Nomenclatural status of names of tetraodontiform fishes based on Bibron's unpublished work

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Kottelat M. 2001. — Nomenclatural status of names of tetraodontiform fishes based on Bibron's unpublished work. *Zoosystema* 23 (3) : 605-618.

ABSTRACT
The nomenclatural status of names proposed for tetraodontiform fishes in a paper by A. Duméril summarising an unpublished work by Bibron is reviewed. Although not latinised, 13 generic names (*Chilomyctere*, *Stenometope*, *Dichotomyctere*, *Promecocephale*, *Dilobomyctere*, *Amblyrhynchote*, *Geneion*, *Catophorhynque*, *Batrachops*, *Monotrete*, *Ephippion*, *Xenoptere*, *Rhynchote*) and six specific names (*Tetraodon longicauda*, *T. rueppelii*, *T. maculatum*, *Ephippion maculatum*, *Xenoptere bellangerii*, *T. peronii*) are made available by Duméril (1855). The use of latinised versions of the same names by Troschel (1856) and Hollard (1857) are subsequent incorrect spellings. Differences between the definition of "vernacular name" in the English and French Glossaries of the *International Code of Zoological Nomenclature* are noted. The identity of the type species of *Lagocephalus* Swainson, 1839 is discussed, and it is concluded that *L. stellatus* Swainson, 1839 is a junior subjective synonym of *T. lagocephalus* Linnaeus, 1758, Swainson's reference to plate 143 of Bloch (1785) being a lapsus for plate 140.

KEY WORDS
Pisces,
Tetraodontiformes,
Tetraodontidae,
Diodontidae.

RÉSUMÉ

Statut nomenclatural des noms de poissons tétraodontiformes basés sur le travail inédit de Bibron.

Le statut nomenclatural des noms proposés pour des poissons tétraodontiformes dans un article de A. Duméril résumant un travail inédit de Bibron est discuté. Bien que non latinisés, 13 noms génériques (*Chilomyctere*, *Stenometope*, *Dichotomyctere*, *Promecocephale*, *Dilobomyctere*, *Amblyrhynchote*, *Geneion*, *Catophorhynque*, *Batrachops*, *Monotrete*, *Ephippion*, *Xenoptere*, *Rhynchote*) et six noms spécifiques (*Tetraodon longicauda*, *T. rueppelii*, *T. maculatum*, *Ephippion maculatum*, *Xenoptere bellangerii*, *T. peronii*) sont rendus disponibles par Duméril (1855). L'usage de versions latinisées de ces mêmes noms par Troschel (1856) et Hollard (1857) sont des orthographes subséquentes incorrectes. Des différences entre les définitions de « nom vernaculaire » dans les Glossaires anglais et français du *Code international de Nomenclature zoologique* sont signalées. L'identité de l'espèce type de *Lagocephalus* Swainson, 1839 est discutée et il en est conclu que *L. stellatus* Swainson, 1839 est un synonyme subjectif junior de *T. lagocephalus* Linnaeus, 1758, la référence de Swainson à la planche 143 de Bloch (1785) étant un lapsus pour la planche 140.

MOTS CLÉS
Pisces,
Tetraodontiformes,
Tetraodontidae,
Diodontidae.

INTRODUCTION

The stability of zoological nomenclature is *in fine* the reason for having an *International Code of Zoological Nomenclature* (hereunder, the *Code*; International Commission on Zoological Nomenclature 1999). But, repeatedly, nomenclatural "earthquakes" shake large numbers of stable or "stable-like" names. Some of these changes could possibly be avoided (for example those affecting effectively used names and resulting from modifications of the *Code*). Other changes in "stable-like" groups simply reflect the fact that nomenclatural issues have not been addressed properly before.

At a time when some are dreaming of "official" lists of valid species (not to be confused with the List of Available Names in Zoology which just creeped into the *Code* [art. 79]), it is worth giving some thoughts at the use of lists and their contents. Having written quite a number of lists (e.g., Kottelat 1989, 1997), I believe that I know some of the problems encountered during this exercise, as well as the limitation of the use and usefulness of lists. A list is *never* authoritative, there are always errors, from the most subtle to the most trivial. A significant source of errors is that often it takes years to compile a list and that an individual's perception of a type of problem evolves with time, and the same problem encountered at the beginning of the work could have been perceived very differently if dealt with at the end. While most users tend to perceive lists as final words, their authors usually know that lists are working documents and that there will always be something to add or modify.

It may appear as a truism, but for a list to exist, somebody has to compile it and to assume responsibility for its content. The content of the list also has to be accepted by knowledgeable pairs (I am not talking of a democratic process; science is supposed to seek for the "truth", not for a democratic, oecumenic or parsimonious lie). Here we have a dilemma: in theory, to compile a reliable and robust list one would seek the involvement of all possible specialists. In the real world, this usually does not work and after years such project disappears into nothingness. The reality is that most lists which can be considered as benchmarks in the history of their fields result

from the work of a few persons or of isolated individuals.

Large lists usually involve such an amount of work that other workers prefer to rely on them without checking the details. An error introduced in a list is repeated for years and when corrected, there is a tendency to reject the correction. Ichthyology witnessed this 130 years ago with Günther's *Catalogue of Fishes* (1859-1870) and is now ready to witness it again with the publication of Eschmeyer's (1998) *Catalog of Fishes*. As an editor, when pointing nomenclatural problems to authors, I am already receiving answers like "but I cannot change, this is the name in the catalogue". Systematists are expected not to simply copy data but to check them. Dubois (1987a, b) gives additional examples of problems associated with lists.

This introduction is to explain that the following discussion is not a negative judgement of Eschmeyer's catalogue, even if I disagree with it on several points (as of January 2001, I have checked 5750 nominal species of Asian freshwater and marine fishes and found omissions, errors or disagreement for 2077 [36%] of them). It is a characteristic of such discussions that points of disagreement are discussed in full while the numerous points of agreement are never mentioned. But it seems useful that these comments be kept in mind as an example of the severe limitations of lists in general. Lists are tools to work with, to start with; they are not the truth, they are not the final word.

In the following discussion, years written in bold denote work or data which I have not checked myself because they are not directly relevant to the argument. For these works, authorship and date of publications of names are taken from Eschmeyer (1998). For bibliographic purposes (and that is the *only* reason of citing authors of names; see also Ng 1994) author's names are spelled as they appear on the printed work; hence my use of the spellings La Cepède and Lacépède as these are the spellings appearing on the works referred to here. The change of status of the names made available by Duméril discussed below does not affect the validity of other names used in zoology; all have been checked in *Nomenclator Zoologicus* (Neave 1939-1950; Edwards & Hopwood 1966; Edwards & Vevers 1975).

TETRAODONTIFORM NAMES USED IN BIBRON'S WORK

Pufferfishes have long attracted attention. They are among the few tropical fishes mentioned and figured in the literature of the very early days of the natural history literature and were brought home and sold as curiosities by sailors. This partly explains their complex and confused nomenclature, especially at the genus level, and the plethora of names.

While checking the nomenclature of generic names of some freshwater pufferfishes, I came across several names inconsistently attributed to Bibron, Duméril, Troschel or Hollard, with a variety of spellings, and variously dated between 1855 and 1857. Even within the same work, these names are treated with inconsistency. For example, Eschmeyer (1990: 427; 1998: 2169) stated that *Xenopterus* first appeared as a non-latinised name (xénoptère) used by Bibron (*in* Duméril 1855: 281), subsequently latinised as *Xenopterus* by Troschel (1856: 88) and Hollard (1857: 319). Eschmeyer also lists the type species as "*Xenopterus [sic] bellengeri* Bibron *in* Duméril 1855: 281" ("[sic]" appears in the original text) and "addition of species not researched; type as given by Jordan 1919: 263". Eschmeyer treats several other Bibron's names (e.g., Sténométope, Epipédorhynque) the same way, but others (e.g., *Batrachops*) are treated as available. *Ephippion* is listed as "treated as latinized when appeared as above. *E. maculatum* Bibron apparently never published in an available way". This and other inconsistencies in the treatment of Bibron's names by various authors prompted me to re-examine these names.

Gabriel Bibron (1806-1848; see C. Duméril 1849 for a biography) is mainly known for his works on reptiles and amphibians, but he also authored two ichthyological contributions. In his

last years, he worked at a monograph of Tetraodontiformes, but he could only spend for this research the spare time left by his herpetological work (A. Duméril 1855). When Bibron died, the systematics of Diodontidae was completed (which probably explains the use of *Chilomycterus* by Brisout de Barneville 1846) and most species of Tetraodontidae were described or at least named. A. Duméril (1855) deposited the manuscript in the Library of the Muséum national d'Histoire naturelle in Paris and published a summary and extracts of it. Among others, the text includes diagnoses of 17 genera. Duméril (or Bibron) interchangeably used the wordings "genres" (genera) and "groupes naturels" (natural groups); this is explicit on p. 277: "Toutes les espèces […] ont […] été réparties en groupes naturels ou genres" [= All the species have been distributed in natural groups or genera]. In fact, the new genera are listed by Duméril in a way which is somewhat similar to our present way of treating subgenera (see p. 280, his treatment of *T*[*etraodon*] *G*[*eneion*] *maculatum*), and many (not all) new species in these genera are listed as new species of *Diodon* and *Tetraodon*. For each (sub)genus, the text is very consistently organised in the following way:
Rank number. Generic name in italics, preceded by the abbreviation "G." [genus], followed by a comma and Bib. [Bibron], then, in parentheses, the etymology of the name. Diagnosis extracted from Bibron's manuscript, in quotation marks. A next paragraph lists the included species, often explicitly indicated as "Espèce unique" [= only known species]. This second paragraph has no quotation marks, indicating that Duméril wrote it. Exceptions are the two genera of Diodontidae for which the text is less formalised, and four genera of Tetraodontidae for which there is only the etymology and no diagnosis. Duméril noted (p. 278) that Bibron had not (yet?) written the diagnoses for these four genera. Two examples:

7° G. *Batrachops*, Bib. (βατρακοσ, grenouille, ϖψ, apparence). "Narines en forme de tube clos au sommet, mais percé latéralement de deux ouvertures opposées. – Museau court. – Epiptère et hypoptère arrondies, opposées ; uroptère à bord terminal presque rectiligne".
Espèce unique: *T. psittacus*, Schn. (*Ostracion tetraodon*, Séba).

8° G. *Monotrète*, Bib. (μονοσ, seul, τρητοσ, troué, percé). "Narines n'ayant chacune qu'une seule ouverture circulaire à bord non saillant. – Point d'épine sur aucune partie du corps, qui est complètement lisse. – Nageoires impaires arrondies ; épiptère et hypoptère courtes".
Espèce unique: *T. cutcutia*, Ham. (Buchanan).

Does the account of *Monotrète* differ from that of *Batrachops* in a way that would make it unavailable? One has an ending which looks similar to a latinised Greek ending (it indeed is) and the other has an ending which does not look too much Latin or Greek, but somewhat more French and in addition it has an accent. Does this suffice to make most of Bibron's name unavailable? Accents have been commonly used by a variety of authors and this does not make a name unavailable; art. 32.5.2.1 of the *Code* has simple provisions on how to handle accents and other diacritic marks: deletion.
As for the criterion of latinisation, it is nowhere required by the *Code*. On the contrary, art. 11.3 and the appended examples very explicitly permit the use of non-Latin words.
Art. 11.3. "**Derivation.** Providing it meets the requirements of this Chapter, a name may be a word in or derived from Latin, Greek or any other language (even one with no alphabet), or be formed from such a word. It may be an arbitrary combination of letters providing this is formed to be used as a word".
Monotrète is spelled in Latin letters, in italics, is used as a scientific name by Duméril when published, it is not Latin or latinised but this is not forbidden (the *Code* explicitly says "may"), it is in a language which uses the Latin alphabet, if one absolutely wishes one may even think it is an arbitrary combination of letters, etc. Que demande le peuple ? *Monotrète* clearly and unambiguously is available from Duméril (1855); it merely needs to be emended by deletion of the accent into *Monotrete*.

The *Code*, after arts 11.3 and 30.2.1, lists examples of available names, among them *Pfrille*, a German word for the minnow. Other such words used as generic names abound in ichthyology: *Sander* Oken, 1817, *Zingel* Cloquet, 1817, *Rasbora* Hamilton, 1822, *Colisa* Hamilton, 1822, *Bangana* Hamilton, 1822, *Pirarara* Agassiz *in* Spix & Agassiz, 1829, *Pacu* Agassiz *in* Spix & Agassiz, 1829, *Abudefduf* Fors[s]kål, 1777, *Clarias* Scopoli, 1777, *Fugu* Abe, 1952, to cite only the first 10 which come to mind and there are hundreds of them used as valid species-group names.

One point requires discussion: are these names scientific names or vernacular names? The *Code* defines (Glossary, p. 109) a scientific name as "a name that conforms to Article 1, as opposed to a vernacular name". And a vernacular name (p. 110) is "a name of an animal or animals in a language used for general purposes as opposed to a name proposed only for zoological nomenclature".

Art. 1 includes a definition of zoological nomenclature and of animals that can be named, and a list of categories of names excluded from the provisions of the *Code*. These categories are hypothetical concepts, teratological specimens, hybrid specimens, infrasubspecific entities, works of animals, names modified by standard prefixes, and names proposed as a mean "of temporary reference and not for formal taxonomic use as scientific names in zoological nomenclature". The names proposed by Bibron belong to none of these excluded categories. They were proposed for formal taxonomic use as scientific names in zoological nomenclature, so they are scientific names. As for all other scientific names in the same work, they are italicised and the author's name is listed, and two of the new generic names are used in combination with latinized species names (*T*[*etraodon*]. *(*G[*eneion*]) *maculatum*, *X*[*enoptere*] *bellangerii*).

Bibron's names are not vernacular names because these are not names in common use in French (contrary to *Pfrille* and *Zingel* in German, *Fugu* in Japanese, etc.), but names specifically created for these fishes by Bibron. To my knowledge, these names have never been used in vernacular French before or after Bibron's work. A reviewer commented that French authors of that epoch would normally not have proposed new scientific names which would not be latinised, a point on which I partly disagree as Duméril's (1856) contemporary *Ichthyologie analytique* is an example of the contrary. Duméril consistently used gallicised versions of latinised names of earlier authors, printed in a different font (italics or capitals); these names are, case by case, incorrect subsequent spellings or unjustified emendations. A few new names are proposed and they are not latinised; they nevertheless are new names proposed in the context of zoological nomenclature and are available.

I note that the definition of vernacular name in the English Glossary is ambiguous as it opposes names "in a language used for general purposes" to names "proposed only for zoological nomenclature". The definition in the French Glossary (p. 246, nom vernaculaire) is not equivalent to the one in the English Glossary as it translates as opposing names "used (in a language) with a general meaning" [= utilisés dans une langue avec une acception générale] to names "proposed in the context of zoological nomenclature" [= proposés dans le cadre de la nomenclature zoologique]. Some French-English dictionaries translate the French "acception" into the English acceptation, but this is not correct. "Acception" is the particular meaning in which a word is used (Willerval 1988); a given word may have several "acceptions" and the meaning then depends of the context. The English "acceptation" is the accepted meaning of a word (Hanks 1988); one or more of the "acceptions" of a word may possibly not be part of its acceptation.

With the definition in the English Glossary, one could come to the aberrant conclusion that all names "used for general purposes" in a language are vernacular names (thus all the *Pfrille*, *Fugu,* etc.) (this assumes that the definition means a name "used for general purposes" and not a language "used for general purposes"; this ambiguity does not exist with the definition in the French Glossary, as the use of "acception" refers to the

name, not to the language. If scientific names have to be "proposed only for zoological nomenclature" a large number of names proposed in the 18th century cannot be considered as scientific names as they were classical Latin or Greek names not "proposed only" for zoological nomenclature (e.g., *Canis, Equus*, *Homo*, *Salmo*, *Acipenser*, *Cobitis*). With the definition in the French Glossary, the case is clearer: a scientific name does not have to be "proposed only" for zoological nomenclature but "proposed in the context of" zoological nomenclature (Bibron's names clearly belong to this category) and a vernacular name must be a name used in a language and with a general meaning (Bibron's names are not used in French and do not have a "acception générale", therefore they are not vernacular names).

To conclude this long digression, I cannot refrain from ironically quoting Art. 87: "The Commission may authorize the publication of the *Code* in any language and under such conditions as it may decide. All such authorized texts are official and are equivalent in force, meaning and authority to the English and French texts". This is opening the door to more linguistic and semantic problems and in no way contributes to the pretence of stability claimed in the Preamble of the *Code*.

AUTHORSHIP

Duméril (1855) clearly states that his note is based on Bibron's manuscript and in most instances he provides diagnoses in quotations marks from Bibron's text. Thus authorship of the names should be attributed to Bibron *in* Duméril (1855). The only exception are *Stenometope* and *Dichotomyctere* (see below). The lists of included species are not within quotation marks and possibly authored by Duméril, although probably compiled or copied from Bibron's manuscript. When a type species is fixed by monotypy, technically Duméril is the author of the type species fixation. As the availability of the name (authored by Bibron *in* Duméril) and the fixation of the type species (by Duméril) are simultaneous, I have not distinguished the two acts (the only exception concerns *Dichotomyctere* [see below] which is available only because of the inclusion of an available species-group name). As pointed by one reviewer, one might consider that what I treat as type species fixation by monotypy in fact is a sort of subsequent monotypy. It is effectively subsequent if one considers the time the two acts were written, but the two acts are published simultaneously in Duméril (1855) and I do not see an advantage or a reason to distinguish the two acts. The *Code* (art. 67.4) qualifies a type fixation as subsequent only if the type is fixed after the genus is established.

GRAMMATICAL GENDERS

The generic names which have a classical latinised Greek ending, take the classical endings; thus *Geneion* and *Ephippion* are neuter (art. 30.1.2) and *Batrachops* is masculine (art. 30.1.4.3). For the other names, the situation is more complex. Art. 30 rules how the grammatical gender of genus-group names is determined. It distinguishes two cases and the headings are: "30.1. Gender of names formed from Latin or Greek words" and "30.2. Gender of names formed from words that are neither Latin nor Greek". The names proposed by Bibron are formed from Latin or Greek words and therefore the fixation of their gender should be directed by art. 30.1. But the content of all sections of this article applying to Greek words explicitly refers to Greek words "transliterated into Latin without other changes" (art. 30.1.2) or "latinized with change of ending" (art. 30.1.3). The *Code* does not expect the case of Greek words which are gallicised, anglicised or adapted to any other modern language.

Art. 30.2 does not apply ("Gender of names formed from words that are neither Latin nor Greek") as Bibron's names are Greek words with gallicised endings. Articles 30.2.1 ("a name reproduces exactly a noun having a gender in a modern European language") and 30.2.2 ("name […] not

formed from a Latin or Greek word") do not apply. Arts 30.2.3 and 30.2.4 could apply (if it were not that the heading of art. 30.2 excludes Bibron's names) and I tentatively apply them here. Under art. 30.2.3, the grammatical gender can be inferred from the gender of adjectival species-group names of the originally included nominal species but this applies for none of the genera of concern here because, as mentioned above, Duméril listed their member species as species of *Tetraodon*, thus with the grammatical gender of *Tetraodon* and not of the new genera. Where he used the names as genera, the associated species-group names have uninformative endings. Under art. 30.2.4, all genera other than *Geneion*, *Ephippion* and *Batrachops* are masculine.

NOMENCLATURAL STATUS OF INDIVIDUAL NEW TAXA PROPOSED BY BIBRON

Diodon dussumieri Bibron *in* Duméril, 1855: 278 (*nomen nudum*)

Chilomyctere Bibron *in* Duméril, 1855: 278.

Spelled *Chilomyctère*. Accompanied by a diagnosis, thus available. A single included species, *Diodon reticulatus* Linnaeus, 1758, which is also type species by original designation by Duméril. Gender: masculine.
Chilomycterus Troschel, 1856: 88 is an unjustified emendation. The name *Chilomycterus* is already available from Brisout de Barneville (1846: 140) with the same type species.

Stenometope Duméril, 1855: 278

Spelled *Sténométope*. Duméril lists *Stenometope* under the genera for which Bibron had written the etymology but no diagnosis (see under *Aphanacanthe*, below). After listing the etymology (narrow forehead), Duméril commented "en effet, remarquables par le peu de largeur de l'espace compris entre les régions oculaires" [= effectively, noteworthy by the limited width of the space between the ocular areas]. This constitutes a diagnosis making the name available and as Duméril authored this diagnosis, he is author of the name. Eleven included species: *Tetraodon testudineus* Linnaeus, 1758, *T. spengleri* Bloch, 1785, *T. plumerii* Schneider, 1801, *T. marmoratus* Lowe, **1838**, *T. angusticeps* Jenyns, **1842**, *T. laevissimus* Bibron *in* Duméril, 1855 (*nomen nudum* [listed as available from Cuvier 1829: 368, by Eschmeyer 1998: 863, but in fact a *nomen nudum* in Cuvier too; Cuvier lists the species as authored by "Bl., Schn". [Bloch *in* Schneider 1801], but I did not find this name in Schneider 1801]), *T. kieneri* Bibron *in* Duméril, 1855 (*nomen nudum*), *T. binummulatus* Bibron *in* Duméril, 1855 (*nomen nudum*), *T. bernierii* Bibron *in* Duméril, 1855 (*nomen nudum*), *T. subflavus* Bibron *in* Duméril, 1855 (*nomen nudum*), *T. pleei* Bibron *in* Duméril, 1855 (*nomen nudum*). Type species: *T. testudineus* Linnaeus, 1758, designated by Jordan & Snyder (1901: 232). Gender: masculine.
Stenometopus [as spelled by Troschel 1856: 88] and *Stenometopus* [as spelled by Hollard 1857: 319] are incorrect subsequent spellings.

Aphanacanthe Bibron *in* Duméril, 1855: 279 (*nomen nudum*)

For this and three other names, Duméril (p. 278) explicitly stated that Bibron provided no diagnosis but only a name. The etymology of the names is indicated, but formally, there is no explicit statement that these etymologies describe particular characters of the species (common sense suggests they do, but there is no room for common sense in formal nomenclatural arguments). The only included species-group name is a *nomen nudum*. Thus there is neither description nor indication and *Aphanacanthe* is a *nomen nudum*. Included species: *Tetraodon reticulatus* Bibron *in* Duméril, 1855 (*nomen nudum*).
Aphanacanthus Troschel, 1856: 88 and *Aphanacanthus* Hollard, 1857: 319 are *nomina nuda*. *Aphanacanthus* is made available by Le

Danois (1959: 174); its type species is *Tetrodon hamiltonii* Richardson, **1846**, designated p. 183 by the mention of 16 specimens, including those examined by Bibron, identified by the museum name *A. reticulatus* and which Le Danois considered as "used as type by Bibron, for the species and the genus". As these "types" are unambiguously identified by Le Danois as belonging to her *Aphanacanthus hamiltoni*, this makes *T. hamiltoni* type species of *Aphanacanthus* Le Danois. Unfortunately, Le Danois was either not familiar with nomenclatural practices or had very peculiar nomenclatural concepts, often difficult or impossible to bring in agreement with the *Code*.
These specimens of "*Aphanacanthus reticulatus*" are listed by Le Danois (1962: 469) as the "holotype" consisting of eight specimens [sic] (MNHN B.1576, B.1577, number in each lot not stated) and two "paratypes" (consisting of two specimens in MNHN B.1505 and one in MNHN B.1507). In 1959, she also included in her *A. hamiltoni*, the "type" of *Crayracion marmorata* Castelnau, **1873**; in 1962, she listed four specimens in MNHN B.1506 as the "holotype". These specimens have been examined by Hardy (1983: 10) who identified seven specimens in MNHN B.1576, B.1577 (the identity of the eighth specimen is not mentioned) and the four in MNHN B.1506 as *Tetractenos glaber* (Fréminville, 1813) and MNHN B.1507 as "not conspecific with" the other specimens. We have thus the case of a type species (*T. hamiltoni*) misidentified in the original description of *Aphanacanthus* Le Danois. Hardy (1983) considered *T. hamiltoni* and *T. glaber* as congeneric. Under art. 70.3 of the *Code*, the type species of *Aphanacanthus* is fixed as *Tetraodon hamiltoni* Richardson, **1846**. The type species of *Tetractenos* Hardy, 1983 is *Tetraodon hamiltoni* and therefore *Tetractenos* is a junior objective synonym of *Aphanacanthus.*

Epipedorhynque Bibron *in* Duméril, 1855: 279 (*nomen nudum*)

Spelled *Epipédorhynque*. Only etymology given, no diagnosis, no available species-group name included, thus not available. Three species included: *Tetraodon freycinetii* Bibron *in* Duméril, 1855 (*nomen nudum*), *T. leschenaultii* Bibron *in* Duméril, 1855 (*nomen nudum*), *T. gernaertii* Bibron *in* Duméril, 1855 (*nomen nudum*). *Epipedorhynchus* Troschel, 1856: 88 and *Epipedorhynchus* Hollard, 1857: 319 are *nomina nuda*.

Dichotomyctere Duméril, 1855: 279

Spelled *Dichotomyctère*. Only etymology given, no diagnosis, but available as the single included species-group name is available. Duméril is responsible for the conditions which make the name available (the inclusion of an available species-group name) and is thus author of the name. Type species: *Tetraodon fluviatilis* Hamilton, 1822, by monotypy.
Dichotomycterus [as spelled by Troschel 1856: 88] and *Dichotomycter* [as spelled by Hollard 1857: 319] are incorrect subsequent spellings.

Promecocephale Bibron *in* Duméril, 1855: 279

Spelled *Promécocéphale*. Diagnosis provided, thus an available name. Six included species: *Tetraodon argentatus* (misspelling for *T. argenteus* Lacépède, 1804: 211), *T. lunaris* Bloch *in* Schneider, 1801, *T. spadiceus* Richardson, 1845, *T. laevigatus* Linnaeus, 1766, *T. lagocephalus* sensu Bloch, 1785 (non Linnaeus, 1758), *T. inermis* Temminck & Schlegel, **1850**. Type species: Jordan & Snyder (1901: 232) listed "*argentatus*" as type species, without indicating authorship or bibliographic reference. P. 234, in the synonymy of *Spheroides sceleratus* (Gmelin, **1789**), they list "*Tretrodon* [sic] *argenteus* Lacépède, […] 1804" and "*Tetrodon argentatus* Blyth, […] 185[3]". As *T. argenteus* was originally included by Duméril (misspelled as *T. argentatus*), when listing the type species of *Promecocephale* as *T. argentatus*, Jordan & Snyder are deemed to have cited *T. argenteus* Lacépède, 1804 [*Code*, art. 67.6]. Gender: masculine.

Promecocephalus [as spelled by Troschel 1856: 88] and *Promecocephalus* [as spelled by Hollard 1857: 319] are incorrect subsequent spellings.

Dilobomyctere Bibron *in* Duméril, 1855: 279

Spelled *Dilobomyctère*. Diagnosis provided, thus an available name. Eleven included species: *Tetraodon reticularis* Bloch *in* Schneider, 1801, *T. hispidus* Linnaeus, 1758, *T. maculatus* Bloch *in* Schneider, 1801, *T. meleagris* La Cepède, **1798**, *T. nigropunctatus* Bloch *in* Schneider, 1801, *T. mappa* Lesson, **1831**, *T. diadematus* Rüppell, 1829, *T. longicauda* Bibron *in* Duméril, 1855, *T. sordidus* Rüppell, 1829, *T. immaculatus* Bloch *in* Schneider, 1801, *T. rueppelii* Bibron *in* Duméril, 1855. Type species: *Tetraodon reticularis* Bloch *in* Schneider, 1801, designated by Jordan (1919: 263). Gender: masculine.
Dilobomycterus [as spelled by Troschel 1856: 88] and *Dylobomycter* [as spelled by Hollard 1857: 319] are incorrect subsequent spellings.

Tetraodon longicauda Bibron *in* Duméril, 1855: 280

Although listed as not available by Eschmeyer (1998: 927), this name is clearly available by indication to *T. manilensis* Marion de Procé (1822: 130) and *T. strigosus* Bennett, 1834: 46. The syntype series of *T. longicauda* includes the type material of *T. manilensis* (which is lost; Marion de Procé 1822: 129) and *T. strigosus*. *Tetraodon strigosus* is based on an unstated number of specimens. Eschmeyer (1998: 1622) lists BMNH (Natural History Museum, London) 1852.9.13:92 as the holotype. I accept this specimen as the holotype of *T. strigosus* (and if later it turns out that the type series included more than one specimen, this specimen would be a lectotype by inference of holotype; ICZN art. 74.6). I designate the holotype of *T. strigosus* as lectotype of *T. longicauda*.

Tetraodon rueppelii Bibron *in* Duméril, 1855: 280

Although listed as a name not available by Eschmeyer (1998: 1485), this name is available by reference to Rüppell (1829: 65, pl. 17, fig. 2) who described and figured a single specimen from the Red Sea as *Tetraodon honkenii* (Bloch, 1785). The holotype of *T. rueppelii* is the specimen described by Rüppell, which has been identified by Dor (1984: 283) as *Amblyrhynchote hypselogeneion* (Bleeker, 1852).

Tetraodon dorsounicolor Bibron *in* Duméril, 1855: 280 (*nomen nudum*)

Tetraodon bourouensis Bibron *in* Duméril, 1855: 280 (*nomen nudum*)

Amblyrhynchote Bibron *in* Duméril, 1855: 280

Diagnosis provided, thus an available name. Four included species: *Tetraodon honckenii* Bloch, 1785, *T. oblongus* Bloch, 1786, *T. richei* Fréminville, 1813, *T. alboguttatus* Bibron *in* Duméril, 1855 (*nomen nudum*). Type species: *Tetraodon honckenii* Bloch, 1785, designated by Jordan (1919: 263). Gender: masculine.
Amblyrhynchotes [as spelled by Troschel 1856: 88] and *Amblyrhynchotus* [as spelled by Hollard 1857: 319] are incorrect subsequent spellings.

Geneion Bibron *in* Duméril, 1855: 280

Diagnosis provided, thus an available name. A single included species, thus type species by monotypy: *Tetraodon (Geneion) maculatum* Bibron *in* Duméril, 1855. Gender: neuter.
The specimen recorded as holotype of *T. maculatum* by Le Danois (1962: 470) is conspecific with *T. honckenii* Bloch, 1785, which is the type species of *Amblyrhynchote* Bibron *in* Duméril, 1855. This makes *Amblyrhynchote* and *Geneion*

simultaneous subjective synonyms and precedence among these names is fixed by the first reviser. The first reviser is apparently Le Danois (1959: 185) who used *Geneion* as the valid name and listed "*Amblyrhynchotus* (pars) Bibron (Duméril)" (treated here as an incorrect subsequent spelling of *Amblyrhynchote*) in its synonymy. On p. 171, she also treated "*Amblyrhynchotus* Bibron" as a valid genus, with an erroneous type species; this apparently has no implication on the validity of the precedence established on p. 185 (if Le Danois's action cannot be recognised as a first reviser action, then Shipp [1974: 19] is the first reviser as he stated: "Le Danois [1959: 189] [...] synonymized *Geneion maculatum* with *Geneion honckenii* (Bloch) and thus considers *Geneion* as the genus to represent this latter species rather than *Amblyrhynchotes* [...]").

Catophorhynque Bibron *in* Duméril, 1855: 280

Diagnosis provided, thus an available name. Two included species: *C. lampris* Bibron *in* Duméril, 1855 (*nomen nudum*), *C. longispinis* Bibron *in* Duméril, 1855 (*nomen nudum*). Type species: listed as *C. lampris* Bibron *in* Duméril, 1855 by Jordan (1919: 263), but this is not valid as *C. lampris* is a *nomen nudum*. *Catophorynque* has first been used (as "*Catophorhynchus* Bibron, 1855", but see *Code*, art. 67.7) with a single included available species-group name by Le Danois (1959: 208). On p. 209, Le Danois stated to have examined a single specimen, the holotype of *Tetraodon scaber* Eydoux & Souleyet, 1850, "used by Bibron as genotype for *Catophorhynchus longispinis*". I consider this as a designation of *T. scaber* as type species of *Catophorhynque* [if this is not accepted as a designation, *T. scaber* is anyway type species by subsequent monotypy in Le Danois, 1959]. Gender: masculine.
Catophorhynchus [as spelled by Troschel 1856: 88] and *Catophorhynchus* [as spelled by Hollard 1857: 319] are incorrect subsequent spellings.
Randall (1985: 348) considers *T. scaber* as a junior subjective synonym of *Arothron immaculatus* (Bloch *in* Schneider, 1801) and this makes *Catophorhynque* a junior subjective synonym of *Arothron* Müller, 1841 at least as understood by most contemporary authors (there are problems with the identity of its type species and *Ovoides* Anonym, 1798 apparently is an earlier name available for the same genus; this is beyond the context of present paper and will not be discussed here).

Batrachops Bibron *in* Duméril, 1855: 281

Diagnosis provided, thus an available name. A single included species, thus type species by monotypy: *Tetraodon psittacus* Bloch *in* Schneider, 1801. Gender: masculine. A junior homonym of *Batrachops* Heckel, **1840** in Pisces (Eschmeyer, 1998).

Monotrete Bibron *in* Duméril, 1855: 281

Spelled *Monotrète*. Diagnosis provided, thus an available name. A single included species, thus type species by monotypy: *Tetraodon cutcutia* Hamilton, 1822. Gender: masculine.
Monotretus [as spelled by Troschel 1856: 88] and *Monotreta* [as spelled by Hollard 1857: 319] are incorrect subsequent spellings.

Ephippion Bibron *in* Duméril, 1855: 281

Diagnosis provided, thus an available name. A single included species, thus type species by monotypy: *E. maculatum* Bibron *in* Duméril, 1855. Gender: neuter.

Xenoptere Bibron *in* Duméril, 1855: 281

Spelled *Xénoptère*. Diagnosis provided, thus an available name. A single included species, thus type species by monotypy: *Xenoptere bellangerii* Bibron *in* Duméril, 1855. Gender: masculine.

Xenopterus [as spelled by Troschel 1856: 88] and *Xenopterus* [as spelled by Hollard 1857: 319] are incorrect subsequent spellings.

Rhynchote Bibron *in* Duméril, 1855: 281

Diagnosis provided, thus an available name. Six included species: *Tetraodon gronovii* Cuvier, 1829, *T. margaritatus* Rüppell, 1829, *T. striolatus* Quoy & Gaimard, 1824, *T. peronii* Bibron *in* Duméril, 1855, *T. laterofasciatus* Bibron *in* Duméril, 1855 (*nomen nudum*). Type species: *Tetraodon peronii* Bibron *in* Duméril, 1865, designated by Jordan & Snyder (1901: 254) (listed as type of *Rhynchotus* Hollard, an incorrect subsequent spelling; nevertheless valid fixation, *Code* art. 67.6, 67.7). Gender: masculine.
Rhynchotes [as spelled by Troschel 1856: 88] and *Rhynchotus* [as spelled by Hollard 1857: 319] are incorrect subsequent spellings.

Tetraodon peronii Bibron *in* Duméril, 1855: 282

Available by indication to "De Verkenstop" of Valentyn (**1724: pl. 498**). Probably no type specimens.

APPENDIX: THE TYPE SPECIES OF *LAGOCEPHALUS* SWAINSON, 1839

The identity of the type species of *Lagocephalus* had to be investigated when writing this paper. It is no longer immediately relevant to the main discussion and is therefore given as an appendix.
Lagocephalus is available from Swainson (1839: 194, 328). On p. 194, he gave a very brief diagnosis of *Lagocephalus*: "Body above smooth; belly armed with spines". On p. 328, he gave a slightly expanded diagnosis: "Head short; the upper parts of the body smooth; the belly armed with angulated spines, as in *Diodon*" and he listed two nominal species: "*L. stellatus.* Bl. pl. 143 [*L.*] *Pennantii*. Yarrell, ii. 347". Swain (1883) published a list of all Swainson's genera, including comments on the identity of some and a list of the included species, exactly in Swainson's format, merely adding an asterisk under each genus to designate a type species. This is how "*L. stellatus.* Bl. pl. 143" is type species of *Lagocephalus*.
Tyler (1966) considered that Bonaparte (1841) had earlier designated *L. pennantii* as type species, in designating *T. lagocephalus* Linnaeus, 1758 as type and at the same time synonymizing *T. lagocephalus* and *L. pennantii*. This would be a valid designation under art. 69.2.2 of the *Code*. This was not accepted by Eschmeyer (1998: 1987) and I partly agree. Bonaparte's work is not commonly available and is difficult to quote as the pages are not numbered. The relevant passages are quoted and translated by Tyler (I have checked them in the original). Eschmeyer commented that Bonaparte has not synonymized the two species; I considered that the sentence: "We adopt […] the name *Tetraodon pennanti* given to it by Yarrell […] inasmuch as the Linnean specific name *lagocephalus* has become generic" clearly is a synonymization. But I agree with Eschmeyer that nowhere did Bonaparte designate a type species for *Lagocephalus*. "*Lagocephalus* Swainson […] is the *T. lagocephalus* of Linnaeus" cannot be regarded as a type species designation.
Eschmeyer (1998: 1987) concluded that the type species is Swainson's "*Tetraodon stellatus* Bl. pl. 143" (Bloch, 1785: pl. 143) by subsequent designation by Swain (1883: 283). As Bloch's pl. 143 in fact shows *T. honckenii* Bloch, 1795 (which is the type species of *Amblyrhynchote*), Eschmeyer commented that the name *Lagocephalus* could only be retained as currently used if the International Commission on Zoological Nomenclature is petitioned. This is only partly correct.
Swainson (1839) makes available a large number of species group names by indication to published plates. Is this the case of *Lagocephalus stellatus*? It is possible. But it is also possible that he referred to *Tetraodon lagocephalus* var. *stellatus* Bloch *in* Schneider, 1801: 503 (a valid species of *Arothron*; Dor 1984: 285; Matsuura 1994: 29), *T. stellatus* Donovan, **1804** (a synonym of *L. lagocephalus*; Shipp 1974: 24) or *T. stellatus*

Shaw, **1804** (a synonym of *T. l. stellatus* Bloch *in* Schneider, 1801). Bloch and Shaw's names are based on "Tetrodon étoilé" of La Cepède (**1798**).
A large number of nomenclatural problems are associated with Swainson's book, suggesting a lack of familiarity with nomenclature and ichthyology. These include, among others, inconsistencies in spelling and placement of genera, use of different names for the same taxa in different parts of the book, and erroneous references.
My hypothesis is that there is a lapsus in Swainson (1839: 328) and that in fact he wanted to refer to plate 140 and not 143 of Bloch (1785). Plate 143 shows a fish (*T. honckenii*) with simple, pointed spines extending high laterally towards the dorsum – but not on middle of dorsum). Plate 140 shows a fish (*T. lagocephalus*) with rows of spines on the belly and no spines on the dorsal half of the body. The spines are stellate and on Bloch's plate appear somehow similar, although smaller, than those of *Diodon* species (plates 125-127, especially 127). Plate 140 is labelled with the Latin name *Tetrodon lagocephalus*, the German "Sternbauch" (stellate belly), the French "Orbe étoilé" (stellate globe) and the English "The Stary Globe-Fish". The generic name used by Swainson (*Lagocephalus*), the specific name (*stellatus*) and the listed diagnostic characters (see above) all support the hypothesis that Swainson was in fact referring to plate 140 and not 143. Swainson named many new genera by using the specific name of one of the included species. If *L. stellatus* is linked with plate 143, neither the generic nor the specific names make sense and there is no agreement with the description.
Common sense suggests to consider the reference to plate 143 as a lapsus for plate 140 and to correct this error; this is what I do, even if the *Code* is silent on such cases (it neither allows nor forbids doing so; I consider that what is not explicitly forbidden is permitted. Others may consider that what is not explicitly permitted is not allowed, but it can easily be demonstrated *ad absurdum* that this approach cannot apply to the *Code*: the *Code* nowhere states who has the right to publish nomenclatural acts, so under this logic nobody has the right to publish nomenclatural acts; as a result there would be no nomenclatural problems and a *Code* is not needed).
If one does not accept such a correction of lapsus or errors, I see only three ways of handling the case. The first two preserve the usage of *Lagocephalus* for the species currently called *L. lagocephalus*:
1) the first one is to petition the Commission to either designate an other type species for *Lagocephalus* or to set aside the holotype of the type species and designate a specimen of *L. lagocephalus* as neotype (this also implies that a lectotype be designated for *L. lagocephalus*; see below);
2) the second way is to treat *L. stellatus* of Swainson as a new combination of *T. stellatus* Donovan, **1804** (and to treat the reference to "Bl. pl. 143" as a misidentification of Bloch's [1785] plate 143). By virtue of art. 67.7 of the *Code*, Swain (1883) designated *T. stellatus* Donovan as type species of *Lagocephalus*. As the type species designated by Swain was misidentified by Swainson (evidenced by his erroneous reference to Bloch's plate 143), we have here the case of a misidentified type species and, under art. 70.3 of the *Code* I fix here *T. stellatus* Donovan, **1804** as the type species of *Lagocephalus* Swainson, 1839. *Tetraodon stellatus* Donovan, **1804** is a junior homonym of *T. l. stellatus* Bloch *in* Schneider, 1801 and is invalid, but this does not affect its availability as type species of *Lagocephalus. Tetraodon stellatus* Donovan, **1804** is treated as a junior synonym of *L. lagocephalus* by Shipp (1974: 24), but formally, this should first be established by a designation of a lectotype as, as demonstrated by Shipp (1974: 25-27), Linnaeus's (1758: 332) account is based on several sources involving species of *Lagocephalus* and *Canthigaster*. One of the syntypes is possibly still extant (Fernholm & Wheeler 1983: 278);
3) the third way does not preserve the present usage of *Lagocephalus*. Swainson's *L. stellatus* is treated as a new name available by indication (*Code*: art. 12.2.7). As there is no reference to Bloch's text, the name is based only on the plate of *T. honckenii*, and the specimen used as model for the plate should be treated as the holotype. As

Tetraodon stellatus Donovan, **1804** is a synonym of *L. lagocephalus* (Linnaeus, 1758), *L. stellatus* Swainson, 1839 would be a junior secondary homonym of *T. stellatus* and invalid (*Code*, art. 57.3.1). This would not affect its availability as type species of *Lagocephalus*. As *T. honckenii* is the type species of *Amblyrhynchote*, *Amblyrhynchote* would become a junior synonym of *Lagocephalus* and the species presently placed in *Lagocephalus* would have to be called *Promecocephale* Bibron *in* Duméril, 1855. There are two syntypes of *T. honckenii* (Paepke, 1999: 148); the figured one would be the holotype of *T. stellatus*; the synonymy would become subjective or objective depending of which specimen would be designated as lectotype of *T. honckenii*.

CONCLUSION

Accepting Swainson's reference to Bloch's plate "143" as a lapsus for plate "140" is the alternative which is most logical, most parsimonious and preserves best nomenclatural stability. This means that *Lagocephalus stellatus* Swainson, 1839 is a junior subjective synonym of *T. lagocephalus* Linnaeus, 1758.

Acknowledgements

I am pleased to thank Peter K. L. Ng, Philippe Bouchet, Annemarie Ohler and Alain Dubois for their comments on the manuscript, and Monique Margout for her help in checking bibliographic details.

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Submitted on 24 June 1999;
accepted on 26 February 2001.