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PROPOSALS TO AMEND THE CODE

(45)–(47) The typification of generic names and criticism of the text of Art. 10 of the Sydney Code with three proposals to amend.

When one encounters a nomenclatural problem one is obliged to consult the Code to see what, if anything, it may have to say on the matter. The vagaries of nomenclators are more complex in practice than is usually contemplated under the Code, which deals mostly with relatively simple problems. What it has to say on complex problems is sometimes ambiguous and requires some interpretation of the rules. In making an interpretation one is obliged to consider 1) what, if anything, the rules mean when given a strict legal interpretation; 2) what informed colleagues think the rules say; 3) what the evident historical intention behind the rules was; and 4) what the common practice of botanists has been in the face of similar problems.

Many botanists clearly do not like to have pettifogging legal interpretations of what the rules say and mean, and prefer to think of the rules as guidelines, to be acknowledged when it suits but circumvented by conservation when it does not. One must acknowledge that the retroactive imposition of a set of rules halfway through a game necessitates a complex procedure for "escaping" unfortunate consequences. The rules have to be both prescriptive for newly introduced names, and descriptively accurate for the names of the past. This isn't easy. But unless the reasons, the original reasons for a rule are understood, there is a real danger that escape clauses piled on to it will obliterate the principle and the normal procedure. In my opinion this is what has happened to Article 10.

A major methodological change was made to the Code at Sydney with a covert but fundamental change in Article 10, governing the typification of generic names. Despite pretensions to the contrary, the change altered the typification of every generic name, although not necessarily in a way which affected the application of the name. As Principle II states "The application of names is determined by nomenclatural types." When all the types were changed, the applications were not always affected but many were. That a foundation stone of the "type method" should be relaid seems surprising but it grew out of a discrepancy of interpretation over an article which became legally awkward only when complex problems were scrutinised. The need for a satisfactory method for dealing with the complex problems necessitated a change to the method of the simple problems too. To understand the source of the difficulty one has to consider the phenomenological nature of taxonomy and its attendent nomenclatural system.

The objects to which botanical names are applied are taxa. Taxa have the properties of circumscription (i.e., constituent elements), rank (vertical position in taxonomic hierarchy) and position (their location relative to other taxa at the same rank). Taxa are artificial models of "real life" entities but they have no inherent biological reality themselves. They are constructed, rather, by taxonomists, in their imperfect judgement in accordance with what they perceive of reality. It is only when the precise rank, position and circumscription of a taxon are known that it is possible to apply to it a name which is "correct" in the sense of the Code. Objects without distinct, delimited circumscriptions are no more than metaphysical abstractions perceived as biological entities and these cannot be "correctly" named under the Code, as their contents are vague. Only the taxonomic models with stated contents, which represent to the community of botanists the entities "out there" can be "correctly" named. It is the work of taxonomists to construct and to refine these models. Botanists are prone to forget that taxa are just models of nature developed with limited judgement and imperfect knowledge from our imperfect perceptions; they are not biologically real, although they can be biologically useful.

When the Code talks about a "species" it is really always talking about a model, a taxon with specific rank, a position as a constituent element of a genus-model and a circumscription (a set of constituent specimens). The Code does not talk of species as genetic, biosystematic or phylogenetic entities; it has no business whatever to be concerned with these, for it is solely concerned with the correct application of names to artificial models.

The "same" taxon may be differently circumscribed by different authors. Often the circumscription is indicated only by the author citation. For instance if one cites *Myriophyllum spicatum* L., Sp. Pl.

1753 one is limiting the circumscription to whatever elements (specimens) Linnaeus included in his treatment. The "same" taxon, as *Myriophyllum spicatum* L. sensu Aitken & McNeill, 1980 has a different circumscription, as Linnaeus on the one hand and Aitken and McNeill on the other hand included different elements.

When the Code said in Art. 10 that "the type of the name of a genus is a species" it meant that the nomenclatural type of a generic name was a particular taxon (model) with a particular rank position and circumscription. The statement that the type of the name *Myriophyllum* was the species *M. spicatum* L., 1753 meant that the element to which the name *Myriophyllum* was permanently attached was the model species called *M. spicatum* by Linnaeus, as circumscribed by Linnaeus. The specific model of Linnaeus might be one specimen or several which he regarded as conspecific. According to other taxonomic opinions the specimens might or might not all be conspecific, but this is irrelevant to the typification, because Linnaeus thought that they *were,* and they will all always be elements of the taxonomic model *M. spicatum* L. sensu Linnaeus. This fixed and immutable thing, the nomenclatural type of *Myriophyllum,* ceased to be the nomenclatural type of the name *Myriophyllum* when the Code was changed at Sydney.

When a particular herbarium preparation consists of more that one specimen and is cited as the type of a species name, it is always theoretically possible that someone will consider the type to be a mixture. This results in a problem over the way the name is to be applied. In the case of species names, Art. 9.2 guides us on what to do. All parts of the type preparation remain of course parts of the type preparation, so the typification of the name cannot be affected; the opinion that the type is heterogeneous is only an opinion, and it may not be considered correct by others. But while the typification of the name does not change its application has to, since the name cannot continue to be applied to two different things. The future application of the name therefore has to be to that part of its type (and whatever is judged conspecific with that) which is most consistent with the protologue, the inclusion of a discordant part being regarded as a mistake. If the type is heterogeneous a TAXONOMIC decision has to be made to determine the intended APPLICATION of the name. The Code actually calls this decision "lectotypification" but this is a misnomer; the type does not change, for no part of the original type ceases to be part of the type preparation. It is the application of the name which changes, not its typification.

A similar procedure, logically enough, had been followed by many botanists in resolving the application of a generic name based on a heterogeneous "type species", although there was no legal warrant for them to do so. If *Myriophyllum spicatum* L. sensu Linnaeus, 1753 is perceived as a mixture, how is the name *Myriophyllum* to be applied? McNeill (1981a, p. 203) indicated that "the dominant element in Linnaeus' concept of *M. spicatum* was the species now known as *M. exalbescens* Fernald," but accepted lectotypification of the name *M. spicatum* on another element thinking it more important to typify the name *M. spicatum* in "such a way as to preserve traditional usage" rather than to typify it in accordance with the "strong suggestion of the protologue." Since the mixture called *M. spicatum* by Linnaeus was the type of *Myriophyllum* how is the correct APPLICATION of the name *Myriophyllum* to be determined; from the greater or the lesser part of its type? The similarity of the problem which Art. 9.2 dealt with indicates that a similar procedure is appropriate here. On the other hand Art. 13 makes reference to "the specimen which serves directly or indirectly" as the type of a name, and Art. 55.2 compels mistypification of a misapplied new combination, usually interpreted to mean that the correct application of the generic name is determined by the taxonomic identity of the type of the combination used to designate the type of the generic name. Although *this* type was not the type of the *generic* name, it did determine that name's correct application. Thus many botanists followed this procedure instead of the one suggested by Art. 9.2 and two contradictory methods arose.

The problem of course arises from a difficulty in the typification of a species name based on discordant elements. It is a different matter altogether from determining which of the discordant syntypes of a generic name should be designated lectotype (which is lectotypification in the proper sense). Typification of the generic name was not the problem; the problem was how to apply the name once its type was shown to consist of discordant elements. On this subject Art. 10 was silent.

It may be helpful to consider this problem by an analogy. A discordant element in a protologue is rather like a worm in an apple. Under Art. 9.2 (dealing with a type sheet of mixed specimens) the correct procedure, misnamed "lectotypification" was to excise the worm. Similarly when an untypified basionym is typified, a lectotypifier is free to winkle out any worms found among the syntypes. But when a newly introduced name is a recombination, and the basionym happens to be typified on a worm, then the new name has to be typified on the worm too (Art. 55.2), although the name is applied

to the apple, not to the worm within it. When the worm is recognized the name is kept (applied in accordance with its type), for the worm! The apple is thrown away! If the worm-infested apple happens to be the type of a generic name, then a name intended for a genus of apples turns out to be a name for a genus of worms; the apples are discordant!

This is what happened in the famous case of *Pseudolarix* and in many others discussed by Subcommittee F of the International Mycological Association, and by the Committee on Generic Typification (so misnamed) which reported to the Sydney Congress. In every single case the problem resulted from the automatic typification imposed by either Art. 55.2 or Art. 7.11. In my view the only sensible solution was to eliminate the discordant element from the problem at the basic level of species name combination. Once this is done any problems of application at higher ranks are eliminated. Aware that the essentially illogical Art. 55.2 could not be reversed or eliminated by any appeal to the logic of the Sydney Congress I suggested that the problems we faced could be resolved by allowing, by conservation, for expedient exceptions to Art. 55.2 by permitting where convenient the treatment of misapplied recombinations as new basionyms, a practice not so very different from that allowed for under Art. 72. I called this procedure rectotypification and formally proposed it under Art. 14 (Parkinson, 1981a, p. 275) with a fully worked example (*Grateloupia ornata*) (Parkinson, 1981b, p. 312). This approach, in the better known case of *Pseudolarix kaempferi* would have allowed this name, once conserved with a Fortune specimen as type ("*P. kaempferi* Gordon. nom. rectotyp.") to stand as the earliest name for the Chinese larch, which would then retain the generic name *Pseudolarix,* while the Japanese larch could continue to be called *Larix kaempferi* (Lambert) Carr. Art. 10 is entirely irrelevant to this solution. Unfortunately the logical simplicity and elegance of this solution was entirely lost on both the Committees, on the Rapporteurs and on the Sydney Congress.

McNeill (letter to Parkinson 14.10.80) wrote "You and I perceive the application of the present wording of Art. 10 identically. A large number, perhaps even a majority, of our botanical colleagues perceive it differently. Your reaction to this situation is to re-trench your position forcefully, mine is to try for a rewording which will obviate the difficulty."

The rewording adopted by the Committee, of which McNeill was Secretary, was eventually adopted by the Congress. In my opinion it completely fails to resolve the *Pseudolarix* problem and fails to deal logically and unambiguously with the other problem area which the Leningrad Code also failed to tackle, a problem which did affect Art. 10 but which the Committee seems not to have discussed; typification of generic names validated without named included species. The Committee, in my view, failed to reach adequate conclusions for three reasons. Firstly it did not realise that the divergent methods rested on Art. 9.2 on the one hand and Art. 55.2, 13 and 7.11 on the other. (The Committee made no reference to any of these Articles in its report, except for an incidental misinterpretation of one of my proposals, under which misrepresentation they agreed to disregard my suggestions.) Secondly the Committee was quite unable to establish the clear distinction between the typification of a name and its application and of the dependence of the application of a generic name on the typification of a specific one. Thirdly the Committee was fixated on a need to change Art. 10 and would not look at the real source of the problem when it was pointed out to them.

The Committee thought, wrongly, that it could trace the source of the problem of *Pseudolarix* and others like it to the different interpretations of the word "species" made by different botanists. They could see that for some botanists "species" meant the biosystematic species described, and that for others "species" was a type specimen. They couldn't see (apparently) that "species" meant "taxonomic model" although McNeill at least must have been aware of this as he agreed with me (see above) that this was the correct interpretation of what the Code said. The Committee rejected the view that "species" was intended to mean "biosystematic species" and they also rejected Greuter's strange suggestion that "species" meant "name of a species." Reasoning therefore that since for most botanists the identity of a "species" was determined by a particular specimen the Committee abandoned the established position that a taxon could act as a type and opted for type specimens for all typified names of all ranks (Prop. 111). Although this was presented by the Committee as a "clarification" of the present meaning of Art. 10 it was obviously not a clarification. In fact it made a basic philosophic change and altered the typification of all supraspecific names. It did not change their application, in most cases. The Committee failed to see the difference.

Unfortunately the proposals 111–113 were adopted. After some editorial amendment they appear as Art. 10.1–5 in the Sydney Code. The debate on the proposals has been reported at some length (Greuter and Voss, 1982, pp. 40–49). One must now attempt to apply this rule and to clarify any emergent ambiguities.

Generic Names Published with "Reference to One or More Species Names"

Art. 10.1 of the Sydney Code provides that "The type of a name of a genus . . . is the type of the name of a species." ("An included species" was the expression used in the first three drafts of the article.) Art. 10.2 provides that "If in the protologue of the name of a genus . . . reference to one or more species names is definitely included, the type must be chosen from among the types of these names." Yet "inclusion of a species" in a genus is one matter; inclusion of a reference to a species name in a generic name protologue is another matter entirely. As I shall show below by examples, the simplistic assumption that these matters are the same leads to problems.

To take a conventional, straightforward and workable example first, consider the typification of the name *Euhymenia* Kützing, Phyc. Gen., p. 400 (1843). There are three listed and obviously "included" species; named as *E. requienii, E. reniformis* and *E. lactuca.* The type of one of these names typifies the generic name. Since, as is shown by the protologue, *Euhymenia* is a substitute name for *Kallymenia* J. Agardh, rejected by Kützing as a later homonym of *Calymenia* Persoon, *Euhymenia* is automatically typified (Art. 7.9) on *E. reniformis,* which as *K. reniformis* (Turn.) J. Ag., is the lectotype of *Kallymenia.* Not all cases are so simple. In cases where the generic name protologue contains reference to a species name but the species is not "included" in the genus the rule compels an absurdity.

Examples. 1) *Rhodosaccion* ([J. Agardh]) Montagne was introduced by J. G. Agardh (Spec. Gen. Ord. Alg. v. 2(2), p. 459 (1852)) as "*Chaetangium* sect. 1 *Rhodosaccion*" based on *Ch.* (*R.*) *saccatum* J. G. Agardh, Öfv. K. Sv. Vet.-Akad. Forhandl. 6: 89 (1849). The subgenus was elevated to generic rank by Montagne in Gay, Hist. Pol. Fis. Chil. [Fl. Chil.] v. 8, p. 323 (1854, title page 1852), whereupon the generic name *Rhodosaccion* was created. However the only species name to which reference was definitely included by Montagne was *Rhodosaccion fastigiatum* (Bory) Montagne, which under Art. 10.2 must stand as the type of *Rhodosaccion,* even arguably (Art. 7.3) as holotype, notwithstanding the fact that as a status novus, *Rhodosaccion* would be automatically typified under Art. 7.10 on the type of its basionym, *Chaetangium* sect. 1 *Rhodosaccion,* which, indeed as "*Chaetangium saccatum*" *is* cited as its type in ING. Does Art. 10.2 override Art. 7.10? This requires interpretation. I guess that 10.2 does override 7.10. Others may not agree.

2) *Erinacea* Lamouroux in Bory de St Vincent, Dict. Class. Hist. Nat. 9: 258 (1824) was validly published without a clear indication of included species, the author simply stating "Les Erinacées sont peu nombreuses en espèces; elles se trouvent presque toutes dans les pays chauds . . . Le *Fucus erinaceus* tab. 26 de Turner, peut être regardé comme le type principal du group des Erinacées." The definite inclusion of a reference to the species name *Fucus erinaceus* Turner compels typification of *Erinacea* Lamouroux on the type of this name, fortunately a logical conclusion. There are in fact three included species named elsewhere in the same work, but without a cross reference to them, in the entry under *Delesseria*; but these are nomina nuda.

3) *Argolasia* A. L. Jussieu, Gen. p. 60 (1789) was published with the statement "Confer cum Hyacintho lanato L. Argos lasios, albus hirsutus" and with reference to a specimen; "Caractere ex sicco specimine, nondum satis fructifero." Historically the specimen ought to be the type, but the rather incidental mention of the species name *Hyacinthus lanatus* L. compels the typification of *Argolasia* on the type of that Linnaean name, a specimen which Jussieu had probably never seen. This specimen is the type of the name *Lanaria lanata* (L.) Druce ≡ *Lanaria plumosa* W. Aiton, nom. illeg., type of *Lanaria* W. Aiton, 1789 which is conserved against *Argolasia.* Thus *Lanaria* and *Argolasia* are homotypic synonyms. ICBN indicates no type for *Argolasia* but lists it as a heterotypic synonym of *Lanaria.*

4) *Pogonia* A. L. Jussieu, Gen. p. 65 (1789) was published with the statement "Huc referuntur *Arethusa ophioglossoides* L., *A. ciliaris* L. S., *Epidendrum ciliare* L., *E. cucullatum* aliaeque species ciliatae." Although there are more than four included species ("aliaeque species ciliatae"), the name *Pogonia* must be typified on one of the four named included species. According to ING its type is: "LT: *P. ophioglossoides* (Linnaeus) Ker-Gawler (Bot. Reg. 148. 1 Oct. 1816)."

5) *Cantua* A. L. Jussieu, Gen. p. 136 (1789) includes in the protologue the statement "Caracter ex siccis Jos. Jussaei speciminibus Peruvianis Bignoniae nomine inscriptis. Huc referent *Ipomaea rubra* L. suffrutex foliis pinnatifidis, floribus spicato-paniculatis, inter *Polemonium* & *Cantuam* media." The cited specimen is obviously the historical type of *Cantua,* but it cannot be designated as type because "reference to a species name [*Ipomaea rubra* L.] is definitely included." While *I. rubra* is only mentioned as an aberrant *Cantua* in order to show that Jussieu includes it in *Cantua* rather than *Polemonium* it must, under Art. 10.2 serve as the nomenclatural type of *Cantua,* since the historical

type specimen can only be designated type of *Cantua* under Art. 10.3 by conservation designed to reject the automatic typification of *Cantua* on the type of *I. rubra*. ING cites the type of *Cantua* as "LT: *C. buxifolia* J. Jussieu ex Lamarck."

6) *Incarvillea* Jussieu, Gen. p. 138 (1789) was published with the following statement: "Caractere ex sicco specimine herbarii ad Bern. Jussaeum missi annot 1743 a P. d'Incarville Jesuita apud Sinenses apostolico Botanices perito. Cum adjunctis plurimis novarum specierum seminibus, praecipue *Asteris Chinensis* L. ante hac Europaeis incogniti." The Incarville specimen is obviously the historical type. The protologue however includes incidental reference to a species name; *Aster chinensis*. Under Art. 10.2 the type of *Aster chinensis* L. is the type of *Incarvillea* (Bignoniaceae!). Yet certainly *Aster chinensis* was never an included species of *Incarvillea*. This example shows up clearly a textual fault in Art. 10.2. ING cites as type of *Incarvillea* "*I. sinensis* Lamarck (Encycl. 3: 243. 19 Oct. 1789)."

Generic Names Published without "Reference to One or More Species Names"

Art. 10.2 provides that "If no reference to a species name is definitely included, a type must be otherwise chosen." This brief tautology takes us nowhere because no explanation of "otherwise" follows; the article neglects to indicate what this type can be or what it can be selected from or what sort of a type it is (lectotype, neotype). The principle in the minds of the authors of the proposals in their original form was that the type should be a specimen used by the author in the preparation of the protologue, if no species were named. But the eventual rule does not allow this. The vagueness of the rule allows the type specimen to come from anywhere, being effectively a blank cheque for neotypification, with only one condition attached: the neotype has to be (10.1) "the type of the name of a species," in this case, a name accepted by the typifying revisor. An authentic specimen which is *not* the type of a name of a species cannot be designated as lectotype under 10.2 but only under 10.3 as a typus conservandus to overcome a neotype designated under 10.2. Art. 10.2 does permit, by its last sentence, any typification made under the provision of its first two sentences to be superseded "if it can be demonstrated that the selected type is not conspecific with any of the material associated with the protologue." This clause can operate only when a neotype specimen is not conspecific with any material assigned to the genus by the original author, according to the opinion of a second revisor. Ordinarily a neotype specimen which is the type of a species name will have precedence over an authentic specimen which is not.

Colletia Jussieu, Gen. p. 380 (not 180 as cited in ICBN) for example, was validly published without inclusion of any reference to a species name, but with reference to authentic material; "Caracter ex Commers. Brasil & ex J. Juss. Peruv." This material can only be designated type of *Colletia* if it is "the type of the name of a species" (10.1) or if (10.3) "other than the type of a name of an included species" it is designated typus conservandus. According to ICBN the type of *Colletia* is "*C. spinosa* Lamarck (Tab. Enc. 2: 91, 1798)," a neotype unless, fortuitously, it is itself typified on the Commerson and Jussieu material. This neotype can be superseded only if it can be demonstrated that it is not conspecific with any original material of any included species used by Jussieu in drawing up the protologue. This is a matter of very subjective taxonomic judgement. Supersession of Lamarck's material, were it to occur, would not open the way for typification of *Colletia* on Commerson material, for without conservation any specimen which happened to have a species name based on it would be automatically preferred to the Commerson material as long as it was conspecific with one of Jussieu's "included species"!

Since it was mainly the generic names of Jussieu which were expected to need the irregular procedure for typification covered by the second sentence of Art. 10.2 (most other authors at least attempting to publish names for included species), I have checked a copy of Jussieu's 'Genera Plantarum' (1789) to see how the rule would work. In the first hundred pages Jussieu introduced three generic names with references to species names (always to synonyms, not to "correct" names): *Argolasia, Pogonia, Ourisia*. He introduced another eleven generic names without reference to species names but with reference to authentic specimens or drawings which could serve as historic lectotypes (*Callixene, Philesia, Luziola, Nastus, Latania, Lontarus, Xerophyta, Tapeinia, Catimbium, Chancoa, Anredera*). He also introduced nine names without reference to either species names or to specimens (*Narthecium, Methonica, Imperialis, Basilaea, Watsonia, Bipinnula, Quinchalium, Lagetta, Nyctago*). Thus twenty out of twenty-three names require "neotypification" under Art. 10.2, overriding in eleven cases possible lectotypification on historically authentic specimens. A strange contrast to Art. 7.4!

It can also be noted that a generic name validly published in a protologue without reference to a species name and never adopted subsequently by another author is, without conservation, incapable

of typification under Art. 10, and consequently (Principle II) incapable of correct application. Such names certainly exist.

Thus it is shown that the clarification (so called) to which the Sydney Congress subjected Article 10 has not been a clarification at all. It has instead left us with a new complex of ambiguities and contradictions. Even if its basic methodological guideline (generic names with type specimens) is accepted the new article botches the method and fails utterly to deal with the resolution of the complex problems (*Pseudolarix* etc) which caused the earlier text to be scrutinised, beyond laying down a rather mechanical procedure without indicating potentially preferable alternatives. It leaves all complex problems to be dealt with by nomenclatural conservation, which was equally possible under the old rule.

What should be done about this debacle? Since the basic change of methodology (generic names with type specimens) was accepted it seems to me now that it would be a waste of time to try to return to the pre-Sydney methodological starting point. Therefore I am obliged to suggest workable improvements to the present defective text. In particular a workable procedure has to be found for typifying validly published generic names validated without any valid species names. It is necessary at this point to reflect on the purpose of nomenclatural typification and how it works.

After twenty-five years of existence the Code incorporated at Cambridge (1930) an important new concept; the "type method." Basically the type method is a procedure for determining the correct application of names on the basis of the taxonomic disposition of particular nomenclatural type specimens with one of which each name is associated permanently. A name is only able to be used correctly for a taxon if that taxon includes the type of the name. A nomenclatural type is not necessarily the most "typical" or "representative" element of a taxon (Art. 7.2) but it does have to be a representative of the taxon as it was circumscribed when the name was first introduced, however much the taxonomic limits may have changed since then. Although theoretically (Principle II) the application of a name is determined by its nomenclatural type actually botanists often apply names erroneously as misidentifications; it is correct application which is determined by the type, not actual application.

Types are not selected so as to suit the convenience of current popular taxonomies, at least not overtly. Rather type selection is to be viewed as an historical investigation of the thought of the author who first introduced the name. The procedure is not supposed to be arbitrary, mechanical or expedient, rather deliberative and orthodox. There is a school of thought which has little concern for historical veracity in typification and which favours sundry mechanical provisions to minimise historical enquiry (e.g., automatic typification of "superfluous" names, priority accorded to lectotypification, readiness to accept early statements about types (i.e., about examples) as proof of holotypification) but this school is plainly out of sympathy with the tenor of research in historical taxonomy. Typification on this basis ultimately leads to making nonsense of taxonomic history and consequently nonsense of nomenclatural history as well.

Although terminology distinguishes them, holotypes, lectotypes and neotypes are functionally identical. The distinction between them is entirely one of the reliability to be accorded to their selection. Selected by the author himself, a holotype ought to be reliable; selected by someone else from the original author's materials, a lectotype is less reliable because a secondary taxonomic judgement intrudes; least reliable is a neotype, based entirely on a secondary taxonomic judgement which may be little more than a guess.

There are three problem areas in Art. 10 as it now stands. These are 1) Definition of "included species." (2) Procedure when there are no included species. (3) Procedure when a "type species" is heterogeneous and the nomenclatural type is not an element of the "natural" genus. These problem areas will be discussed from the perspective of the method of typification just outlined.

Definition of "Included Species"

The "included species" relevant to the typification of a generic name are those included by the author of the generic name and not those of subsequent revisors who may have added to or subtracted from the circumscription of the original author. There is no definition of "included species" in the Code, and the definition in Art. 63.2 of "inclusion of a type" is pertinent only in as much as it gives examples to clarify the technical meaning of "inclusion." The "included species" formerly contemplated in Art. 10.1 and still mentioned under 10.3 are

(a) species named and accepted by the author, without any expression of doubt, under the new generic appellation.

(b) species not named under the new generic appellation, but indicated by citation of synonyms as being definitely assigned to the genus, without any expression of doubt.

Species, whether named under the generic appellation or not, cannot be said to be "included" if their position within the genus is indicated with doubt about their position. Although their new names have to be accepted as valid if in accordance with the rules, these species cannot be considered to be "type species" and typification of the generic name on the type of the name of one of them would clearly be a mistypification.

A lectotype should be selected from the types of the names of included species.

Procedure When There Are No Included Species

When there are no included species identifiable in either category (named or unnamed), a lectotype ought to selected, whenever possible, from cited specimens assigned to the genus by the author, but not to a species. It is unfortunate that this grates against Art. 2 of the Code. When there are neither included species nor included specimens an illustration cited, as a substitute for the specimen(s) on which it was based, ought to be accepted as an eligible lectotype. In the absence of even an illustration lectotypification is impossible and neotypification alone can be used to settle the application of the name.

These principles are expressed in the following proposal.

Proposal (45) Replace Art. 10 in the Sydney Code with the following:

10.1 The type of a name of a genus or of any subdivision of a genus (*) is a specimen or illustration. When included species (10.2) are named in the protologue the type must be selected from among the types of the names of included species. When included species are not named in the protologue (10.3) a cited specimen or illustration must be selected as lectotype. When neither included species nor specimens nor illustrations are named or cited in the protologue a neotype must be selected (10.4).

10.2 "Included species" are those named and accepted by the validating author without any expression of doubt as elements of the genus, whether under the new generic appellation (or infrageneric appellation) or by citation of homotypic synonyms in lieu of recombinations. The types of all such names of included species are considered equally as syntypes. Whether named under the new generic appellation or not, species marked with a sign of doubt as to their position in the genus are ineligible as syntypes.

10.3 When no "included species" are indicated and a cited specimen or illustration is designated as lectotype it must be clear that the specimen (or the specimen on which the illustration was based) was assigned to the genus by the validating author.

10.4 A neotype must be selected from authentic material used in drawing up the protologue, where such material exists, even if the material is not cited in the protologue. A neotype must always be a specimen; it cannot be an illustration. When no original material exists any specimen may be designated as neotype, but such a neotype will be superseded if any original material is rediscovered.

10.5 Notwithstanding Art. 10.1–4 any specimen can be declared typus conservandus for a generic name (Art. 14.10).

10.6 The citation of a name as a nomenclatural type is considered equivalent to the citation of the type of that name.

10.7 The type of a name of a family or of any subdivision of a family (**) is the same as that of the generic name on which it is based (Art. 18.1). The type of a name of a family or subfamily not based on a generic name is the same as that of the corresponding alternative name (Art. 18.5 & 19.7).

10.8 The principle of typification does not apply to names of taxa above the rank of family, except for names that are based on generic names; such names are typified on the type of the generic name on which they are based.

Note. 1. For typification of some names of subdivisions of genera see Art. 22.

Proposal (46) Delete Rec. 10.A.

The present Rec. 10.A is utterly redundant since it only concerns the citation of conserved types listed in Appendix III. As a guide to future editors of Appendix III it does not need to be in the Code.

These proposals accommodate within the new methodology most of the problems which the so called "Committee on Generic Typification" was supposed to resolve, except for one, the most complex, that of the "misapplied type species name." This problem is the one which arises when a generic name is typified under Art. 10.1–2 on the type of the name of an included species and that type specimen turns out to belong in another genus; a worm in the apple. The Sydney Code attempts to cope with this by ruling that the application of the generic name is determined by the worm (forced misapplication) unless Art. 10.3 is invoked to designate "a specimen used by the author in the preparation of the protologue" as typus conservandus, superseding the other. The classic and much discussed case is that of *Pseudolarix*. Under the Sydney Code the correct application of the name *Pseudolarix* is determined by the type of the name *Pseudolarix kaempferi* (Lambert) Gordon, unless Art. 10.3 is successfully invoked to typify the name *Pseudolarix* on a specimen used by Gordon.

Hara and Brummitt (1980) selected as "lectotype" of *Pinus kaempferi* Lambert ≡ *Pseudolarix kaempferi* (Lambert) Gordon "Larix Kara Matz nomi . . . Am. 883," pl. ccxviii in Kaempfer's MS drawings "Delineatio Plantarum Japonicarum manu Engelbert Kaempferi" in Bibliotheca Sloaniana Min. 139, Catalogue no. 2914xxviG, but since they admit that "It seems unlikely that this is the drawing directly referred to by Lambert . . ." it should perhaps have been designated as a neotype (cf. Art. 7.5, 7.8). It did not comprise part of the original material of *P. kaempferi* as circumscribed by Lambert, and indeed it is questionable that it is, strictly "material" of any species. This "neotype illustration" stands, under the Code as the "neotype" of *Pseudolarix,* despite the fact that neither Lambert nor Gordon saw it. This is, of course, absurd. Under Art. 10.2 if it can be shown that this selected type is not conspecific with any of the material associated with the protologue then the typification is "to be superseded." That is, the Code requires the rejection of the choice made by Hara and Brummitt. If there was another "included species" the type of its name would supersede that of the name *P. kaempferi* as the type of the name *Pseudolarix*. Since *Pseudolarix* was monotypic when published this cannot happen, so the effect is that the Code orders designation of a typus conservandus under Art. 10.3, for there is no other way that the name *Pseudolarix* can legally be typified. McNeill (1981, p. 462) in discussing the effect of what is now Art. 10.3 on *Pseudolarix* did not foresee this. Neither did Wilbur (1981, p. 455).

Hara and Yü (1983, pp. 485–487) have now proposed to conserve *Pseudolarix* with LT.: "Cult. in England, Herb. Gordon s.n. (K-0003455) [=*P. amabilis* (J. Nelson) A. Rehder (*Larix amabilis* J. Nelson)" using Art. 10.3, as the Code required someone to do. As long as this specimen is NOT the type of a name of a species their action is legal. Certainly it is satisfactory. It is a pity that commonsense can only be arrived at by nomenclatural conservation. It should be noted in passing however that the name *P. amabilis* itself is supposed to be an illegitimate (because superfluous) substitute for the name *P. kaempferi*. This still leaves the golden larch without a legitimate specific name. It appears that a nomen specificum novum is necessary.

According to McNeill (letter to Parkinson 14/12/81) the last sentence of 10.2 (then 10.3) was "entirely dependent on Art. 10.1 and not alternative to it." It therefore applies to both the first sentence and the second of 10.2, and is not meant to be read only in conjunction with the second sentence, as it might seem (the syntax is ambiguous).

After much thought about the *Pseudolarix* problem and others like it, I have reached the conclusion that the Code would be better to cope with the matter by means of a recommendation to explain the appropriate procedure to resolve a "misapplied type species name" problem, rather than to compel a particular solution in all cases by means of an article. I therefore propose the following new Rec. 10.A.

Proposal (47) Add new Recommendation 10.A:

"10.A.1 If the type of a generic name selected under Art. 10 is the type of the name of an included species (10.2) and it is found that the specimen is not conspecific with the remaining elements of the "included species" which includes *it* (so-called "misapplied type species name"), a revisor should choose the best of the following options for resolving the problem.

1) If there are other named included species, relectotypify the generic name on the type of one of these names, conserving the type under Art. 14.10 if this seems appropriate to end dispute, or
2) If there are no other named included species propose a specimen as typus conservandus under Art. 10.5, or
3) Propose as typus conservandus the type of a name of a species which although not included in the

genus by the original author, does fit both his original concept and the current taxonomic interpretation of the genus, or

4) Allow the generic name, mistypified on the type of the misapplied type species name, to pass into synonymy, and adopt another existing name in place of it, or propose a new name, It may be necessary to conserve a later synonym against the mistypified generic name if (as misapplied) it has no earlier synonyms."

In the case of the generic name *Chaetangium* Kützing, 1843 (typified on the type of the name of the sole included species *Ch. ornatum* (L.) Kützing under the Sydney Code Art. 10.2) which, as discussed elsewhere (Parkinson, 1980, pp. 18–20) turns out to be a priorable synonym of *Suhria* J. Agardh ex Endlicher, 1843, these options work as follows.

1) There are no other names of included species given by Kützing, so this option is not available in this case.
2) A specimen ("Cap. Drege Lucae!") cited by Kützing in the protologue of *Chaetangium* could be designated as typus conservandus. This allows retention of *Chaetangium* in its long established sense. The type specimen will be assigned to what should be known as *Chaetangium erinaceum* (Turn.) Papenfuss.
3) The type of the name *Chaetangium erinaceum* (Turn.) Papenfuss, which was implicitly included in *Chaetangium* by Kützing could be proposed as typus conservandus.
4) *Chaetangium* can be allowed to remain mistypified on the type of the name *Chaetangium ornatum* and so to pass into synonymy with *Suhria* J. Agardh ex Endlicher, 1843 which would need to be conserved against *Chaetangium,* which by unhappy chance has a few days priority over it. The next name for what is presently called *Chaetangium* is *Nothogenia* Montagne, 1843 which I have elsewhere adopted to replace *Chaetangium.* In my view, elsewhere explained (Parkinson, 1983) it will be most convenient for phycologists to abandon the name *Chaetangium* altogether; its retention seems likely to lead to further misunderstandings even if the name is conserved with a type matching its established application. It is also desirable to avoid the years of uncertainty associated with any attempt at conservation.

Another interesting case which has come to my attention is that of *Bifurcaria. Bifurcaria* Stackhouse, Mém. Soc. Imp. Nat. Moscou 2: 59, 90 (1809) is automatically typified on the type of the name (*Bifurcaria tuberculata*) of the sole included species. The typification of the name *Bifurcaria tuberculata* has been problematic, but the intended (and actual) application of the name to a brown alga of the family Cystoseiraceae has never been in doubt. The name *Bifurcaria tuberculata* has been applied to this alga, the only species in its genus, for many years. The circumscription of *B. tuberculata* given by Stackhouse includes "Ray Syn. 43 no. 13" which is Ray's *Fucus kali geniculato similis, non tamen geniculatus,* first given a Latin binomial by Hudson (1762, p. 471) as *Fucus rotundus* Hudson, and typified on a Ray specimen (no. 1906, in the Sherardian Herbarium at Oxford), illustrated by Drew (1958, pl. 61). In the second edition of his Flora Anglica, Hudson (1778) dropped the name *Fucus rotundus* and replaced it with the superfluous substitute name *Fucus tuberculatus* Hudson, 1778 (non *F. tuberculatus* Lightfoot, 1777) which is automatically typified on the type of *Fucus rotundus.* This substitute name was the "basionym" for the name adopted by Stackhouse but since the "basionym" is illegitimate (Art. 64, 63) the author citation omits mention of Hudson, so that we have *Bifurcaria tuberculata* Stackhouse, automatically typified on the Ray specimen and itself a superfluous name for what ought to have been called *Bifurcaria rotunda* (*Fucus rotundus* Hudson ≡ *Bifurcaria rotunda* (Huds.) Papenfuss, 1950).

Unfortunately the type of *Fucus rotundus* Hudson, which typifies the name *Bifurcaria* under the Sydney Code, is not a plant assigned to the Cystoseiraceae in the Phaeophyta but rather a representative of what is usually called *Polyides rotundus* (Polyidaceae, Rhodophyta)! Under the Sydney Code, unless conservation intervenes, the red alga ought to be known as *Bifurcaria rotunda.* (Ironically when Papenfuss (1950) adopted this name he applied it to the brown alga!) This red alga must then be placed in a family for which no valid and legitimate name exists. There are two valid family names (Polyidaceae Kylin nom. cons. prop., and Spongiocarpaceae Greville) but both are illegitimate (Art. 18.3) being based on illegitimate generic names (*Polyides, Spongiocarpus,* both superfluous substitutes for *Bifurcaria*). This solution leaves the brown alga with a family name (Cystoseiraceae) but without either a generic name or a usable specific epithet. Applying the Code in this manner would be intolerable

so a way must be sought, through conservation, to seek retention of the name *Bifurcaria* for the brown alga and *Polyides* for the red alga. Can this be done under the Sydney Code, by the use of Art. 10.3?

Under 10.2 *Bifurcaria* is typified on Sherardian herbarium no. 1906 but "Such a typification is to be superseded if it can be demonstrated that the selected type is not conspecific with any of the material associated with the protologue." The "material" associated with the protologue explicitly includes a reference to the Ray type specimen, but although this is clearly a worm in the apple all the other "materials" cited are figures of the brown alga so Art. 10.2 cannot operate to set aside the Ray type in favour of something else, despite the instruction.

Under 10.3 "By conservation the type of [*Bifurcaria*] can be a specimen used by [Stackhouse] in the preparation of the protologue other than the type of a name of an included species." Unfortunately the protologue gives no indication of any such specimen and it is quite likely that Stackhouse based the protologue entirely on the accounts and figures of other authors. Illustrations are not "specimens used by the author" and cannot therefore supersede Sherardian herb. no. 1906 as typus conservandus of *Bifurcaria*. Unless by luck a Stackhouse specimen survives in one of the extant fragments of his herbarium and can be proved to have been used by him in the preparation of the protologue, Art. 10.3 cannot be used to preserve the name *Bifurcaria* in its current application.

Under the new Recommendation 10.A the four options work out as follows. Options 1 and 2 cannot operate. Option 3 cannot yet operate as there is no validly published species name for the brown alga which is not automatically mistypified on the type of *Fucus rotundus*. However the description of the brown alga as *Bifurcaria something* nova species (which will be necessary anyway) would supply such a name, and the type of this name could then be designated typus conservandus of the name *Bifurcaria*; this would stabilise usage in the manner desired. [Were I to propose such a name now it would be invalid as a provisional name, proposed in anticipation of the acceptance of the proposal (Art. 34).] This leaves the red alga as *Polyides rotundus*, under which name it has been known since 1830. Under option 4 a new name is needed for the brown alga both at the generic level and at epithet level; there are no existing names which can be taken up for it. The later synonym *Polyides* would have to be conserved against the name *Bifurcaria*, in order to preserve the current name of the red alga. In my opinion the third option is the best of these.

The examples given by McNeill (1981b) are insufficiently complete for me to indicate how options 1–4 of the proposed Recommendation 10.A would work. However the examples used by Wilbur (1981) can be considered in this way.

Diamorpha

As *Diamorpha* was monotypic the first option does not work. The second option is workable (typification of *Diamorpha* on a Nuttall specimen as typus conservandus). The earliest valid name for the taxon including this specimen is *D. smallii* Britton. Under the third option the type of the name *D. smallii* Britton could be designated as typus conservandus of *Diamorpha*. Under the fourth option the name *Diamorpha* is lost and new names are required. Of these options 2 and 3 look acceptable in that they stabilise the usage of the name *Diamorpha* in the manner desired.

Leucaena

The first option works, declaring *L. diversifolia* (Schlecht.) Bentham as typus conservandus of *Leucaena*, in accordance with the lectotypification already carried out by Williams. The second option does not work in this case. The third option would work by making the type of the name *Leucaena leucophylla* (Lam.) de Wit the typus conservandus of the name *Leucaena*. I do not have sufficient information on the result of applying the fourth option. Wilbur (1981, p. 453) states "It must be admitted that either no harm or only minimal damage would be done to our nomenclatural principles if Williams's (1964) proposal to lectotypify the genus [name] *Leucaena* were to be adopted." The first option therefore appears to be the best one in this case.

Odontonema

The genus was monotypic and consequently option one does not work. The second option does not work because the validating author (Endlicher) had no specimens. Evidently *Odontonema* was intended to be based on the taxon correctly called *O. rubrum* (Vahl) Kuntze, so the type of that name (≡*Justicia rubra* Vahl) could be designated typus conservandus of *Odontonema*, under the third option. Not enough information is available to show the result of the fourth option, although it is not likely to be favoured. The third option will preserve established usage.

Picrodendron

The genus was monotypic so the first option does not work. The second option works by designating as typus conservandus of *Picrodendron* the authentic MacFadyen specimen of *Picrodendron* cited by Planchon and now at K (=*P. baccata* (L.) Krug & Urban). The third option, typifying *Picrodendron* on the type of the name *P. baccatum* has the same result, although the name *P. baccatum* is typified on a Sloane illustration and Planchon did not refer to this. Again, not enough information on the fourth option is available, but it is unlikely to find favour anyway. In this case the second option seems the best one.

Pseudolarix

The genus was monotypic so the first option is not available. The second works, by making a specimen used by Gordon into the typus conservandus of the name *Pseudolarix*. As was the case with *Bifurcaria*, a new species name (basionym) would be needed, since the name which might be thought available (*P. amabilis*) is supposed to be illegitimate as a superfluous substitute for *P. kaempferi* (see McNeill, 1981b, p. 462). [This is essentially the position of the Hara and Yü and this proposal.] Option three does not work until the new species name is proposed for the golden larch. When this has happened the type of this name can be designated typus conservandus of the name *Pseudolarix*. Option four will not work in this case as there are no available synonyms which can replace the name *Pseudolarix*. (*Chrysolarix* falls into synonymy with *Pseudolarix*.) The best solution in this case is probably the third option, so contrived that the new species description of the golden larch, under the name *Pseudolarix something* nova species is based on a Gordon specimen in part and the new name is holotypified on that specimen. This leaves the name *Pseudolarix* typified on the type of the name of the sole included species of *Pseudolarix*; an historically correct and satisfying resolution which everyone will be able to understand.

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