities of the plant taxa (see, e.g., Hidayati & al. in Franco & al., Case Studies in Biocultural Diversity from Southeast Asia: Traditional Ecological Calendars, Folk Medicine and Folk Names: 167–225. 2022, https://doi.org/10.1007/978-981-16-6719-0_7), and thus they can be reflected also in scientific names of organisms.

Hayova & al. (Prop. 221 in Taxon 72: 455. 2023) proposed "to add a new Recommendation after Article 38, with the advice to report local/indigenous vernacular names (if available) of new taxa and to use such names, if appropriate, in scientific nomenclature". If the proposal of Hayova & al. (l.c.) is accepted, protologues of new taxa might therefore contain vernacular names and/or cite publications containing traditional knowledge. Actually, Art. 6.13 footnote of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) provides no restriction on the kind of information already allowed to be included in the protologue, but if the proposal of Hayova & al. (l.c.) is accepted, such inclusions may become far more common. This kind of information from the protologue might appropriately be used for various purposes related to plant taxonomy and nomenclature.

However, not all information in the protologue can be used in a "description or diagnosis" required by Art. 38.1 for valid publication of a new name. The current proposal is to make it clear that any "description or diagnosis" mandated by Art. 38.1 is limited to morphological characteristics (and possibly, in future, DNA sequences, see Thiele & al. in Taxon 72: 965–973. 2023) of the taxon itself, and does not include any reference to any other human cognizance of the taxon, whether that be scientific ("geographical origin, or geological age", see Art. 38.3) or traditional/cultural.

There could be a situation when the local or indigenous name is in fact descriptive (e.g. meaning "white-flowering tall shrub" or "prickly wide-leaved weed"). A mere citation of such descriptive names, in the past or in the future, should not be sufficient to constitute a description or diagnosis under Art. 38.1. If such names are in a language other than those permitted by Art. 39, they might arguably not be considered part of the validating "description or diagnosis" anyway, but this proposal makes that clear and avoids any such arguments.

On the other hand, there could be a situation when an author of a name refers to some earlier publication on traditional knowledge, which contains a morphological description of the taxon, i.e. a description not relying on properties ruled out by Art. 38.3. In that case, it can be accepted as the validating "description or diagnosis"; there is no good reason why such a morphological description should not be cited.

An addition to Art. 38.3 is therefore proposed.

(374) Amend Art. 38.3 as follows (new text in bold):

"*38.3*. The requirements of Art. 38.1(a) are not met by statements describing properties such as purely aesthetic features, economic, medicinal or culinary use, cultural significance, cultivation techniques, geographical origin, or geological age**; or by statements indicating local or indigenous vernacular names (even descriptive ones); or by statements citing non-descriptive traditional knowledge**."

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(375–376) Proposals to address valid publication based on information in the protologue (Articles 40, 8 Ex. 3 and 9.2)

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Article 40.2 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) states that for purposes of publishing a new species name, "indication of the type as required by Art. 40.1 can be achieved by reference to an entire gathering". In our view, it is implicit that Art. 40.2 is not satisfied if the referenced material is more than one gathering even if this fact is not apparent in the protologue. However, based on Prop. 163–164 by Mosyakin & McNeill (in Taxon 71: 1325–1326. 2022), there is a difference of opinion on this issue.

Article 8 Ex. 3 illustrates this matter. It states that because the apparent holotype includes material "collected at more than one time, it belongs to more than one gathering and cannot be accepted as a type. Raudonat & Rischer's name is not validly published under Art. 40.2." It is important to note that the Example does not make any statement about the actual language of the protologue. In our view, this Example is correct because there is no reference to a single gathering, as required by Art. 40.2, if the referenced item consists of more than one gathering. Whether this is apparent from the protologue is irrelevant.

We offer the following changes to the Example to make this point more explicit.

(375) Amend Art. 8 Ex. 3 as follows (new text in bold, deleted text in strikethrough):

"*Ex. 3*. **The protologue of** "*Echinocereus sanpedroensis*" (Raudonat & W. Rischer (in Echinocereenfreund 8(4): 88–97. 1995) **states "Holotypus: Mexico, Edo Sonora, Rancho San Pedro, Ri. 263, cult. W. Rischer Mai 1995 (ZSS), AX 16502". While the protologue contains no additional information as to the contents of this** ~~was based on a~~ "holotype", **it** ~~consisting~~ **consists** of a complete plant with roots, a detached branch, an entire flower, a flower cut in halves, and two fruits that, according to the label, were taken from the same cultivated individual at different times and preserved, in alcohol, in a single jar. Because this material was collected at more than one time, it belongs to more than one gathering and cannot be accepted as a type. Raudonat & Rischer's name is not validly published under Art. 40.2**, even though there is nothing in the protologue indicating the holotype is more than one gathering**."

We also recommend that the Editorial Committee move this Example to Art. 40.

Examples (other than voted Examples) are not comparable to a rule and are "solely for illustrative purposes" (Art. 8 footnote 1). While we believe that Art. 8 Ex. 3 is fully supported by Art. 40.2, some clarification of the rules appears desirable to address whether external evidence on what is referenced in the protologue is relevant to determine if the publication rules are satisfied. In this regard, we note that Art. 9.2 already addresses certain errors and omissions in the protologue. It states "If a designation of holotype made in the protologue of the name of a taxon is later found to contain errors (e.g. in locality, date, collector, collecting number, herbarium code, specimen identifier, or citation of an illustration), these errors are to be corrected provided that the intent of the original author(s) is not changed. However, omissions of required information under Art. 40.6–40.8 are not correctable." Because this Article mentions Art. 40.6–40.8, it also applies to the valid publication rules in Art. 40.

To further address this issue, consider the following hypothetical example. Assume that the protologue of a new name that is otherwise validly published by Santa (2023) states "Holotype: North Pole, December 25, 2020, *Santa 302* (H)". If the actual specimen is *Santa 320* or *Santa 802*, Art. 9.2 treats the name as validly published. However, if *Santa 302* consists of more than one gathering, it is not an error but is equivalent to an omission. Similarly, if *Santa 302* is a photograph, we do not think it is correctable in light of Art. 40.4, which provides that the type may not be an illustration on or after 1 January 2006 (except as provided in Art. 40.5).

We also note that the statement in Art. 9.2 that omissions of required information are not correctable is better placed in Art. 40. If that information is not provided, the name is not validly published, and there is no holotype to be corrected.

We offer the following proposal to address this matter.

(376) Amend Art. 9.2 as follows (new text in bold, deleted text in strikethrough) and add a new Article in Art. 40:

"*9.2*. If a designation of holotype **(or indication of type under Art. 40)** made in the protologue of the name of a taxon is later found to contain errors (e.g. in locality, date, collector, collecting number, herbarium code, specimen identifier, or **incorrect** citation of an illustration), these errors are to be corrected provided that the intent of the original author(s) is not changed. ~~However, omissions of required information under Art. 40.6–40.8 are not correctable.~~"

"*40.n*. Except as expressly provided in this *Code* (e.g. Art. 9.14), a name of a new taxon is not validly published if external evidence reveals that the internal evidence in the protologue failed to meet the requirements for valid publication (i.e. Art. 32–45, F.4, F.5, and H.9). For example, even if not apparent from the protologue, a name of a new taxon is not validly published if the indicated type consists of more than one gathering, or for names published on or after 1 January 2007, is an illustration (except as permitted by Art. 41.5), or if the purported validating description or diagnosis in a referenced earlier publication is inadequate under Art. 38. In contrast, errors in the indication of the type described in Art. 9.2 do not prevent the valid publication of the name of a new taxon. However, omissions of the required information to validly publish a name (e.g. Art. 40.6–40.8) are not correctable."

It is worth noting that two Examples in the *Shenzhen Code* involve the opposite fact pattern: while the protologue might suggest that the type is more than one gathering, a review of the referenced materials reveals that they are in fact a single gathering. See Art. 40 Ex. 4 and Art. 46 Ex. 22. We have offered appropriate amendments to the Editorial Committee.

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(377–378) Proposals to improve the indexing and exchange of digital nomenclatural data

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The use of agreed-upon standards is one of the foundations of effective scientific communication. In some cases, those standards come about organically as researchers converge on a set of best practices. In other cases, standards may need to be rigorously imposed in order to guarantee adherence. Both examples exist in the *International Code of Nomenclature for algae, fungi, and plants* ("*Code*"; Turland & al. in Regnum Veg. 159. 2018) and either might be applied in the case under discussion. In addition, there is precedence in the *Code* for recommending certain "identifiers" meant to stand in for richer data. See for example, Rec. 46A Note 1, which recommends using standard forms for the authors of plant names. Even more directly applicable is Art. 40 Note 4, which recommends the use of standard herbarium codes when citing institutions. These codes are widely used in digital datasets to unambiguously identify where a specimen resides. A precise statement of the problem we are trying to solve is important here, because it is clear to us that at least three issues are involved: registration, indexing and data exchange. When we discuss this topic with our peers, we find that these issues are often conflated, while in our minds they must be discussed separately.

Registration

Registration as an end unto itself (i.e. as a way to block "bad" names from ever being published) has been summarily rejected by the botanical community and need not be discussed further. However, registration is now offered as a way to achieve two other, more desirable goals – namely rapid indexing and efficient data exchange. It should be pointed out that both indexing and data exchange are already occurring in the absence of registration of plant names. The merits of registration can therefore only be considered in the context of its *marginal* improvement upon these two activities and must be weighed against the extra overhead it introduces to the process.

Indexing

Advocates of mandatory proactive registration suggest that it will improve indexing by either (1) alerting human indexers to the imminent publication of a name, or (2) allowing the AI robots of the future to identify and flag new names in digital (and digitized) publications. Arguments that claim mandatory proactive registration will entirely solve the indexing problem are misguided. That is because the most important data needed by the indexers cannot be required at the time of proactive registration and in most cases are beyond the control of the authors anyway. As indexers and authors, we must already visit and revisit these data at least twice in the case of many electronic publications. First, when the version of record appears and again when it gains final pagination. To add yet another layer on top of this does not make the process any easier and only

introduces more opportunities for error. Furthermore, while these potential new names may be known to the registrar, they cannot be released to the public until the version of record has in fact been effectively published. Because that is the point where indexing would normally proceed anyway, any advantage gained by proactive registration is minimal.

Indexers often face the problem of clarifying to users how to provide feedback, updates and new data to the system. The General Committee could improve the situation immensely by authorizing recognized repositories for these data and encouraging botanists to provide those repositories with the information required to properly index names and other nomenclatural acts. The International Association for Plant Taxonomy (IAPT) could also play a significant role by communicating the importance of timely indexing to its members and by providing logistical support to facilitate this process. Most authors want wider visibility for their work, and getting their names indexed and connected to the digital infrastructure is an effective way to achieve that. There has never been an "official" way to do this for plant names, and botanists (not to mention other stakeholders) are justifiably confused by this lack of standardization. Perhaps all that is needed is to direct people to a portal (like the one the International Plant Names Index [IPNI] has already set up) and provide them with the tools for effective input and feedback? It is even possible to incentivize this activity by, for example, offering bounties in the form of credit towards open-access publication fees in botanical journals. We believe that we should at least try this route before resorting to more drastic measures.

Data exchange

One of the primary principles of modern database design is to eliminate duplication of data and consequently the effort required to keep multiple copies of the *exact same* data in sync. In the jargon of relational database systems this is called normalization. When it comes to cataloguing nomenclatural data, there is still considerable duplication of effort in the botanical community that could be avoided if we were to pool our efforts. However, we should be clear about precisely which information we are trying to normalize/de-duplicate as well as the mechanism that would best achieve that goal. That is because there are two other principles to consider that usually require us to maintain multiple copies of the same or similar data anyway – namely redundancy and diversity. Redundancy will always be necessary because the daily operations of any one of our institutions cannot be dependent on internet connectivity to a central source. Likewise, there is a diversity of uses for these data that cannot be provided for by any single database. The way to provide for normalization, redundancy *and* diversity is by using a single, unique identifier that follows the data from its source to every copy that exists on the internet. This allows for clean, de-duplicated data to be provided by an authorized source, copied to databases where it is required but not altered, and also copied to other sites where it might be mutated or have additional value added by combining it with other data. All these different uses can then be connected back to the source through a single identifier.

For hundreds of years, we have used the Linnaean name as this "identifier" sometimes in combination with its authorship as needed. However, the members of the Registration Committee are keenly aware that, because of homonyms and orthographical variants, using the Linnaean name on its own is inadequate for the purposes of digital data exchange. What is less clear is which identifiers should be used and how they should be established. There is no shortage of unique identifiers for plant names. That is, in fact, precisely the problem. The GBIF page for *Poa annua* L. (https://www.gbif.org/species/2704179, accessed 4 Jun 2023) lists at the bottom no fewer than 83 identifiers (GBIF's own included) and references a Wikidata page where they are catalogued. This is a prime example of the redundancy and diversity that the internet provides, but it is also paralyzing progress on a number of fronts. We contend that the best way out of this situation is not to *create* yet another identifier, but to simply *choose* one that is already established and suitable for our purposes. We also contend that there is very little about having the identifier present in the protologue that makes it somehow any "better" than an identifier assigned later. Instead, it only sets up a situation where it might later become obsolete. Even if we started tomorrow, for the remainder of the lifetimes of every botanist now alive, plant names with identifiers present in the protologue would be only a fraction of the total number of names. By almost any measure, the data problems we face both now and for the foreseeable future mostly concern names that already exist. We should focus our efforts on fixing those problems, first by authorizing nomenclatural repositories as the source and official caretakers of these data, and second by encouraging botanists and particularly members of the IAPT to help those repositories improve the quality of the information that we share with the larger biodiversity data community. To this end, we propose the following changes to Art. 42 of the *Code*, mostly patterned after the current Art. F.5.2, F.5.3 and F.5.5. For the history and results of the Registration Committee's votes on these proposals, see the accompanying report in this issue.

(377) Add three new Articles and three new Notes to Art. 42:

"*42.4*. For an identifier to be issued by a recognized repository for a nomenclatural novelty (Art. 6 Note 4) applied to an organism treated as an alga or plant under this *Code*, the minimum elements of information that must be provided to the repository by either the author(s) or other user(s) of these scientific names are proof of effective publication (Art. 29–31) of the name itself along with those elements required for valid publication under Art. 38.1(a) and 39.2 (validating description or diagnosis) and Art. 40.1 and 40.7 (type) or Art. 41.5 (reference to the basionym or replaced synonym) and for algae Art. 44.2."

"*Note 2*. In contrast to registration of fungal names, registration of algal and plant names is retrospective and accomplished only after valid publication (Art. 42.3)."

"*Note 3*. Proof of effective and valid publication for the purposes of issuing an identifier may be provided to the repository in a variety of forms including (but not limited to) PDFs, scanned page images, and/or URL/DOIs that lead to free and publicly accessible websites where these may be obtained."

"*42.5*. The General Committee (see Div. III Prov. 7) has the power to *(a)* appoint one or more localized or decentralized, open and accessible electronic repositories to accession the information required by Art. 42.4 and issue identifiers; *(b)* cancel such appointment at its discretion; and *(c)* set aside the requirements of Art. 42.4 and 42.6, should the repository mechanism, or essential parts thereof, cease to function. Decisions made by this Committee under these powers are subject to ratification by a subsequent International Botanical Congress."

"*42.6*. For an identifier to be issued by a recognized repository for the purposes of specifying the designation of a type of the name of an organism treated as an alga or plant under this *Code*, the minimum elements of information that must be provided to the repository by either the author(s) or other user(s) of these type designations are

proof of effective publication (Art. 29–31) of the name being typified, along with the author(s) designating the type and those elements required by Art. 9.21, 9.22, and 9.23."

"*Note 4*. For organisms treated as algae or plants under this *Code*, issuance of an identifier by a recognized repository has no effect on valid publication of a name (Art. 32–45) or effective type designation (Art. 7.8–7.11). Instead, these simply serve as stable digital references to the information present in the actual place of publication."

(378) Add two Recommendations to a new Rec. 42A:

"*42A.1*. Following the effective and valid publication of new names and nomenclatural acts, authors should report them to a recognized nomenclatural repository (Art. 42.1) for indexing and assignment of a unique identifier (Art. 42.4 and 42.6). While it is in the interest of the authors to do this promptly, any other party may present proof of effective and valid publication to these repositories for the purposes of both indexing and identifier assignment. In groups where proactive registration is mandatory (see Art. F.5), additional publication details (e.g. final pagination, precise date of publication, etc.) should be provided to the registrar at this time."

"*42A.2*. Specification of names and nomenclatural acts for the purpose of exchange of digital information should include the unique identifier for those entities as established by a recognized nomenclatural repository (Art. 42.1)."

(379–382) Proposals to amend the *International Code of Nomenclature for algae, fungi, and plants* to ensure that the names of algae and fungi are not subject to uncertainty on the applicability of the rules of any other *Code* and to further clarify Art. 45.1

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Alexandrium was published by Halim (in Vie & Milieu, Sér. A, Biol. Mar. 11: 102. 1960). The name applies to a group of thecate dinoflagellates, of which some 30 species are currently recognized (AlgaeBase; https://www.algaebase.org/search/genus/detail/?genus_id=44609). Members of the genus are economically important in forming large blooms, producing so-called red tides, with several species producing toxins that cause Paralytic Shellfish Poisoning when the shellfish are eaten. Halim (l.c.), who was primarily an oceanographer, had returned to his position in the Département d'Océanographie in Alexandria (Egypt) after completing doctoral studies at "la Station zoologique Villefranche" in France. Although his publication lacked any explicit statement as to which *Code* was being followed, it has long been assumed that, given his background, Halim was using the zoological *Code* and that the generic name *Alexandrium* was therefore "available" under the *International Code of Zoological Nomenclature* (*ICZN*; Ride & al., Int. Code Zool. Nomencl., ed. 4. 1999; https://www.iczn.org/the-code/the-code-online/) and hence validly published under the provisions of Art. 45.1 of the *International Code of Nomenclature for algae, fungi, and plants* (*ICN*; Turland & al. in Regnum Veg. 159. 2018; see footnote to Art. 45.1).

The recent interest in the nomenclatural status of *Alexandrium* arose when Elbrächter & al. (in Taxon 68: 589–590. 2019), considering that the type material of *Blepharocysta splendor-maris* (Ehrenb.) Ehrenb. was referable to a species of *Alexandrium* (sensu lato), proposed conservation of *Alexandrium* against *Blepharocysta*. In its report on the proposal (Andersen in Taxon 70: 1125. 2021), the Nomenclature Committee for Algae (NCA) stated that "The name '*Alexandrium*' Halim (*Dinophyceae*) could not be recommended for conservation because it is not a validly published name." The rationale given for this conclusion was advice from Francisco Welter-Schultes, Chair of the Editorial Committee for the next edition of the *ICZN*, to the effect that Halim (l.c.) failed to indicate he was describing an animal (*ICZN* Art. 1.1.1).

The rationale for this decision surprised the members of the NCA and, importantly, the wider audience of users of dinoflagellate names. It also generated extensive correspondence on, among other matters, this particular interpretation of Art. 1.1.1 of the *ICZN*. Discussion also arose as to whether Silva's opinion (Index Nominum Algarum; https://ucjeps.berkeley.edu/cgi-bin/porp_cgi?160711) that it was "not possible to tell whether author uses ICBN or ICZN" was correct or if there was enough internal evidence to show Halim was using the *ICZN*. This is not the place to pursue this matter, except to recognize that the existence of divergent opinions on such a case shows that rules should be devised so as to avoid such controversy, and to address the more fundamental issue, implicit in the current wording of Art. 45.1 of the *ICN*, that, currently, names of algae and fungi may be subject to uncertainty in the interpretation of the rules in *Codes* other than the *ICN*. As the mycological and phycological communities have no say in such interpretation, this seems

inappropriate, and steps should be taken to preclude this ever happening. Woelkerling & Moestrup (in Taxon 71: 1337–1338. 2022) have suggested addressing the issue by exempting dinoflagellates from certain provisions of the *ICN*, such as the need for a Latin description or diagnosis. However, I believe that a more general approach is needed – one that deals with all organisms to which Art. 45.1 may apply and not just to dinoflagellates. My proposal below to add a penultimate sentence to Art. 45.1 addresses this need, ensuring that uncertainty in the interpretation of the provisions of another *Code* is never an issue.

(379) Add a sentence to Art. 45.1 as follows (new text in bold):

"*45.1*. If a taxon originally assigned to a group not covered by this *Code* is treated as belonging to the algae or fungi, any of its names need satisfy only the requirements of the relevant other *Code* that the author was using for status equivalent to valid publication under this *Code* (but see Art. 54 and F.6.1, regarding homonymy). The *Code* used by the author is determined through internal evidence, irrespective of any claim by the author as to the group of organisms to which the taxon is assigned. **If no clear internal evidence exists to determine the *Code* being used by the author, names therein need only satisfy the specific requirements for the equivalent of valid publication in any one of the *Codes* that might have been used regardless of whether or not that *Code* is deemed applicable.** However, a name generated in zoological nomenclature in accordance with the Principle of Coordination is not validly published under this *Code* unless and until it actually appears in a publication as the accepted name of a taxon."

If Prop. 379 is accepted, I would commend the following Example to the Editorial Committee:

The generic name *Alexandrium*, with one species, *A. minutum*, was published by Halim (in Vie & Milieu, Sér. A, Biol. Mar. 11: 101–105. 1960) without clear internal evidence of the *Code* that Halim was following. Halim did not include any Latin description or indicate a type for *A. minutum*, both requirements at that time under the *International Code of Botanical Nomenclature*. His names do, however, meet the specific requirements of the *International Code of Zoological Nomenclature* (Art. 10–20) for availability. Consequently, when treated as algal names, they are validly published under the *International Code of Nomenclature for algae, fungi, and plants*, despite the fact that the *ICZN* has been deemed inapplicable to Halim's publication (Andersen in Taxon 70: 1125. 2021).

There are also more general problems with the current wording of Art 45.1 that I am taking this opportunity to address. From its first inclusion in the *Code*, the precursor of the current Art. 45.1 has implicitly assumed that, whatever might have been the situation in the past, there was at that time no longer doubt as to the *Code* under which any taxon fell. This is reflected in the opening phrase, unchanged since the Leningrad *Code* (Stafleu & al. in Regnum Veg. 97. 1978): "If a taxon originally assigned to a group not covered by this *Code* […]." This assumption overlooks the existence of so-called "ambiregnal organisms" currently treated by some under one *Code* and by others under another. Because it is most commonly for the names of organisms in these groups that the provisions of Art. 45.1 are needed, it should be made clear that they are indeed subject to Art. 45.1.

Because the rules being followed by earlier authors are rarely explicitly stated and, indeed, many names were published before any rules existed, it seems worthwhile to recognize this by including the qualifying "appear to have been". A small rearrangement and rewording of the introductory phrasing will address these concerns.

(380) Amend Art. 45.1 as follows (new text in bold, deleted text in strikethrough):

"*45.1*. ~~If a taxon originally~~ **Any of the names of a taxon treated as belonging to the algae or fungi but that were, or appear to have been, published under the provisions of another *Code*** ~~assigned to a group not covered by this *Code* is treated as belonging to the algae or fungi, any of its names~~ need satisfy only the requirements of the relevant other *Code* that the author was **considered to be** using for status equivalent to valid publication under this *Code* (but see Art. 54 and F.6.1, regarding homonymy). […]."

This proposal, if accepted, also permits the following more concise wording that I would refer to the Editorial Committee: "*45.1*. Any of the names of a taxon treated as belonging to the algae or fungi but that were, or appear to have been, published under the provisions of another *Code* need satisfy only the requirements of that *Code* for status equivalent to valid publication under this *Code* (but see Art. 54 and F.6.1, regarding homonymy). […]."

Many names in current use were published prior to the existence of any rules of nomenclature, and the question has been asked as to how to assess the *Code* considered to be used by the authors of such names. It is implicit that this would be done by internal evidence in the publication, but it would be clearer if this were set out in a Note. Accordingly I propose:

(381) Add a Note immediately after Art. 45.1 to read:

"*Note 0*. Names published prior to the existence of nomenclatural codes are deemed to have been published under whichever *Code* is suggested by internal evidence."

The point has also been made that the sentence in Art. 45.1 "The *Code* used by the author is determined through internal evidence, irrespective of any claim by the author as to the group of organisms to which the taxon is assigned" is overly restrictive as the internal evidence sometimes includes statements of taxonomic assignment that by their wording reveal the *Code* that was being followed. In addition, the phrase "used by the author" might be held to imply the particular edition of the *Code* involved and not, as is necessarily the case because rules are retroactive, the current edition. To address this, I propose the following further amendments:

(382) Amend the second sentence of Art. 45.1 to read (new text in bold, deleted text in strikethrough):

"*45.1*. […]. The *Code* used ~~by the author~~ is determined through internal evidence, irrespective of any claim by the author as to the ~~group of~~ **relationships of the** organisms to which the taxon is assigned. […]."

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(383–389) Proposals to clarify Article 46 (author citations)

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The purpose of these proposals is to provide a simpler Art. 46, which addresses the correct citation for the author of a name of a taxon. Some of the rules in Art. 46 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) are repetitive and overlapping, others too fragmented and the terminology is difficult. The sheer length of Art. 46 of (10 pages with 55 Examples) suggests it is a complex subject.

In most cases, the author of the name is obvious – it is the author of that part of the publication in which the name is validly published unless that author ascribes the name to another person. However, the rules never make this statement. Article 46 Note 1 comes somewhat close when it states "A name of a taxon is attributed to the author(s) of the publication in which it appears (see Art. 46.5) unless one or more of the provisions of Art. 46 rules otherwise." However, this may be overlooked because it is a Note that lacks prominence, and it is not particularly helpful because it does not specify what other rules have an exception.

The following proposal would convert Note 1 into a new Article, and clarify and expand it so that in most cases readers would not need to look at any other rule in Art. 46. These changes to Art. 46 Note 1 include:

(1) While Art. 46.1 states that the rules apply for purposes of citing the "author(s) of the name", the two most important Articles (Art. 46.2 and 46.5) do not use that phrase. Instead, Art. 46.2 and 46.5 both use "attributed", "ascribed" and "associated", and it is not immediately clear that the author of the name is the person to whom the name is attributed.

(2) Art. 46 Note 3 refers to the publication in which "the name is first validly published", while Art. 46 Note 1 and Art. 46.6 use the phrases "in which it appears" and "a name appears", respectively. It is a rare name that does not appear in a later publication. The phrasing in Note 3 is preferable.

(3) The term "publishing author" is not defined, even though it is used in Art. 46.5 and Art. 46 Ex. 39, as well as in Art. 36 Ex. 3.

(4) The phrase "unless one or more of the provisions of Art. 46 rules otherwise" in Art. 46 Note 1 requires readers to review Art. 46 in its entirety. One important exception is Art. 46.6, which provides that the author of the publication is the author of that part of the publication in which the name appears. Because this rule is relevant for a huge number of names, it would be useful to include this statement at the beginning of Art. 46.

(5) Art. 46.2 provides the only other exception to the general rule that the name is attributed to the publishing author. Article 46 implies, but does not explicitly state, that *only* publishing authors can ascribe the name or description to another person. The fact that the name may have been used before (for example, a nomen nudum), or other authors note the name was previously used by other parties, is not relevant under Art. 46 if the publishing author does not note these earlier uses. In addition, Art. 46.2 applies only if the name is ascribed (which is defined as "directly associated") or unequivocally associated with a different person. Making these points explicit in the new Article would make it clear in most cases that the publishing author is the author of the name without reviewing other rules in Art. 46.

(6) Article 13.1 states that the valid publication of names begins on certain starting-point dates. However, Art. 46.2 would appear to allow a post-starting-point author of a publication to ascribe the name and description to a pre-starting-point author, in which case that party would be the author of the name. While Art. 46.7 implies otherwise (by virtue of allowing an optional citation method to acknowledge that author), nothing explicitly states that the name cannot be attributed to a pre-starting-point author.

For ease of reading, the singular (rather than plural) is generally used in this proposal and the others below.

(383) Combine Art. 46 Note 1 and Art. 46.6 into a new Article as follows (new text not appearing in either provision in bold, deleted text in strikethrough):

"***46.n1.*** ~~*Note 1.*~~ ***(a)*** **The author of a** ~~A~~ name of a taxon is ~~attributed to~~ the **publishing** author~~(s) of the publication in which it appears (see Art. 46.5)~~ unless **this author directly or unequivocally associates the name with another person and** ~~one or more of the provisions of~~ Art. 46**.2** rules otherwise. **If the name of a taxon is "attributed" to a person, that person is the author of the name.**

(b) ~~*46.6.* For the purposes of Art. 46, the authorship of a publication is the authorship of~~ **The publishing author is the author of** that part of a publication in which a name **is first validly published,** ~~appears~~ regardless of the authorship or editorship of the publication as a whole.

(c) **The author of a name cannot be a pre-starting-point author.**"

Editorially number it as Art. 46.2 and renumber Art. 46.2–46.5. In addition, the Editorial Committee may wish to replace "author of the publication" or similar phrases with "publishing author" as it sees fit throughout Art. 46.

A clean version of how this new Article would appear is as follows:

"*46.n1. (a)* The author of a name of a taxon is the publishing author unless this author directly or unequivocally associates the name with another person and Art. 46.2 rules otherwise. If the name of a taxon is "attributed" to a person, that person is the author of the name.

(b) The publishing author is the author of that part of a publication in which a name is first validly published, regardless of the authorship or editorship of the publication as a whole.

(c) The author of a name cannot be a pre-starting-point author."

The first two sentences of Art. 46.5 attribute the name to the publishing author even though the name is ascribed to a different person. If Art. 46 Note 1 is converted into an Article, Art. 46.5 is not needed other than to provide the alternative citation method noted in the third sentence.

While this alternative citation method appears to apply in all cases in which the publishing author differs from the person to whom the name is ascribed, that is not accurate. This is because the last sentence of Art. 46.2 states "Art. 46.5 notwithstanding, authorship of a nomenclatural novelty is always accepted as ascribed, even when it differs from authorship of the publication, when at least one author is common to both." The phrasing in the proposal below takes that rule into account.

(384) If Prop. 383 is accepted, amend Art. 46.5 as follows (new text in bold, deleted text in strikethrough):

"*46.5*. ~~A name of a new taxon is attributed to the author(s) of the publication in which it appears when the name was ascribed to a different author or different authors but the validating description or diagnosis was neither ascribed to nor unequivocally associated with that author or those authors. A new combination, name at new rank, or replacement~~ **If the author of a** name is ~~attributed to~~ the **publishing** author~~(s) of the publication in which it appears, although it~~ **but the name** was ascribed to a different ~~author~~ **person** or different ~~authors~~ **persons (none of whom is a publishing author)**, ~~when no separate statement was made that one or more of those authors contributed in some way to that publication. However, in both cases~~ **the following citation may be used:** authorship as ascribed, followed by "ex", ~~may be~~ inserted before the name(s) of the publishing author(s)."

A clean version of this proposed amendment to current Art. 46.5 is as follows:

"*46.5*. If the author of a name is the publishing author but the name was ascribed to a different person or different persons (none of whom is a publishing author), the following citation may be used: authorship as ascribed, followed by "ex", inserted before the name(s) of the publishing author(s)."

If the previous proposal is rejected, certain refinements are desirable in Art. 46.5 to conform to the language in Art. 46.2. The second sentence of Art. 46.2 states that a "new combination […] is attributed to the author(s) to whom it was ascribed when […] it *is explicitly stated* that the same author(s) contributed in some way to that publication" (emphasis added). The second sentence of Art. 46.5 uses different wording: "A new combination […] is attributed to the author(s) of the publication […] although it was ascribed to a different author or different authors, when *no separate statement was made* that one or more of those authors contributed in some way to that publication" (emphasis added). There is also a minor inconsistency between the first sentences of Art. 46.2 and 46.5.

Article 46.5 may provide the wrong answer because the last sentence of Art. 46.2 overrides it but is not mentioned in Art. 46.5.

(385) If Prop. 384 is rejected, amend Art. 46.5 as follows (new text in bold, deleted text in strikethrough):

"*46.5*. **Except as provided by the last sentence of Art. 46.2, the author of the name is** ~~A name of a new taxon is attributed to~~ the author~~(s)~~ of the publication in which it **is first validly published** ~~appears~~ **if** ***(a)*** ~~when~~ **in the case of the name of new taxon,** the name was ascribed to a different author or different authors but the validating description or diagnosis was **not simultaneously** ~~neither~~ ascribed to ~~n~~or unequivocally associated with that author or those **same** authors~~.~~ **or** ***(b)*** **in the case of a** ~~A~~ new combination, name at new rank, or replacement name~~is attributed to the author(s) of the publication in which it appears~~, ~~although it~~ **the name** was ascribed to a different author or different authors~~, when no separate statement was made~~ **but it was not explicitly stated** that one or more of those **same** authors contributed in some way to that publication. […]."

A clean version of this proposed alternative amendment to Art. 46.5 is as follows:

"*46.5*. Except as provided by the last sentence of Art. 46.2, the author of the name is the author of the publication in which it is first validly published if *(a)* in the case of the name of new taxon, the name was ascribed to a different author or different authors but the validating description or diagnosis was not simultaneously ascribed to or unequivocally associated with that author or those same authors or *(b)* in the case of a new combination, name at new rank, or replacement name, the name was ascribed to a different author or different authors but it was not explicitly stated that one or more of those same authors contributed in some way to that publication. […]."

Article 46.2 contains the three exceptions to the general rule that the publishing author is the author of the name. It would be helpful to make it clear at the outset that the author of the name is the person to whom the name is ascribed in each case.

The exceptions also partially overlap with the general rule that the author of the name is the author of the publication. This seems to require the reader to parse both provisions to determine the author of the name.

The last sentence of Art. 46.2 states "Art. 46.5 notwithstanding, authorship of a nomenclatural novelty is always accepted as ascribed, even when it differs from authorship of the publication, when at least one author is common to both." This appears to permit authors to use any form of citation (using terms other than "ex" or "in" if they wish) if one author is common to both. It should be revised to prevent that reading.

While Art. 46.3 defines ascription in terms of the association of the name of a "person or persons" with the name of a taxon, Art. 46.2 refers to the "author(s)" to whom the name of the taxon is ascribed. To minimize confusion, it would be desirable to use "person" when referring to ascription.

While Art. 46.2 permits attribution to a person who is "unequivocally associated with" a description or diagnosis, it does not appear to permit attribution to an author who is unequivocally associated with the name. Article 46 Note 5 indicates otherwise; it states "A name or its validating description or diagnosis is treated as though ascribed to the author(s) of the publication (as defined in Art. 46.6) when there is no ascription to or unequivocal association with a different author or different authors." Example 25 provides an example where both the name and description are unequivocally associated with the author.

(386) Amend Art. 46.2 and 46.3 as follows (new text in bold, deleted text in strikethrough):

"*46.2*. **If the author of the publication ascribes the name to another person and one of the following conditions is met, the other person is the author of the name:**

(a) **in the case of a** ~~A~~ name of a new taxon**,** ~~is attributed to the author(s) to whom the name was ascribed when~~ **if** the validating description or diagnosis was simultaneously ascribed to or unequivocally associated with the same ~~author(s)~~ **person**~~, even when authorship of the publication is different.~~**; or**

(b) **in the case of a** ~~A~~ new combination, name at new rank, or replacement name ~~is attributed to the author(s) to whom it was ascribed~~

~~when~~, ~~in~~ **if** the publication ~~in which it appears, it is~~ explicitly stated that the same ~~author(s)~~ **person** contributed in some way to that publication~~.~~**; or**

(c) ~~Art. 46.5 notwithstanding, authorship of a~~ **in the case of any** nomenclatural novelty ~~is always accepted as ascribed, even when it differs from authorship of the publication~~, ~~when~~ **if** at least one **of those** ~~author~~ **person(s)** is ~~common to both~~ **also a publishing author**.

In all other cases, the author of the name is the author of the publication."

"*46.3*. For the purposes of Art. 46, ascription is the direct **or unequivocal** association **(by the publishing author)** of the name of a person or persons with a new name or **with the** description or diagnosis of a taxon. […]."

In addition, in Art. 46, replace "author" with "person" when the rules refer to the author to whom the name is ascribed. In addition, make similar changes regarding the deletion of "unequivocal association" in Art. 46 Note 5 and Art. 46.5.

A clean version of the proposed amendment to the current Art. 46.2 is as follows:

"*46.2*. If the author of the publication ascribes the name to another person and one of the following conditions is met, the other person is the author of the name:

(a) in the case of a name of a new taxon, if the validating description or diagnosis was simultaneously ascribed to or unequivocally associated with the same person; or

(b) in the case of a new combination, name at new rank, or replacement name, if the publication explicitly stated that the same person contributed in some way to that publication; or

(c) in the case of any nomenclatural novelty, if at least one of those person(s) is also a publishing author.

In all other cases, the author of the name is the author of the publication."

Article 46.10 is intended to permit publishing authors to use "ex" in the manner set forth in Art. 46.5 (see Brummitt in Taxon 42: 154. 1993). However, it is worded much more broadly: "Authors publishing nomenclatural novelties and wishing other persons' names followed by "ex" to precede theirs in author citation may adopt the "ex" citation in the protologue." This arguably permits publishing authors to credit any person as they deem appropriate, including those to whom the description, but not the name, is ascribed or persons to whom neither is ascribed. It seems best to state that publishing authors may use "ex" when permitted under the terms of Art. 46.5.

Article 46.7 provides an alternative author citation (using "ex") if there is a pre-starting-point author.

Both Art. 46.7 and 46.10 could easily be combined with the last sentence of Art. 46.5 and thereby include these various alternative citations in one Article.

(387) Delete Art. 46.7 and 46.10 and amend the last sentence of Art. 46.5 as follows (new text in bold):

"*46.5*. […]. However, in both cases**, the following citation may (but need not) be used by the publishing author and/or later authors:** authorship as ascribed, followed by "ex", ~~may be~~ inserted before the name(s) of the publishing author(s). **This same citation may be used if the name is ascribed to a pre-starting-point author. For groups with a starting-point later than 1753, when a taxon of a pre-starting-point author was changed in rank or taxonomic position upon valid publication of its name, that pre-starting-point author may be cited in parentheses, followed by "ex".**"

Article 46.2 Note 2 provides an alternative citation if the author of the name is not the publishing author. Because this is a new concept, it should be stated as a new Article.

(388) Convert Art. 46 Note 2 into a new Article as follows (new text in bold, deleted text in strikethrough):

"***46.n2***. ~~*Note 2*. When~~ **If the author** ~~authorship~~ of a name differs from **the publishing author, the following citation may (but need not) be used: "[author of the name] in [publishing author]"** ~~authorship of the publication in which it was validly published, both are sometimes cited, connected by the word "in"~~. In such a case, "in" and what follows are part of a bibliographic citation and are better omitted unless the place of publication is being cited."

If Prop. 387 and 388 are both accepted, the Editorial Committee may wish to consider making this Art. 46.5(b) so that all alternative citation methods appear in a single Article.

Because there may be more than one author, some rules (e.g. Art. 46.1 and 46.2 use the term "author(s)", while others (e.g. Art. 46.4 and 46.7) use "author" or "different author or authors" (Art. 46.5 and Note 5) or "person or persons" (Art. 46.3). These are not only inconsistent but also distracting. The author hopes that others will find the following proposal useful.

(389) Add a new Article to Art. 46 as follows:

"*46.n3*. For purposes of Art. 46, any reference to the author (or person) shall be deemed to include a reference to authors (or persons)."

In addition, make appropriate changes throughout Art. 46.

Acknowledgements

I thank Jefferson Prado for his review of an earlier draft of this set of proposals and helpful comments. I also thank Nicholas J. Turland and John H. Wiersema for their helpful assistance and comments.

(390) Proposal to clarify "inclusion of the type in a different taxon" in Article 48.1

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In general terms, Art. 48.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) states that a homonym is published if the author adopts an existing name but definitely excludes its type and that a name of a new taxon is published if the author adopts a name with an apparent basionym or replaced synonym but "explicitly excludes its type". Article 48.2 states "For the purpose of Art. 48.1, exclusion of a type means exclusion of *(a)* the holotype under Art. 9.1 or the original type under Art. 10 or all syntypes under Art. 9.6 or all elements eligible as types under Art. 10.2; or *(b)* the type previously designated under Art. 9.11–9.13 or 10.2; or *(c)* the type previously conserved under Art. 14.9."

The last sentence of Art. 48.1 adds that "Exclusion can be effected by simultaneous explicit inclusion of the type in a different taxon by the same author." Read by itself, this sentence arguably provides that the type is excluded if an element designated as the type in the future is included in another name. Because Art. 48.2 defines "exclusion of a type", it is not clear if Art. 48.2 applies for purposes of the "inclusion of the type" rule in the last sentence of Art. 48.1.

The issue is not merely academic. Some index authorities treat both *Cereus triangularis* Mill. and *C. lanuginosus* Mill. as correct names, while some use either *C. triangularis* (L.) Mill. or *C. lanuginosus* (L.) Mill. In each case, Miller (Gard. Dict., ed. 8. 1768) included an illustration cited in the protologue of the Linnaean apparent basionym in a different taxon. A few centuries later, the illustration was designated as the type of the apparent basionym.

It makes no sense that the explicit exclusion of a type designated in the future results in a new combination, but its inclusion in another taxon results in the name of a new taxon. If that were correct, *Cereus triangularis* and *C. lanuginosus* were new combinations for about two centuries, but then became names of a new taxon when the apparent basionym was typified. The better reading of the last sentence of Art. 48.1 is as follows: "Exclusion [of the type (as qualified in Art. 48.2)] can be effected by simultaneous explicit inclusion of the type [as type is specified in Art. 48.2] in a different taxon by the same author."

The above analysis is consistent with the history of Art. 48. Prior to the *Melbourne Code* (McNeill & al. in Regnum Veg. 154. 2012), Art. 48 simply referred to the "original type". The *Melbourne Code* added Art. 48.2 to include holotypes and other ways to exclude the type. This change was not intended to provide that later-designated types could be taken into account under Art. 48, and this proposal clarifies that point.

Because Art. 48.2 defines exclusion of the type, it would appear more appropriate to move the last sentence of Art. 48.1 to Art. 48.2. This would be consistent with Art. 52.2, which defines inclusion of the type in much the same way as Art. 48.2 but includes another way to include the type in Art. 52.2(e).

(390) Delete the last sentence of Art. 48.1 and move it to Art. 48.2 amended as follows (new text in bold, deleted text in strikethrough):

"*48.1*. When an author adopts an existing name but definitely excludes its type, a later homonym that must be attributed solely to that author is considered to have been published. Similarly, when an author who adopts a name refers to an apparent basionym or replaced synonym but explicitly excludes its type, the name of a new taxon is considered to have been published that must be attributed solely to that author. ~~Exclusion can be effected by simultaneous explicit inclusion of the type in a different taxon by the same author.~~"

"*48.2*. For the purpose of Art. 48.1, exclusion of a type means exclusion of *(a)* the holotype under Art. 9.1 or the original type under Art. 10 or all syntypes under Art. 9.6 or all elements eligible as types under Art. 10.2; or *(b)* the type previously designated under Art. 9.11–9.13 or 10.2; or *(c)* the type previously conserved under Art. 14.9. **Exclusion can be effected by *(d)* simultaneous explicit inclusion of the type (as type is specified in the preceding sentence) in a different taxon by the same author.**"

Acknowledgements

I thank Nicholas J. Turland and John H. Wiersema for their assistance with this proposal.

(391–394) Proposals to clarify "inclusion of the type" and "exclusion of a type" (Articles 48.2., 52.2, 22.2 and 26.2)

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Article 52.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) provides that certain names are nomenclaturally superfluous when published if the author "definitely included the type" of another name that would have priority. In general terms, Art. 48.1 states that an author who adopts an existing name but "definitely excludes its type" has published a homonym, and that an author who adopts a name with an apparent basionym but "explicitly excludes its type" has published the name of a new taxon.

The definition of "exclusion of a type" in Art. 48.2 is almost identical to the definition of "inclusion of the type" in Art. 52.2 (excluding parts (d) and (e)). (The full definition of each is set forth in the first two proposals below.) This first proposal would refine these definitions in three respects.

Article 48.2(a) provides in part that the exclusion of a type is effected by the exclusion of "all syntypes under Art. 9.6 or all elements eligible as types under Art. 10.2". (Article 52.2 has a similar rule.) The last sentence of Art. 10.2 provides that if no type of a previously or simultaneously published species name is included in the protologue of a generic name, then a type must be otherwise chosen; there is no limitation on what may be chosen. For that reason, "all elements eligible as types under Art. 10.2" should be limited to those described in its first sentence, excluding Art. 10.2(a).

Articles 48.2(b) and 52.2(b) refer to the previous "designation" of the type under Art. 9.11–9.13 or 10.2. However, Art. 9.13 provides for the selection of the type for a species name, and Art. 10.2 uses the terms "indicated", "chosen" and "designated" for a generic name.

A third refinement is needed if there is a previously conserved type. In that case, the inclusion of any of the other types but not the previously conserved type is not an inclusion of the actual type and should not result in a nomenclaturally superfluous name.

(391) Amend Art. 48.2 as follows (new text in bold, deleted text in strikethrough):

"*48.2*. For the purpose of Art. 48.1, exclusion of a type means exclusion of *(a)* **if there is no type previously conserved,** ***(1)*** the holotype under Art. 9.1 or the original type under Art. 10; or all syntypes under Art. 9.6 or all elements eligible as types under **the first sentence of** Art. 10.2 **(excluding Art. 10.2(a))**; or ***(2~~b~~)*** the type previously designated **or selected** under Art. 9.11–9.13 or **previously indicated, designated, or chosen under Art.** 10.2; or ***(b~~e~~)*** the type previously conserved under Art. 14.9."

(392) Amend Art. 52.2 as follows (new text in bold, deleted text in strikethrough):

"*52.2*. For the purpose of Art. 52.1, definite inclusion of the type of a name is effected by citation of *(a)* **if there is no type previously conserved,** ***(1)*** the holotype under Art. 9.1 or the original type under Art. 10 or all syntypes under Art. 9.6 or all elements eligible as types under **the first sentence of** Art. 10.2 **(excluding Art. 10.2(a))**; or ***(2~~b~~)*** the type previously designated **or selected** under Art. 9.11–9.13 or **previously indicated, designated, or chosen under Art.** 10.2; or ***(b~~e~~)*** the type previously conserved under Art. 14.9; or ***(c~~d~~)*** the illustrations of these. It is also effected ***(d~~e~~)*** by citation of the name itself or any name homotypic at that time, unless the type is at the same time excluded either explicitly or by implication."

Article 52.2 lists "*(d)* the illustrations of these" as a way to include the type. This meaning of "these" is not entirely clear in light of the many ways to include the type in Art. 52.2(a)–(c). This phrase might also cause some to wonder if a name is nomenclaturally superfluous if the author cites an illustration that was cited in the protologue of the name that would have priority.

Article 63.2 of the Berlin *Code* (Greuter & al. in Regnum Veg. 118. 1988), a predecessor to Art. 52.2, stated that inclusion of a type was effected by "citation of the type specimen, the citation of an illustration of the type specimen […]". This language makes it clear that Art. 52.2(d) simply means that the citation of an illustration of a specimen is equivalent to the citation of the specimen itself.

It is worth noting that Art. 48.2 correctly does not include the phrase "illustrations of these". While Art. 52.2 states "inclusion of the type of a name is effected by citation of", Art. 48.2 instead states "exclusion of a type means exclusion of". This language appears sufficient to cover the exclusion of an illustration of the type.

(393) Amend Art. 52.2 as follows (new text in bold, deleted text in strikethrough):

"*52.2*. For the purpose of Art. 52.1, definite inclusion of the type of a name is effected by citation of *(a)* […]; or *(c)* the type previously conserved under Art. 14.9~~; or *(d)* the illustrations of these~~. **For this purpose, citation of an illustration of a specimen is treated as citation of the specimen.** It is also effected ***(e~~d~~)*** […]."

Article 26.2 states "A name of an infraspecific taxon that includes the type (i.e. the holotype or all syntypes or the previously designated type) of the adopted, legitimate name of the species to which it is assigned is not validly published unless its final epithet repeats the specific epithet unaltered." Article 22.2 has a similar rule for genera and subdivisions thereof. However, Art. 22.2 and 26.2 do not reference a previously conserved type or illustrations of these.

(394) Amend Art. 22.2 and 26.2 as follows (new text in bold, deleted text in strikethrough):

"*22.2*. A name of a subdivision of a genus that includes the type **(as specified in Art. 52.2(a)–(d)** ~~i.e. the original type or all elements~~

~~eligible as type or the previously designated type~~) of the adopted, legitimate name of the genus is not validly published unless its epithet repeats the generic name unaltered. […]."

"*26.2*. A name of an infraspecific taxon that includes the type (**as specified in Art. 52.2(a)–(d)** ~~i.e. the holotype or all syntypes or the previously designated type~~) of the adopted, legitimate name of the species to which it is assigned is not validly published unless its final epithet repeats the specific epithet unaltered. […]."

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(395–402) Proposals to clarify homonyms, new combinations, names at new ranks, replacement names, misapplications and ineffective typifications (Articles 48, 6, 7, 40 and the Glossary)

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While Art. 48.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) is included in Chapter VI Section 1 titled "Author Citations", these rules do much more than provide an author citation for a subset of names. In fact, they clarify the meaning of homonym, new combination, name at new rank and replacement name; once the name's status is determined, the author citation is quite clear. In my view, the significance and purpose of these rules is not apparent, which may lead to incorrect interpretations of Art. 48.1. These proposals make its purpose clear and address various issues raised by the language of Art. 48.1.

Article 48.1 states "When an author adopts an existing name but definitely excludes its type, a later homonym that must be attributed solely to that author is considered to have been published. […]." For a reader who is not familiar with Art. 48 and its underlying purpose, this statement raises two immediate issues. First, every homonym under Art. 48 appears to be a homonym under Art. 53, which states that a homonym is a name "spelled exactly like a name based on a different type that was previously and validly published for a taxon at the same rank" (Art. 53.1). The definition of homonym in the Glossary appears to confirm this conclusion – it does not even mention Art. 48. Second, why is it necessary to address the attribution of this subset of homonyms? Because all other homonyms are also attributed to their authors under Art. 46, it seems more appropriate to state that all homonyms are attributed to their authors.

Nicolson (in Taxon 26: 569–570. 1977) provided an answer to these mysteries. At that time, Art. 48 of the Seattle *Code* (Stafleu & al. in Regnum Veg. 82. 1972) stated "When an author circumscribes a taxon in such a way as to exclude the original type of the name he uses for it, he is considered to have published a later homonym that must be ascribed solely to him." Nicolson (l.c.) proposed the current language because he correctly observed that "This suggests that what are normally considered as misapplications could be regarded as validly published later homonyms […]." Armed with this explanation, Art. 48.1 now makes sense. While Art. 48 Note 1 mentions misapplications of new combinations, names at new ranks and replacement names, Art. 48.1 does not mention other misapplied names or new circumscriptions, and the potential implications of Note 1 as to the first sentence of Art. 48.1 are not at all clear, at least to this author.

Nicolson's (l.c.) proposal adding the current language was designed to ensure that misapplied names are not treated as homonyms "if the type of the earlier name is not demonstrably excluded". In contrast, Art. 48.1 tells us the treatment if the type is excluded; this statement does not address (even implicitly) the treatment if the type is not excluded.

The proposal below clarifies the first sentence of Art. 48.1 to address these concerns. While Rec. 50D provides a recommended citation method for misapplications, that term is not defined. The brief definition below is derived from Art. 7.3, which addresses misapplied new combinations.

(395) Amend Art. 48.1 as follows (new text in bold, deleted text in strikethrough):

"*48.1*. **The application of an existing name to a different taxon without exclusion of the type is considered a misapplication that has no nomenclatural status (see also Rec. 50D).** ~~When~~ **However, if** an author **applies** ~~adopts~~ an existing name but definitely excludes its type, a later homonym that must be attributed solely to that author is considered to have been published. […]."

(396) Add a new Note in Art. 48 as follows:

"*Note n*. A later homonym published as described in Art. 48.1 only has nomenclatural status if it satisfies all the relevant requirements for valid publication of the name of a new taxon."

(397) Add the following sentence at the end of the definition of "homonym" in the Glossary (new text in bold):

"homonym. […]. **A homonym also results from the application of an existing name to a different taxon if the author definitely excludes its type (see Art. 48).**"

The second sentence of Art. 48.1 states "Similarly, when an author who adopts a name refers to an apparent basionym or replaced synonym but explicitly excludes its type, the name of a new taxon is considered to have been published that must be attributed solely to that author." While Art. 48.1 does not mention misapplications, Art. 48 Note 1 states that a misapplied new combination, name at new rank, or replacement name "is dealt with under Art. 7.3–7.4". (For simplicity, I will only address new combinations below; the same problems exist for names at new rank and replacement names.) In turn, Art. 7.3 states that a new combination "is typified by the type of the basionym even though it may have been applied erroneously to a taxon now considered not to include that type (but see Art. 48.1)".

Both Art. 48 Note 1 and Art. 7.3 begin with the premise that the name is a new combination. They do not state that a name could not qualify as a new combination even if the name was misapplied. As a result, it is not clear whether some misapplications of a potential new combination result in the name of a new taxon even if the type is not excluded.

In particular, the rules do not explicitly address the status of a name if the author of an apparent new combination designates a type that cannot be the type of its basionym. Article 6.10 defines a new combination as "a new name based on a legitimate, previously published name, which is its basionym". Due to Art. 7.3, it is arguable that the author's designation of an impermissible type necessarily means the new name is not "based on" the earlier name, with the result that the new name is not a new combination.

The rules do not clearly address a related situation. What happens if the author excludes the type of the apparent basionym but the name is not validly published as the name of a new taxon? Because the automatic typification rule in Art. 7.3 is not part of the definition of new combination (Art. 6.10), it is arguable that a new combination is published in this case; in effect, the author's statement that the type is excluded is disregarded, just as a misapplication is disregarded. However, it would be absurd to disregard this statement only if the conditions for valid publication of the name of a new taxon were not met.

The proposals offered below explicitly and unambiguously address these matters.

(398) Convert the second sentence of Art. 48.1 into a new Article in Art. 6 as follows and delete Art. 48 Note 1 (new text in bold, deleted text in strikethrough):

"*6.n*. ***(a)*** **Unless an author explicitly excluded the type of the apparent basionym or replaced synonym of a name, that name will not fail to be a new combination, name at new rank, or replacement name merely because *(1)* its author applied it erroneously to a taxon now considered not to include that type and/or *(2)* its author attempted to designate a type that is contrary to the rules.**

(b) ~~Similarly, when~~ **If** an author who adopts a name refers to an apparent basionym or replaced synonym but explicitly excludes its type, the name of a new taxon is considered to have been published that must be attributed solely to that author**; however, if the relevant requirements for valid publication of the name of a new taxon are not satisfied, then no name is published even if the requirements of Art. 41 are satisfied.**"

(c) **For this purpose, exclusion of the type is defined in Art. 48.1 and 48.2.**"

"~~*Note 1*. Misapplication of a new combination, name at new rank, or replacement name to a different taxon, but without explicit exclusion of the type of the basionym or replaced synonym, is dealt with under Art. 7.3–7.4.~~"

If the previous proposal is accepted, some of the language in Art. 7.3 and 7.4 is redundant and can be deleted.

(399) If Prop. 398 is accepted, amend Art. 7.3 and 7.4 as follows (new text in bold, deleted text in strikethrough):

"*7.3*. A new combination or a name at new rank (Art. 6.10) is typified by the type of the basionym ~~even though it may have been applied erroneously to a taxon now considered not to include that type~~ (but see Art. ~~48.1~~ **6.n**)."

"*7.4*. A replacement name (Art. 6.11) is typified by the type of the replaced synonym ~~even though it may have been applied erroneously to a taxon now considered not to include that type~~ (but see Art. 41 Note 3 and ~~48.1~~ **6.n**)."

What happens if the author does not exclude the type of the apparent basionym but fails to meet the requirements to publish a new combination? Article 33.8 of the *Vienna Code* (McNeill & al. in Regnum Veg. 146. 2006) stated that such a name was not validly published even if the conditions for valid publication of a name of a new taxon were satisfied. While that rule was deleted based on a proposal by Turland (in Taxon 59: 1921. 2010), there is no explicit statement that these are names of new taxa, and it may not be readily apparent. This can be noted in a Note.

(400) Add a new Note in Art. 6 as follows:

"*Note n*. If an author who publishes a potential name on or after 1 January 1953 *(a)* refers to an apparent basionym or replaced synonym, *(b)* does not exclude its type, and *(c)* does not satisfy Art. 41, the name of a new taxon is considered to have been published (if it meets the conditions for valid publication as such)."

Proposal 398 above addresses a concern that the publication of a new combination with an impermissible type might be treated as the name of a new taxon. There is a related concern that a person who both published an existing name and ineffectively designated a lectotype (or neotype) for it prior to 1 January 1990 inadvertently published the name of a new taxon that is a later homonym; the ineffectively designated lectotype (or neotype) would be treated as the holotype of the name of a new taxon. This interpretation would likely result in hundreds of newly published homonyms. A homonym will almost never be published for later designations due to Art. 40.6; it provides that a name of a new taxon is not validly published on or after 1 January 1990, unless the protologue includes one of the words "typus" or "holotypus", or its abbreviation.

(401) Add a new Article in Art. 40 follows:

"*40.n*. A name of a new taxon is not validly published merely because an author attempted to designate a type for an existing name that is contrary to the rules (but see Art. 48.1)."

Editorially revise "48.1" to "6.n and 48.1" if the second sentence of Art. 48.1 is converted to a new Art. 6.n.

Article 48 Note 2 states "Retention of a name in a sense that excludes its original type, or its type designated under Art. 7–10, can be effected only by conservation (see Art. 14.9)." The term "retention" is not defined here and some might think an Art. 48 homonym has no nomenclatural status unless conserved.

Because the second sentence of Art. 48.1 addresses a name with an apparent basionym that excludes its type, Note 2 might be incorrectly read to suggest that these names also need to be conserved.

(402) Amend Art. 48 Note 2 as follows (new text in bold, deleted text in strikethrough):

"*Note 2*. Retention of a ~~name~~ **later homonym as a legitimate (as opposed to illegitimate) name** ~~in a sense that excludes its original type, or its type designated under Art. 7–10~~, can be effected only by conservation (see Art. 14.9)."

Acknowledgements

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(403–406) Proposals to clarify the meaning of rejected and rejected name (Articles 51, 52.1, 53.1 and the Glossary)

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The Glossary of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) defines a rejected name as "A name ruled as not to be used, either by formal action under Art. 14, 56, or F.7 overriding other provisions of the *Code* […] or because it was nomenclaturally superfluous when published (Art. 52) or a later homonym (Art. 53 and 54)."

While this definition suggests that a name is rejected only if the applicable provision rules that it is not be used, Art. 14, 52, 53 and 54 do not state that the name is not to be used. The phrase "not to be used" also suggests that the name may have no nomenclatural status. However, rejected names are often cited as synonyms and in some cases can serve as replaced synonyms, and are "used" in those ways. Based on Art. 11.3, which states that illegitimate names and names rejected under Art. 14 or 56 cannot be correct names for a given taxon, it would be more accurate to state that a rejected name is not to be used as the correct name of a taxon.

The term "rejected name" is not even used in Art. 52–54, which address illegitimate names (although Art. 52 uses "rejected"). The Appendices to the *Shenzhen Code* state that they list all rejected names but in fact list only those rejected by formal action. It would be preferable to limit the definition of rejected names to those rejected by formal action. This change would not impact the operation of illegitimate names under Art. 52–54.

It is also worth noting that a rejected name may be restored under Art. 14.6 "if it is considered the name of a taxon at the same rank distinct from that of the conserved name". In this case, the name may be used; this exception is noted in the proposed change.

(403) Amend the definition of "rejected name" in the Glossary as follows (new text in bold, deleted text in strikethrough):

"rejected name. **Subject to Art. 14.6, a** ~~A~~ name ~~ruled as~~ **that is** not to be used **as the correct name of a taxon (Art. 11)**~~, either~~ by formal action under Art. 14, 56, or F.7 overriding other provisions of the *Code* (see *nomen rejiciendum, nomen utique rejiciendum*) ~~or because it was nomenclaturally superfluous when published (Art. 52) or a later homonym (Art. 53 and 54)~~. A name treated as rejected under Art. F.7 may become eligible for use by conservation under Art. 14."

Article 52.1 states that a nomenclaturally superfluous name is "illegitimate and is to be rejected". As noted above, this might incorrectly be interpreted as stating the name has no nomenclatural standing. Rather than requiring the reader to refer to the meaning of rejected in the Glossary, it would be preferable to state the name cannot be used as a correct name.

In contrast to Art. 52.1, Art. 53.1 states that homonyms are illegitimate but does not add that they are to be rejected. There is no reason for the disparate treatment.

(404) Amend Art. 52.1 as follows (new text in bold, deleted text in strikethrough):

"*52.1*. A name, unless conserved (Art. 14), protected (Art. F.2), or sanctioned (Art. F.3), is illegitimate **(**and is **not** to be **used as the correct name of a taxon)** ~~rejected~~ if it was nomenclaturally superfluous when published, […]."

(405) Amend Art. 53.1 as follows (new text in bold):

"*53.1*. A name of a family, genus, or species, unless conserved (Art. 14), protected (Art. F.2), or sanctioned (Art. F.3), is illegitimate **(and is not to be used as the correct name of a taxon)** if it is a later homonym, […]."

Article 51.1 states that "A legitimate name must not be rejected merely because it, or its epithet, is inappropriate or disagreeable, or because another is preferable or better known (but see Art. 56.1 and F.7.1), or because it has lost its original meaning." The Examples

under Art. 51 use rejected in the sense of unilateral disregard of the name by a later author, as opposed to the definition of rejected name in the Glossary.

(406) Amend Article 51.1 as follows (new text in bold, deleted text in strikethrough):

"*51.1*. A legitimate name ~~must~~ **may** not be rejected **or otherwise disregarded by later authors** merely because it, or its epithet, is inappropriate or disagreeable, or because another is preferable or better known (but see Art. **14,** 56.1**,** and F.7.1), or because it has lost its original meaning. **None of these reasons affects the valid publication, legitimacy, and priority of a name.**"

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(407–410) Proposals to clarify nomenclaturally superfluous names (Articles 52.1, 52 Note 2 and 6.4)

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Article 52.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) states that a name is "nomenclaturally superfluous when published, […] if the taxon to which it was applied, as circumscribed by its author, definitely included the type (as qualified in Art. 52.2) of a name that ought to have been adopted, or of which the epithet ought to have been adopted, under the rules (but see Art. 52.4 and F.8.1)". This appears to require readers to make a taxonomic assessment of the author's circumscription of the newly described taxon. In fact, the only question is whether the author cited certain elements or names in the protologue. It is worth noting that Art. 48.1 was previously amended to eliminate a reference to "circumscription" for this reason. See Nicolson (in Taxon 26: 569. 1977).

The placement of "but see Art. 52.4 and F.8.1" at the end of Art. 52.1 suggests that they are exceptions to the definition of nomenclaturally superfluous; in fact, they provide that certain nomenclaturally superfluous names are not illegitimate.

(407) Amend Art. 52.1 as follows (new text in bold, deleted text in strikethrough):

"*52.1*. A name, unless conserved (Art. 14), protected (Art. F.2), or sanctioned (Art. F.3), is illegitimate **(but see Art. 52.4 and F.8.1)** and is to be rejected if it **is** ~~was~~ nomenclaturally superfluous when published~~, i.e. if the taxon to which it was applied, as circumscribed by its author,~~**. A name is nomenclaturally superfluous if its protologue (including the protologue of names of simultaneously adopted subordinate taxa)** definitely included the type (as qualified in Art. 52.2) of a name that ought to have been adopted, or of which the epithet ought to have been adopted, under the rules ~~(but see Art. 52.4 and F.8.1)~~."

While the rules consistently use "nomenclaturally superfluous", Art. 6.4 uses "superfluous".

(408) Amend Art. 6.4 by adding the word "nomenclaturally" before "superfluous".

Article 52 Note 2 provides that the "inclusion, in a new taxon, of an element that was subsequently designated as the type of a name that, so typified, ought to have been adopted, […], does not in itself make *the name of the new taxon illegitimate*" (emphasis added). It is not clear if the quoted language is meant to limit the application of this Note to the almost identical similar term "name of a new taxon", and thereby exclude new combinations, names at a new rank and replacement names. In addition, because a nomenclaturally superfluous name with a basionym is not illegitimate (Art. 52.4), it is more appropriate to state that a subsequent designation does not make the new name nomenclaturally superfluous.

(409) Amend Art. 52 Note 2 as follows (new text in bold, deleted text in strikethrough):

"*Note 2*. The **citation** ~~inclusion,~~ in **the protologue of** a new **name** ~~taxon,~~ of an element that was subsequently designated as the type of a name that, so typified, ought to have been adopted, or of which the epithet ought to have been adopted, does not in itself make the **new** name ~~of the new taxon~~ **nomenclaturally superfluous** ~~illegitimate~~."

It may also be helpful to address the treatment of a type that is included if that type is later superseded.

(410) Add the following sentence at the end of Art. 52 Note 2:

"*Note 2*. […]. In addition, if the included type that caused the name to be superfluous is subsequently replaced or superseded in accordance with the rules, the name remains nomenclaturally superfluous."

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(411–413) Proposals to clarify exclusion of a type for purposes of Article 52.2(e) and Note 1

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Article 52.1 of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) provides that certain names are superfluous if the author "included the type" of another name that would have priority. Article 52.2(a)–(d) define "inclusion of the type" as the citation of the holotype, original type under Art. 10, previously designated or conserved type, all syntypes, all elements eligible as types under Art. 10.2, or illustrations of these. Article 52.2 adds that inclusion is "also effected *(e)* by citation of the name itself […], unless the type is at the same time excluded either explicitly or by implication". However, Art. 52 does not define exclusion of the type.

This proposal borrows from Prop. 172 (Rijckevorsel in Taxon 71: 1329–1330. 2022), which would define exclusion of the type in accordance with Art. 48.2. This would essentially define type for this purpose as the type in Art. 52.2(a)–(c). However, certain refinements are desirable to reflect the difference between an inclusion and exclusion. In particular, Art. 52 Note 1 hints that this definition is too limited: it states that a new name is not nomenclaturally superfluous if a name with priority is cited "with an expression of doubt, […] in a sense that excludes one or more of its *potential type elements*" (emphasis added). Potential type elements are not defined.

Article 52.2(a) correctly states that inclusion of the type is effected by citation of "*all* syntypes under Art. 9.6 or all elements eligible as types under Art. 10.2" (emphasis added). However, if an author of a new name cites a synonym with priority, but excludes *any* one of its syntypes, the author has not necessarily included the type of the name – that excluded syntype may later be designated as the type of the cited name.

To address this concern and to support Art. 52 Note 1, the term potential type element should be used in Art. 52.2(e) and defined as the type within the meaning of 52.2(a)–(c) modified to include any (as opposed to all) syntypes or any element eligible as a type under Art. 10.2. Because any species name may be chosen as type under the last sentence of Art. 10.2 (the generic equivalent of a neotype), only elements in the first sentence of Art. 10.2 (excluding Art. 10.2 (a)) should be considered.

Finally, Art. 52.2(e) should apply only if the same author who publishes the new name excludes the type.

(411) Amend Art. 52.2 as follows (new text in bold, deleted text in strikethrough):

"*52.2*. […]. It is also effected *(e)* by citation of the name itself or any name homotypic at that time, unless ~~the~~ **a potential** type **element of that name** is at the same time excluded **by the same author** either explicitly or by implication. **A potential type element is the holotype under Art. 9.1, the original type under Art. 10, or a previously designated or conserved type as qualified in Art. 52.2(b)–(c), or if none of the foregoing exists, any syntype or any element eligible as a type in the first sentence of Art. 10.2 (excluding Art. 10.2(a)).**"

If Prop. 411 is rejected, the Editorial Committee may wish to consider amending Art. 52 Ex. 12 as follows (new text in bold, deleted text in strikethrough):

"*Ex. 12. Leccinum* Gray (Nat. Arr. Brit. Pl. 1: 646. 1821) does not include all **the species names included in the protologue** ~~potential types (in fact, none)~~ of **the then untypified** *Boletus* L. (Sp. Pl.: 1176. 1753) : Fr. **(in fact, none)** and is not therefore illegitimate even though it included, as *L. edule* (Bull. : Fr.) Gray, the subsequently conserved type of *Boletus*, *B. edulis* Bull. : Fr."

To further address the meaning of potential type element, consider the likely thousands of names published by Linnaeus with two or more cited illustrations and no syntypes. Due to the broad species concepts of Linnaeus, the illustrations may depict different taxa in modern usage. If a later author publishes a new name, and cites an untypified Linnaean name explicitly excluding one of the illustrations, the name should not be treated as superfluous – it may be the publication of the name of a new taxon that is only a pro parte synonym of the Linnaean name.

(412) If Prop. 411 is accepted, amend the definition of "potential type element" in the amended Art. 52.2(e) as follows (new text in bold):

"*52.2*. […]. A potential type element is the holotype under Art. 9.1, the original type under Art. 10, or a previously designated or conserved type as qualified in Art. 52.2(b)–(c), or if none of the foregoing exists, any syntype **or illustration cited in the protologue** or any element eligible as a type in the first sentence of Art. 10.2 (excluding Art. 10.2(a))."

Article 52.2(e) states that the type can be excluded either explicitly or by implication. Article 52 Ex. 6, the only Example addressing exclusion by implication, states: "Exclusion of type by implication. *Tmesipteris elongata* […] was published as a new species but *Psilotum truncatum* R. Br. was cited as a synonym. However, on the following page, *T. truncata* (R. Br.) Desv. is recognized as a different species […], thus showing that the meaning of the cited synonym was either "*P. truncatum* R. Br. pro parte" or "*P. truncatum* auct. non R. Br."" While this Ex. 6 is correct, it is not fully supported by Art. 52.2(e) in my view. A third possibility is that *T. truncata* should be treated as auct. non. Desv. More importantly, because it is not clear if the author included the type in *P. truncatum* or *T. truncata*, he may not have excluded the type at all. In fact, if there is no type within the meaning of Art. 52.2, it appears impossible to exclude the type explicitly or by implication.

For that reason, the following proposal revises Art. 52.2(e) and Art. 52 Note 1 to support Ex. 6. Similarly, because it is not clear in the Example that the "type" of the synonym is excluded, as required by Art. 52.2(e), the Note appears to introduce a new concept and is more appropriately treated as an Article.

(413) Amend Art. 52.2 and convert Art. 52 Note 1 into a new Article, as follows (new text in bold, deleted text in strikethrough):

"*52.2*. For the purpose of Art. 52.1, definite inclusion of the type of a name is effected by **the unqualified** citation of *(a)* […]. It is also effected *(e)* by **the unqualified** citation of the name itself or any name homotypic at that time, unless the type is at the same time excluded either explicitly**, definitely** or by implication **(e.g. inclusion of the type in another taxon)**."

"~~*Note 1. 52n*~~**.** ~~The inclusion,~~ **For purposes of Art. 52.2, a citation of a name or element is not unqualified if *(a)* it is cited** with an expression of doubt~~, of an element in a new taxon,~~ **(**e.g. the citation of a name **or element** with a question mark~~),~~ or in a sense that excludes one or more of its potential type elements~~, does not make the name of the new taxon nomenclaturally superfluous~~ **(e.g. the citation of a name pro parte, either explicitly or by exclusion of a homotypic name) or *(b)* the name itself or any name homotypic at that time is also simultaneously cited as a different taxon (or as a synonym of a different taxon) by the same author**."

If Prop. 413 is accepted, certain changes are desirable for Art. 52 Ex. 5 and 6. In the former Example, Dandy cited *Galium tricorne* and also excluded *Valantia aparine*, its replaced synonym. Because a name is not the same as a type, Dandy did not explicitly exclude the type. In fact, *V. aparine* was not typified until 2000. The Editorial Committee may wish to consider amending the Examples as follows (new text in bold, deleted text in strikethrough):

"*Ex. 5*. ~~Explicit exclusion of type~~ **Unqualified citation**. When publishing the name *Galium tricornutum*, Dandy (in Watsonia 4: 47. 1957) cited *G. tricorne* Stokes (Bot. Arr. Brit. Pl., ed. 2, 1: 153. 1787) pro parte as a synonym while explicitly excluding ~~its type~~ ***Valantia aparine*** **L., its replaced synonym, which was not typified until 2000. *Galium tricornutum* is not superfluous for two reasons: the pro parte citation of *G. tricorne* and the exclusion of the homotypic name *V. aparine***."

"*Ex. 6*. ~~Exclusion of type by implication~~ **Unqualified citation**. *Tmesipteris elongata* P. A. Dang. (in Botaniste 2: 213. 1891) was published as a new species but *Psilotum truncatum* R. Br. was cited as a synonym. However, on the following page, *T. truncata* (R. Br.) Desv. is recognized as a different species and two pages later both are distinguished in a key~~., thus showing that the meaning of the cited synonym was either "*P. truncatum* R. Br. pro parte" or "*P. truncatum* auct. non R. Br."~~ **Because Dang's citation was qualified, *Tmesipteris elongata* is not nomenclaturally superfluous.**"

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(414–425) Proposals on orthographical errors and orthographical variants

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Chapter VIII ("Orthography and Gender of Names") of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018) has always been contentious, some persons considering that it asks for too much attention to grammatical correctness, others that there is a limit to the tolerance of unusual, unjustified original spellings. A family environment that facilitated my access to advice in philology encouraged me to attempt to clarify this section of the *Code*, first alone for the 1981 Sydney Congress (Demoulin in Taxon 30: 233–248. 1981) and later by animating, together with Dan Nicolson, a Special Committee for Orthography for the 1987 Berlin Congress (Demoulin & Nicolson in Taxon 35: 794–803. 1986). In each case, few proposals reached a sufficient majority for acceptance by Congresses and, discouraged and convinced that orthography committees are hopeless enterprises, I did not involve myself much anymore in the issue.

Discussions in the General Committee for nomenclature made me consider some progress could be made by freely discussing issues with a limited number of persons, and I felt encouraged to publish a detailed analysis of the case of *Brachycome* Cass., which helped me devise proposals on correctable errors (Demoulin in Lejeunia 200. 2019). Those proposals were not published in Taxon in order to leave time for additional comments, and indeed I now believe they could be ameliorated.

The question of correctability under Art. 60 led me to a reflexion on orthographical variants (Art. 61, which implies there are correct and incorrect variants, while strictly speaking an orthographical variant is an admissible one). Two years ago I prepared a manuscript on that issue for distribution to the General Committee, but having been left aside until recently it did not attract many comments. Some, however, drew my attention to enough important points

to make me feel ready to introduce some proposals that I hope will be welcomed.

A detailed history of the correctability issue is to be found in the *Brachycome* paper (Demoulin, l.c. 2019), but the draft on the history of Art. 61 would not have been ready for publication before the deadline for submitting proposals to amend the *Code* and can be requested from me.

(414) Add a new paragraph after Art. 60.1 (current wording of Art. 60.1 unchanged but quoted for context):

["*60.1*. The original spelling of a name or epithet is to be retained, except for the correction of typographical or orthographical errors and the standardizations imposed by Art. 60.4 (letters and ligatures foreign to classical Latin), 60.5 and 60.6 (interchange between u/v, i/j, or eu/ev), 60.7 (diacritical signs and ligatures), 60.8 (terminations; see also Art. 32.2), 60.9 (intentional latinizations), 60.10 (compounding forms), 60.11 and 60.12 (hyphens), 60.13 (apostrophes and full stops), 60.14 (abbreviations), and F.9.1 (epithets of fungal names) (see also Art. 14.8, 14.11, and F.3.2)."]

"*60.1bis*. Orthographical errors to be corrected under this Article are those occurring when a name or epithet issued from Greek or Latin is incorrectly written or constructed, even with a large tolerance for usages of post-classical Latin, especially botanical Latin."

(415) Add a second new paragraph after Art. 60.1:

"*60.1ter*. Correction is also to be applied when names or epithets derived from the name of a person, a geographical place, or a language other than Greek or Latin is written in a way incompatible with the real orthography of the name or word, unless it is an evident intentional latinization under Art. 60.9."

(416) Add a third new paragraph after Art. 60.1:

"*60.1quater*. In case of doubt, a voted Example (Art. 7 *Ex. 16 footnote) may be proposed. When an erroneous usage has been dominant for a long period, conservation may be proposed under Art. 14.11."

An issue that has sometimes been raised is that of arbitrary formation under Art. 20. To clarify it, an addition to Art. 20 would be useful.

(417) Add the following at the end of Art. 20.1 (new text in bold):

"*20.1*. The name of a genus is a noun in the nominative singular, or a word treated as such, and is written with an initial capital letter (see Art. 60.2). It may be taken from any source whatever, and may even be composed in an absolutely arbitrary manner, but it must not end in *-virus*. **Names containing one or more orthographical errors are not composed in an absolutely arbitrary manner and are correctable under Art. 60.1. They are not to be considered names not validly published under Art. 32.1(c).**"

(418) Add a new voted Example to the Examples under Art. 60.1 or 60.2:

"**Ex. n*. The generic name *Brachycome* Cass. (in Bull. Soc. Philom. Paris 1816: 199. 1816) is to be so spelled, even though it was originally spelled *'Brachyscome'* (see Demoulin in Lejeunia 200. 2019)."

In case my modification of Art. 60.1 is adopted, this would not need to be a voted Example but, given the long-standing controversy about this name, it may nonetheless be useful to close the book in this way, whatever the decision on my proposal for the Article would be.

There is no space here to detail the convoluted history of Art. 32 (valid publication in relation to the form of a name) and Art. 61 ("orthographical" variants), but they are largely redundant, and it might be simpler to have most issues concerning variants treated under Art. 32 with emphasis on valid publication and a broad definition of variants, based on homotypy and confusability, without linguistic considerations. This will make Chapter VIII more homogeneous, strictly dealing with orthography without introducing a definition of "orthographical variant for the purpose of this *Code*", which is in contradiction with the usual meaning of what is an orthographical variant. Egon Eichler, with whom I shared more opinions than one may think from occasional divergences, already pointed out that "orthographic variant" in the Leningrad *Code* (Stafleu & al. in Regnum Veg. 97. 1978) was used in a misleadingly wide sense. It is indeed anomalous that Art. 60.1 prescribes the correction of an orthographical error, which, there, cannot be understood otherwise than in its restricted usual meaning of erroneous spelling, while Art. 61.2 gives a wide definition of orthographical variant that includes forms which by themselves are not erroneous (a nominative and a genitive for example). A clearer situation would be to abandon the inappropriate qualification "orthographical" for any kind of variants and move the situation based on homotypy to Art. 32, where just the name "variant" would be used.

Article 61 will then be restricted to real orthographical situations and could be the place to introduce a standardization of individual cases of strictly orthographical variants, among which choice is possible, that is variants in spelling that have occurred through space and time. The existence of such variants as *caespitosus/cespitosus*, *sylvaticus/silvaticus* has been found inconvenient to many every time one has to cite a name, and the benefits of some standardizations have been frequently mentioned. Here is the opportunity to introduce it.

(419) Restructure Art. 32 by adding amended content from Art. 61 as detailed below:

Article 32.1 and Note 1 remain unchanged.

Article 61.1 becomes Art. 32.2; "32.2" (at the end) is replaced by "16–19, 21, 23, and 24"; "orthographical" in qualification of "variant" is deleted here and elsewhere except in Art. 60 or elsewhere when it is not used with the same restricted meaning. Note that I find the reference to Art. 6.10 in Art. 61.1 uselessly confusing and Art. 14.8 is an Article to which I am radically opposed, but, if it stays, those references can be editorially added.

Article 32 Ex. 1 and 2 would be better placed under Art. 21.2.

Article 32 Note 2 may be deleted. This Note is anyway erroneous because the reference to Art. 32.2 stands for Art. 21.2.

Article 61.2 becomes Art. 32.3 and is followed by a new Art. 32 Note 2 clarifying the case of compounds with inverted elements.

Article 61 Ex. 1 becomes Art. 32 Ex. 1 and Art. 61 Ex. 2 becomes Art. 32 Ex. 2.

Article 61.3 becomes Art. 32.4.

Article 61.4 becomes Art. 32.5 with the addition at the end of the first sentence of "without change of authorship or date" that comes from present Art. 31.2 and the replacement of "corrected" by "changed" (also in Art. 61 Note 1, which becomes Art. 32 Note 3).

Article 61.5 becomes Art. 32.6, with the formulation adapted by referring to the new Art. 32.2.

Article 61 Ex. 3 becomes Art. 32 Ex. 3.

Article 32.3, 32.4, Ex. 3–5 and Notes 3 and 4 remain unchanged but become Art. 32.7, Art. 32.8, Ex. 4–6 and Notes 4 and 5, respectively.

Here is the result:

[Article 32.1 and Note 1 unchanged.]

"*32.2*. Only one variant of any one name is treated as validly published: the form that appears in the original publication, except as provided in Art. 60, 61, and F.9 (typographical or orthographical errors and standardizations), Art. 14.11 (conserved spellings), Art. F.3.2 (spelling of sanctioned names), and Art. 16–19, 21, 23, and 24 (rank-determining terminations). Application of the aforementioned Articles does not lead to a change of author citation or date.

32.3. Variants of a name, only one nomenclatural type being involved, are the various spellings of a name or its final epithet. Variants also result from the use of different but related stems for adding a termination or forming a compound, or from the use of different terminations as long as the category, either adjective or substantive, remains the same.

Note 2. For compounds, variants do not include words in which the order of the compounding words is inverted, which are to be treated as synonyms, not homonyms.

Ex. 1. *Nelumbo* Adans. (Fam. Pl. 2: 76. 1763) and *'Nelumbium'* (Jussieu, Gen. Pl.: 68. 1789) are variants of a generic name based on *Nymphaea nelumbo* L., formed by using either a termination of the second or third declension of substantives. Similarly *Musineon* Raf. (in J. Phys. Chim. Hist. Nat. Arts 91: 71. 1820) and *'Musenium'* (Nuttall in Torrey & Gray, Fl. N. Amer. 1: 642. 1840) are variants in termination, both with *Seseli divaricatum* Pursh as type.

Ex. 2. The epithet of *Selaginella apus* Spring (in Martius, Fl. Bras. 1(2): 119. 1840) is a noun in apposition, so that *apus* cannot be treated as a variant of the adjective *apodus*, used in *Lycopodium apodum* L. (Sp. Pl.: 1105. 1753). Spring cited *L. apodum* as a synonym of *S. apus*, but instead he should have adopted the former epithet and published *"S. apoda"*; consequently *S. apus* was nomenclaturally superfluous when published and is illegitimate under Art. 52.1.

32.4. If variants of a name of a new taxon or replacement name appear in the original publication, the one that conforms to the rules and best suits the recommendations of Art. 60 is to be retained. If the variants conform and suit equally well, the first author who, in an effectively published text (Art. 29–31), explicitly adopts one of the variants and rejects the other(s) must be followed (see also Rec. F.5A.2).

32.5. Any variant of a name not conforming to the validly published form of that name is to be changed to that form without change of authorship or date. Whenever such a variant appears in a publication, it is to be treated as if it appeared in its changed form.

Note 3. In full citations it is desirable that the original form of a changed variant of a name be added (Rec. 50F).

32.6. Confusingly similar names that are not variants as defined in Art. 32.3, but are based on the same type, are nevertheless treated as variants (for confusingly similar names based on different types, see Art. 53.2–53.4).

Ex. 3. *'Geaster'* (Fries, Syst. Mycol. 3: 8. 1829) and *Geastrum* Pers. (in Neues Mag. Bot. 1: 85. 1794) : Pers. (Syn. Meth. Fung.: 131. 1801) are similar names with the same type (see Taxon 33: 498. 1984); they are treated as variants despite the fact that they are derived from two different nouns, *aster (asteris)* and *astrum (astri)*."

[Followed by Art. 32.7, Art. 32.8, Ex. 4, Ex. 5, Ex. 6, Note 4 and Note 5, i.e. the current Art. 32.3 onward unchanged.]

(420) Replace Art. 61.1 by the following:

"*61.1*. For homotypic names, variations in spelling, as well as other cases of variations (compounding or inflectional forms) dealt with in detail in Art. 32, do not represent nomenclatural novelties."

(421) Replace Art. 61.2 by the following:

"*61.2*. The following adjectival epithets, which are orthographical variants s. str., are to be standardized as indicated (conservation is appropriate for generic names). The list is open to additions approved by an International Botanical Congress in the same manner as voted Examples."

Four common cases are proposed with the adoption of the orthography that would be preferred by extensive modern Latin dictionaries like the Oxford one (Glare, Oxford Latin Dictionary, combined ed. 1982). Given wide use for some very well-known names, it may be that some people would prefer the reverse standardization of some cases and each case ought to be voted on separately.

(422) Add to the new Art. 61.2: "cespitosus to caespitosus".

(423) Add to the new Art. 61.2: "lacrymans to lacrimans".

(424) Add to the new Art. 61.2: "pyriformis to piriformis".

(425) Add to the new Art. 61.2: "sylvestris to silvestris".

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(426–433) Miscellaneous proposals to amend the *Shenzhen Code*

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Ever since the publication of the *Shenzhen Code* (Turland & al. in Regnum Veg. 159. 2018), ideas for proposals to amend it have been accumulating and gestating in the Rapporteurs' files, affectionately dubbed the "Madrid Crate". Some of these proposals have been published separately by other authors, while others have been abandoned as unworkable. The remainder is published here.

The first proposal is almost editorial. Articles 3 and 4 list the principal and secondary ranks in both English and Latin, e.g. "form (forma)" in Art. 4.1. Abbreviations for those ranks are recommended in Rec. 5A.1, which cites the unabbreviated ranks in English, except for "forma", which is in Latin. For consistency, this should be replaced by the English "form".

(426) In Rec. 5A.1 change "f. (forma)" to "f. (form)".

Editorially, in Art. 24 Ex. 1 change "subforma" to "subform" and in Art. 36 Ex. 13 change "second forma" to "second form".

A recently noted article by Stafleu (in Taxon 6: 150. 1957) indicates that some conserved fossil names were omitted from both the 1952 Stockholm *Code* (Lanjouw & al. in Regnum Veg. 3. 1952) and the 1961 Paris *Code* (Lanjouw & al. in Regnum Veg. 8. 1956), first appearing only in the 1966 Montreal *Code* (Lanjouw & al. in Regnum Veg. 23: 324. 1961), despite having been approved at the 1950 Stockholm Congress (see Proceedings of the Seventh International Botanical Congress: 548. 1953, https://archive.org/details/in.ernet.dli.2015.351670/page/n565; also in Regnum Veg. 1: 548. 1953). The effective date of conservation of these, which dates before the origin of the General Committee, is not accounted for in Art. 14 Note 4, but would be the same as those of the Special Committee for Fungi, thereby requiring the following modification to the Note:

(427) Amend Art. 14 Note 4 clause (c) as follows (new text in bold, deleted text in strikethrough):

"*(c)* Conservation of names ~~in~~ **for** the 1952 Stockholm *Code* include: *(1)* those of the Special Committee for Phanerogamae and Pteridophyta, which became effective on 1 June 1940 under the authority of the VI IBC held in Amsterdam in 1935 (see Bull. Misc. Inform. Kew 1940: 81–134); *(2)* those of the Special Committee for Fungi, which became effective on 20 July 1950 at the VII IBC in Stockholm (see Regnum Veg. 1: 549–550. 1953)**; *(3)* those of the Special Committee on Palaeobotanical Nomenclature, which also became effective on 20 July 1950 at the VII IBC in Stockholm (see Regnum Veg. 1: 548. 1953), but were omitted from both the Stockholm *Code* and the 1961 Paris *Code***."

Concerning the effective publication of electronic material, a particular electronic publication could have: (1) an evidently preliminary version, which is not effectively published (Art. 30.2); (2) a version whose content is considered by the publisher to be final, which is effectively published (also Art. 30.2); and (3) a version as in (2) that is later altered, in which case the alterations are not themselves effectively published (Art. 30.4). Under case (3), the original version, whose content is considered final, should remain effectively published and not be retroactively treated as a preliminary version. In addition, alteration of an electronic publication could logically extend to retraction of that publication, which was already addressed by a proposed new Note in Art. 30 (Prop. 159, Prado & al. in Taxon 71: 711. 2022): "*Note n*. Electronic material that has been effectively published remains effectively published even if retracted by its publisher." So that Art. 30.4 is more explicit with regard to these issues, the following amendments are proposed.

(428) Amend Art. 30.4 as follows (new text in bold, deleted text in strikethrough):

"*30.4*. The content of a particular electronic publication ~~must~~ **may** not be altered **or retracted** after it is effectively published. Any such alterations are not themselves effectively published **and have no effect on the original publication**. Corrections or revisions must be issued separately to be effectively published."

There is a problem relating to the incongruity of dates appearing in Art. 33.1 and some other Articles. The second sentence of Art. 33.1 states: "A name published *on or after 1 January 1973* for which the various conditions for valid publication are not simultaneously fulfilled is not validly published unless full and direct reference (Art. 41.5) is given to the place(s) where these requirements were previously fulfilled (but see Art. 41.7)" (emphasis added). This provision first entered the Seattle *Code* (Stafleu & al. in Regnum Veg. 82. 1972) in then Art. 45 in essentially identical form. The conditions for valid publication that might require referencing for such a name would include provision of a Latin or English description or diagnosis or a reference to one (Art. 38, 39, 43.1, 44.1), designation or indication of a type (Art. 40), reference to a basionym or replaced synonym (Art. 41) and, for fossil-taxa or algae, provision of or reference to an illustration (Art. 43.2, 44.2). The implication of Art. 33.1 could be that a "full and direct reference" to the place where these requirements were fulfilled is not required *before 1973*, yet one of these requirements, established after 1972, requires that a full and direct reference be provided after an earlier date.

For example, Art. 38.13, which first appeared in the Berlin *Code* (Greuter & al. in Regnum Veg. 118. 1988) in then Art. 32.3, states in part: "For names published *on or after 1 January 1953* it [reference to a previously and effectively published description or diagnosis] must,

however, be full and direct as specified in Art. 41.5." One could read Art. 33.1 to imply that a name of a new taxon published between 1953 and 1973 that at publication lacks a description or diagnosis and a full and direct reference to a previously published description or diagnosis would nonetheless be validly published without any, or with only indirect, reference to such, in seeming conflict with Art. 38.13.

Indeed, there are many such names that have been considered validly published between 1953 and 1973 owing to Art. 33.1. For example, Quézel & Contandriopoulos (in Taxon 16: 239–240. 1967) designated types for seventeen species and infraspecies names they had described in three previous publications in 1964 and 1965 but failed to indicate the types, as required after 1958. While each of the three publications was cited with its full pagination, this was not in conjunction with the names and so lacked the page references required by Art. 41.5 and thus Art. 38.13. These names would be validly published under Art. 33.1, but not under Art. 38.13. Because these names were originally published with descriptions, not with references to them, Art. 38.13 need not apply to these and other similar cases if some adjustment is made to Art. 33.1.

(429) Amend Art. 33.1 as follows (new text in bold, deleted text in strikethrough):

"*33.1*. The date of a name is that of its valid publication. When the various conditions for valid publication are not simultaneously fulfilled, the date is that on which the last is fulfilled. However, the name must always be explicitly accepted in the place of its valid publication. ~~A name published on or after 1 January 1973 for which~~ **When** the various conditions for valid publication are not simultaneously fulfilled**, a name** is not validly published unless ~~full and direct~~ reference ~~(Art. 41.5)~~ is given to the place(s) where these requirements were previously fulfilled**; this reference must be full and direct (Art. 41.5) on or after 1 January 1973** (~~but~~ see **also** Art. 41.7)."

The next proposal concerns Art. 36.3, which reads as follows: "*36.3*. When, on or after 1 January 1953, two or more different names based on the same type are accepted simultaneously for the same taxon by the same author and accepted as alternatives by that author in the same publication (so-called alternative names), none of them, if new, is validly published." There are three issues.

Superfluous wording. The words "and accepted as alternatives by that author" are superfluous. If the names are "accepted simultaneously for the same taxon by the same author" they must be "accepted as alternatives by that author".

Multiple authors. It is also possible that two or more different names based on the same type are accepted simultaneously for the same taxon by different sets of authors in the same publication. If the sets of authors are mutually exclusive, the names are not alternative names and may be validly published. But it seems desirable that if even one author is common to the sets of authors, the names should be alternative names and those that are new should not be validly published. This could be achieved by adding the words in italics: "When, […], two or more different names based on the same type are accepted simultaneously for the same taxon by *any one and* the same author in the same publication […]."

Suprageneric names. The last sentence of Art. 36.3 states that the rule "does not apply in those cases where the same combination is simultaneously used at different ranks, either for infraspecific taxa or for subdivisions of a genus". However, there is no parallel exception for suprageneric names formed from the same generic name, and therefore based on the same type, simultaneously used at different ranks.

The following amendments are therefore proposed.

(430) Amend Art. 36.3 as follows (new text in bold, deleted text in strikethrough):

"*36.3*. When, on or after 1 January 1953, two or more different names based on the same type are accepted simultaneously for the same taxon by **any one and** the same author ~~and accepted as alternatives by that author~~ in the same publication (so-called alternative names), none of them, if new, is validly published. This rule does not apply in those cases where the same combination is simultaneously used at different ranks, either for infraspecific taxa or for subdivisions of a genus (see Rec. 22A.1, 22A.2, and 26A.1–3), **nor where suprageneric names formed from the same generic name are simultaneously used at different ranks (see Rec. 19A.1 and 19A.2),** nor to names provided for in Art. F.8.1."

In Art. 54.1 clause (b), the wording of subclause (2) is strange: "becomes a homonym of an algal, fungal, or plant name when the taxon to which it applies is first treated as an alga, fungus, or plant". Homonyms are homonyms regardless of their taxonomic application, even when two *Codes* are involved, and *becoming* a homonym when *first* applied to an alga, fungus or plant seems to imply a nomenclatural act. The wording also fails to specify that it is a *later* homonym that is illegitimate (see Art. 53.1).

(431) Reword Art. 54.1 clause (b) as follows (new text in bold, deleted text in strikethrough):

"*54.1*. […] *(b)* A name applied to an organism covered by this *Code* and validly published under it (Art. 32–45) but originally published for a taxon other than an alga, fungus, or plant, i.e. under another *Code*, is illegitimate if it *(1)* is unavailable for use under the provisions of the other *Code*[1], usually because of homonymy, or *(2)* ~~becomes~~ **is** a **later** homonym of an algal, fungal, or plant name ~~when the taxon to which it applies is first treated as an alga, fungus, or plant~~ (see also Art. 45.1)."

At the Shenzhen Congress of 2017, there were two Recorders (Lindon & al. in PhytoKeys 150: 5. 2020), and there will again be two at the Madrid Congress of 2024, but Div. III Prov. 4.5 and 4.10 imply that there is only one Recorder. While more than one Recorder is not explicitly forbidden, it would be better if this were explicitly allowed.

(432) Amend Div. III Prov. 4.5 and 4.10 as follows (new text in bold, deleted text in strikethrough):

"*4.5*. The Bureau of Nomenclature of the International Botanical Congress comprises the following officers: President of the Nomenclature Section; up to five Vice-presidents; the Rapporteur-général; the Vice-rapporteur; ~~the Recorder~~ **one or more Recorders**. The Bureau of Nomenclature defines the sequence and timing of debates; appoints Tellers to collect and count voting cards in the event of a card vote (see Prov. 5.10); and advises the President on procedural matters."

"*4.10*. The ~~Recorder is~~ **Recorders are** appointed by the Organizing Committee of the International Botanical Congress in consultation with the Rapporteur-général. The ~~Recorder is~~ **Recorders are** responsible for all local facilities needed by the Nomenclature Section, such as the venue and its equipment, and in particular for the detailed recording of the proceedings of the Section and for facilitating the voting."

According to Div. III Prov. 7.5, "The Committee on Institutional Votes comprises six members, each to represent a different continent, plus the Rapporteur-général, who serves as its chair." However, after the Shenzhen Congress, the Committee took on another member as its "Advisor for Fungi" (see Ulloa Ulloa & al. in Taxon 72: 701–703. 2023) because none of the seven members elected in Shenzhen was a mycologist. The possibility to take on additional members for such purposes should be explicitly allowed.

(433) Amend Div. III Prov. 7.5 as follows (new text in bold):

"*7.5*. The Committee on Institutional Votes comprises six members, each to represent a different continent, plus the Rapporteur-général, who serves as its chair**, plus any additional members that the Committee considers are required**."

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