

In conclusion, we suggest that the Commission should not use its plenary power for this relatively minor case, which has been unambiguously cleared by the simple application of the Code.

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Comments on the proposed conservation of usage of *Testudo gigantea* Schweigger, 1812 (currently *Geochelone (Aldabrachelys) gigantea*) (Reptilia, Testudines)

(Case 3463; see BZN **66**: 34–50, 80–87, 169–186; 274–290; 352–357)

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I am writing in support of Case 3463. I am a non-specialist in this field and as such I found the taxonomy of the Indian Ocean giant tortoises to be complicated and confusing when researching the topic for my book on these animals, *A Sheltered Life* (2004). Based on a literature survey and interviews with researchers, I concluded that *Geochelone (Aldabrachelys) gigantea* was the most appropriate name for this important and iconic species. However, after the book's publication I received correspondence which opposed my use of this name. As an interested observer, I am perturbed by the continuing uncertainty connected with the naming of the Aldabra tortoise and so I strongly support Dr Frazier in his desire to settle this nomenclatural issue.

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Jean-Jacques Dussumier and Aldabra

Pat Matyot (2009) has raised interesting but delicate questions in connection with the lectotype of *Testudo dussumieri* Gray, 1831. Did Dussumier really travel to Aldabra, and therefore is this specimen really an Aldabra tortoise? First, we could extend the questions such as 'is the present Aldabra the same island as that so named in the 18–19th centuries?' (see e.g. Devaux 2006, p. 30, about the Aldabra map by Picault & Grossin, reproduced by Günther (1877), which actually shows the present Farquhar), or even 'did Dussumier really exist?' Laissus, his only known biographer, begins his notice with the words 'La vie de Jean-Jacques Dussumier n'est que très imparfaitement connue et seulement dans ses épisodes principaux' ['Jean-Jacques Dussumier's life is very imperfectly known and then only during his main episodes'] (Laissus, 1973, p. 387).

Next, it must be emphasised that at the time of Dussumier's travels, Aldabra was already well known for its tortoises, and these tortoises were regularly brought to (inter alia) La Réunion island – sailors did not wait until the formal possession of Aldabra in 1892 – as reported in the local newspaper *La Feuille hebdomadaire de Bourbon*, for instance n° 628 (12.01.1831): 'Belles tortues d'Aldabra à vendre à des prix modérés. S'adresser rue du Barachois . . .' ['Beautiful Aldabra tortoises for sale at moderate prices. Address rue du Barachois . . .'] (Bour, 1981, p. 122). If Dussumier did not really go to Aldabra, he could have intercepted a ship with a load of tortoises close to the island, or even bought some genuine specimens on Réunion or elsewhere. But could we really prove that Dussumier never landed on Aldabra?

We hardly understand the comments by Matyot about the correctness or completeness of Dussumier's collecting data. Dussumier himself wrote in 1830: 'Pour tous [fish specimens] j'ai eu soin de tenir un registre, où j'ai inscrit, au numéro correspondant à celui que porte chaque individu, les couleurs qu'il avait au moment où il a été pêché, et j'y ai joint les renseignements que j'ai pu me procurer, après en avoir vérifié l'exactitude' ['For all [fish specimens] I have been careful to keep a register where I have noted, against the number corresponding to that carried by each individual, the colours it possessed at the time it was caught, and I have added such bits of information as I have been able to get, having checked their accuracy'] (Laissus, 1973, p. 392). Such care was highly appreciated by the exacting Cuvier, and

Matyot's comments outlining that 'Gray was tempting men to steal and sell him their specimens' are irrelevant. In the present case, Gray just saw (in 1829) the specimen in the Leiden Museum, and at that time he had no connection with either the Paris Museum or its associated sellers 'on the sly' or with Dussumier himself. On the other hand, as he did with other observed specimens, Gray approximately copied and then published in 1831 the data written on the tag, in this case Dussumiere [sic] as collector and Aldebra [sic] as locality, and we see no reason to doubt their accuracy. As pointed out by Matyot himself, fifty years later Hubrecht (1881), at that time curator of fishes at the Leiden Museum, repeated the same data. The specimen had been labelled by Hermann Schlegel, also a former curator, who later described the Round Island Boa (Schlegel, 1837) and dedicated it to its collector, Dussumier, 'voyageur infatigable et ami éclairé des sciences' ('tireless traveller and enlightened friend of Science').

Finally, Matyot (2009, p. 353) mixed up two distinct young specimens collected by Dussumier, one true (granitic) Seychelles tortoise, seen by Duméril & Bibron, still in the Paris Museum (MNHN 1942; Bour, 2006) and the Aldabra tortoise, seen by Gray, still in the Leiden Museum (RMNH 3231). Dussumier, himself, clearly separated them, on morphological as well as on geographical bases, but it is likely that Matyot never saw either one.

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(3) Roger Bour, Peter C. H. Pritchard and John B. Iverson
(addresses as above)

The present statement is proposed in order to establish definitely on which bases the valid scientific name of the Aldabra tortoise rests. We specifically address the five major points of contention which were disputed in the previous comments about this case published in this journal (BZN, **66**(1), **66**(2) and **66**(3)). We claim to be professional taxonomists of some experience and we aspire to take into account only factual, objective data. The articles and recommendations of the International Code of Zoological Nomenclature presently in force, here the 'Code', are followed. The colleagues who claim they refuse to make the adjustment of giving up the name *gigantea* for the Aldabra tortoise need to agree that, for 200 years, many changes were implemented in the phylogenetic and taxonomic appraisal of the group of tortoises at stake. 'Comfort levels' are not pertinent to the case at hand, and emotion and personal preference are not the criteria by which the case should be judged.

The quality of Schweigger's diagnoses and descriptions is poor

The work of Schweigger (1812) is based on actual specimens, and includes measurements for the new species. It is without any doubt the best of its epoch. At that time, other similar works were mainly founded on previous publications and on more or less literary sources. If Schweigger's descriptions are deemed inadequate, then all descriptions prior to at least Duméril & Bibron (1835) could be called into question. Schweigger mainly worked with the collections of the Paris Museum (MNHN), and presently the type specimens of 14 distinct species described by this author have been identified in this institution, thanks to the accuracy of the publication (see Bour, 2008b). We wonder who among the authors of the published comments have directly read and/or translated the original Latin description, and who among those who have questioned the rediscovery have actually seen the types of any of these early names. Unfortunately, this case is not an isolated one. We predict that future morphological and molecular analysis of type material will show that many names have been misapplied or misunderstood in the past.

The holotype of *Testudo gigantea* Schweigger, 1812 was 'lost' for nearly two centuries

In fact this holotype was misplaced and wrongly identified for a long time. The specimen was also studied and measured by Duméril & Bibron (1835), who did not recognise it as being the 'type' of this species. A careful reading of their opus reveals several other similar misinterpretations, but such an exposition is beyond this note. The recent rediscovery of the type of *T. gigantea* in the MNHN is used by some as argument against our proposition, but we will not debate the defamatory insinuation of a timely rediscovery, like 'rediscovered just when it was supportive for their point of view'. Actually this is not unusual, especially given that few modern chelonian researchers deem the examination of type material as essential to systematic study. We can give several references of recent 'rediscoveries' of type specimens: Iverson & McCord (1989) for *Emys muticus* Cantor, 1842; Pritchard (1996) for *Testudo ehippium* Günther, 1875; Bour & Maran (1998) for *Emys leprosa* Schweigger, 1812; Bour (2008a) for *Testudo angulata* Schweigger, 1812; Rhodin & Carr (2009) for *Testudo scripta* Schoepff, 1792. In some cases, these discoveries challenged the 'accepted' nomenclature: that is science and science recognises change; if not, it is no longer science, it is dogma.

This is not the holotype of *Testudo gigantea*

Bour (2006) has extensively studied each of the details provided in the description(s) of *Testudo gigantea* Schweigger, 1812, which led to the recognition that MNHN 9554, long identified as *Chelonoidis denticulata* (Linnaeus, 1766), a yellow-foot tortoise, is undoubtedly the holotype. But who really understands the diagnostic value of 'testa cylindracea . . . pedes squamis robustis, latissimis robusti . . . marginis viginti tres, aequalis'? Actually, among all known chelonians, a large and elongated tortoise with large scutes on the forearms, no cervical (nuchal) scute, and rounded flanks could only apply alternatively to a Mascarene tortoise (genus *Cylindraspis*); but the origin of the specimen (Brazil, via Lisbon) removes any doubt. It must be explained here that the MNHN collections have gone through a period of disorganisation from 1965 to the opening in 1994 of the 'Zoothèque', an underground storage

building. Several comments allude to a deficient original description, but none of them has provided any precise character that would support a refutation of the identity of the type of *T. gigantea*; they have simply rejected our interpretation. Moreover, no person among the detractors has asked either to examine the specimen, nor for pictures of it. Finally, we will just mention again one measurement: the holotype of *Testudo gigantea* had a curved length of 767 mm according to Schweigger; the large specimen of *C. denticulata* measured by Duméril & Bibron had a curved length of 770 mm; and the ‘rediscovered’ specimen of *C. denticulata* (MNHN 9554) has a curved length of 770 mm. Sometimes numbers are more eloquent than a long description.

The neotype designation is the solution

We here strictly quote the Code, precisely the relevant parts of Article 75.3. A valid neotype is designated when the designation is published with the following particulars:

‘75.3.4. the author’s reasons for believing the name-bearing type specimen(s) (i.e. holotype, or lectotype, or all syntypes, or prior neotype) to be lost or destroyed, and the steps that had been taken to trace it or them’. Such mandatory statements are completely wanting in Frazier’s (2006a) paper.

‘75.3.5. evidence that the neotype is consistent with what is known of the former name-bearing type from the original description and from other sources’. This point was already raised by Bour (2006), who noted these differences between the neotype and the holotype: ‘e.g. absence vs. presence of a cervical scute; limbs shielded by tough and very broad scales vs. only postcranial skeleton, and fragments of skin’; we can also add: a full specimen (head, limbs, tail are described) vs. a shell.

‘75.3.6. evidence that the neotype came as nearly as practicable from the original type locality [Art. 76.1] and, where relevant, from the same geological horizon or host species as the original name-bearing type’. The neotype came from Aldabra, the holotype from Brasil, unless someone can demonstrate that the latter is wrong.

‘Recommendation 75B. Consultation with specialists. Before designating a neotype, an author should be satisfied that the proposed designation does not arouse serious objection from other specialists in the group in question’. Nothing was submitted at least to the present authors or to Justin Gerlach, who are among the taxonomists who recently published the most extensively on the systematics of these tortoises.

Finally, according to Article 75.8, a holotype always out-trumps a neotype: ‘If, after the designation of a neotype, the name-bearing type (holotype, syntypes, lectotype or previous neotype) of the nominal species-group taxon that was (were) presumed lost is (are) found still to exist, on publication of that discovery the rediscovered material again becomes the name-bearing type and the neotype is set aside . . .’. The only conclusion is that the neotype designation is both unnecessary and unacceptable.

The stability stands with the name *T. gigantea* Schweigger, 1812

Beside the rebuttal of the identity of the type specimen of *T. gigantea*, a major expressed argument is the stability of the name in connection with the Aldabra

tortoise. First, we note that the most recent (1982–2006) 36 names (nominal combinations) for the Aldabra tortoise, as listed by Fritz and Havaš (2007), only include a single combination that contains the word *gigantea*. Second, in order to have an idea about the respective importance of the main combinations used to name the Aldabra tortoise, and the involved genera, we used ‘Google’ data, i.e. a procedure which can be reproduced by anyone, but whose results may be very volatile, as developed below. We limited our research to the species *T. gigantea* Schweigger, 1812, *T. dussumieri* Gray, 1831, and *T. elephantina* Duméril & Bibron, 1835. The results (updated on 22 October 2009) are the following:

Combination used	Occurrence	% of subset
<i>Testudo gigantea</i>	8130	85.1
<i>Testudo elephantina</i>	1290	13.5
<i>Testudo dussumieri</i>	136	1.4
<i>Geochelone gigantea</i>	12500	91.6
<i>Geochelone elephantina</i>	71	0.5
<i>Geochelone dussumieri</i>	1080	7.9
<i>Aldabrachelys gigantea</i>	4130	38.5
<i>Aldabrachelys elephantina</i>	6360	59.3
<i>Aldabrachelys dussumieri</i>	234	2.2
<i>Dipsochelys gigantea</i>	255	1.3
<i>Dipsochelys elephantina</i>	2250	11.2
<i>Dipsochelys dussumieri</i>	17600	87.5
<i>Aldabrachelys</i> (alone or combined)	13700	16.8
<i>Dipsochelys</i> (alone or combined)	67900	83.2
TOTAL <i>gigantea</i>	25015	46.3
TOTAL <i>elephantina</i>	9971	18.5
TOTAL <i>dussumieri</i>	19050	35.3

These data reveal that an agreement on usage for the species or the genus names does not exist. Actually these figures are continually moving and they obviously reflect a drift, rather than providing an absolute amount. On 1 August 2009 the number of returns for *Aldabrachelys* was 9510, for *Dipsochelys* 88100; as shown above, on 22 October (when this paper was submitted for publication) this number was 13700 for *Aldabrachelys*, 67900 for *Dipsochelys*; finally, on 28 December (a corrective was sent to the editor) this number was 23200 for *Aldabrachelys*, decreasing to 52700 for *Dipsochelys*. Moreover, within two months some references have overwhelmingly increased: *Testudo elephantina* from 1290 to 5300, *Testudo dussumieri* from 136 to 13800, *Testudo gigantea* from 8130 to 91200! These figures greatly confirm that ‘Google’ numerical data, if applied for more than a brief period, should be used and interpreted with caution, as already underlined by Dubois (2007) and repeated by Frost et al. (2009). In fact, it could be argued that only figures obtained prior to the raising of the case by Frazier (2006a) should be considered, as they were not biased by the debate (see in this respect Dubois, 1997: 319). We must also note that the title of the Case in the ICZN Bulletin was itself biased, including ‘Currently *Geochelone* (*Aldabrachelys*) *gigantea*’, despite a request by one of us (PCHP). This combination only returned 76 ‘hits’.

Presently, all mentions of *gigantea* (including *Testudo gigantea*, which is obviously an outdated combination, used by non-taxonomists) added together show that it is

the most used species epithet by only a moderate margin (46.3% vs. 35.3% for *dussumieri*). On the other hand, the most used combination is *Dipsochelys dussumieri*: 17600 returns vs. 12500 for *Geochelone gigantea* (58.5% vs. 41.5%). However, it is clearly evident that there is no consensus, no established name, i.e., there is not current stability, contrary to the allegations of many comments and of the title of the Case. It simply cannot be argued that the current name is *gigantea*. Furthermore, the only numerically significant observation is the predominance of *Dipsochelys* over *Aldabrachelys* (83.2% vs. 16.8%).

The ‘Code’ must not be taken apart; it must be understood, accepted and followed

Should zoological nomenclature be regulated by a set of rules or by ‘polls’ open to anyone, even without any experience in taxonomy? If so, then the easiest way would simply be to get rid of the Code, and let so-called ‘consensus’ establish the valid names of taxa. Experience in the past has amply shown that consensus rarely ever leads to stability and clarity in the use of names, and often leads to chaos, which is precisely why a Code had to be established in the late 19th century. We believe that dismantling the Code in favor of common opinion would be a mistake.

Finally, why should we reject the name *Testudo dussumieri*, which honours the memory of Jean-Jacques Dussumier, the first traveller who brought back an Aldabra tortoise with its precise locality and offered it to science? If one operates by the letter of the law (Code), as we have, and not by passion or emotion, it is clear that the first valid name for the Aldabra tortoise is *Testudo dussumieri*.

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(4) Gregory B. Pauly

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I am writing in support of the proposal described in Case 3463 to conserve the name *Testudo gigantea* Schweigger, 1812 for the Aldabra tortoise by maintaining a recently designated neotype and suppressing the name *Testudo dussumieri*. Such an action would alleviate any recent confusion and nomenclatural instability that might have arisen regarding the most appropriate name. This confusion stems from the uncertain species identity and collection locality of the specimen used in Schweigger's description; this specimen lacked individual identification (e.g., an accession number) and was only listed as being 'in the Paris Museum.' Recognising that the type specimen was unknown, Frazier (2006) designated a neotype for *Testudo gigantea* to stabilise the nomenclature of the Aldabra tortoise. Subsequently, Bour (2006) claimed to have found Schweigger's lost specimen (MNHN 9554), which he identified as the South American taxon *Chelonoidis denticulata*. However, there remains uncertainty as to whether MNHN 9554 is the specimen examined by Schweigger, in part because this would require misidentifications by Dumeril and Bibron (1835) who were in contact with Schweigger and who specifically stated that *T. gigantea* of Schweigger was not the species that we now call *C. denticulata*. Given this uncertainty, taxonomic debates and nomenclatural instability will continue for the Aldabra tortoise without action by the ICZN. Further, even if MNHN 9554 could unquestionably be identified as Schweigger's tortoise specimen, under Article 75.6 prevailing usage should be conserved by designation of a neotype. To promote stability and universality, I support maintaining USNM 269962 as the name-bearing neotype. A significant advantage of this approach is that it results in continuity of usage of the nomen *gigantea*, which has been used for over a century in numerous scientific and non-scientific writings to reference the extant tortoises from Aldabra Atoll.

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I too support the application of Frazier to conserve *Geochelone gigantea* Schweigger, 1812 by accepting his neotype designation. As recently as 2004, my colleagues and I (Joyce et al., 2004) used the term *Dipsochelys dussumieri* (Gray, 1831) to refer to the Aldabran giant tortoise. However, Frazier compellingly illustrates that usage of this term has resulted in substantial nomenclatural instability. Much of the problem is ultimately based on the highly confusing type situation. I thus fully agree that stability is best served by accepting Frazier's neotype and by conserving the name that has been used most consistently for the last 75 years, i.e. *Geochelone gigantea*.

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Joyce, W.G., Parham, J.F. & Gauthier, J.A. 2004. Developing a protocol for the conversion of rank-based taxon names to phylogenetically defined clade names, as exemplified by turtles. *Journal of Paleontology*, **78**: 989–1013.

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The remarkable and impassioned correspondence on the name of the Aldabra tortoise has thrown up some information that requires further notes to supplement my earlier submission (BZN 66: 174–176).

1. Matyot (BZN 66: 352–354) has offered evidence to suggest that it is unlikely that Dussumier collected specimen RMNH 3231, designated as lectotype of *Testudo dussumieri* by Bour (2006b), on Aldabra. Although many details of his travels are unclear (see Laissus, 1973), I am inclined to agree that Dussumier did not visit Aldabra, but this does not mean the animal did not originate there, nor does it invalidate the name under the Rules. At that time, when native tortoises in the granitic Seychelles were so reduced that recorded export to Mauritius had ceased (Toussaint, 1967; Stoddart & Peake, 1979), from 1815 the principal source of tortoises for human consumption on Mauritius and the granitic Seychelles was Aldabra (Mondini, 1990). Fairfax Moresby (1842, p.741), writing in 1822, reported ‘Aldabra is annually visited in the favourable monsoons for the land-tortoise, which are to be found most plentifully. They grow to a large size, are taken to Mahé or the Mauritius, and sold from one to three Spanish dollars each’. Some of those taken to the Seychelles were then re-exported to Mauritius. Théodore Sauzier (1893) (also Stoddart, 1971, Stoddart & Peake, 1979) cited import from the Seychelles of 3400 tortoises into Mauritius in 1826 alone. The origin of 2600 he presumed to be Aldabra on the grounds that there were no longer such numbers in the granitics; the other 800 came directly from Providence. A handwritten footnote by Sauzier in his own copy of Sauzier (1893) uses further manuscripts to raise the 1826 import total to 4800: 4000 on ships incoming from the Seychelles, 800 direct from Providence (copy in the Radcliffe Science Library, Oxford). It should be added that, as George Harrison, the lessee of Providence, was also government agent in the Seychelles, the Providence shipment could also have originated on Aldabra. Stoddart & Peake (1979) doubted the aboriginal existence of tortoises on Providence and suggested this shipment reported by Sauzier may have been marine turtle, but the number seems excessive for a single haul of *Chelonia mydas*. Slave ships used the excuse of visiting Aldabra for tortoises to cover their illegal trade (Scarr, 2000), also actually collecting tortoises to maintain the story. The slavers were often trafficking to Réunion (McAteer, 2000), and Bour (1981) reported Aldabra tortoises advertised for sale there in 1831 and 1834. Dussumier visited all these islands regularly (Laissus, 1973; Bour, 2006a; Matyot, BZN 66: 352–354), and could easily have obtained an Aldabra tortoise on any one of them. He is known to have been in Mauritius in 1825 or early 1826 (Bélanger, 1834) and visited the Seychelles on the same voyage, which ended in spring 1826 (Laissus 1973) and not spring 1825 as reported by Bour (2006a). Dussumier was back in the Seychelles in 1827 and again in April 1828, then back and forth in the Indian Ocean with stops at Mauritius, Réunion and the Seychelles between 1828 and 1830, before returning to France in September that year. Paris Museum records show he deposited, inter alia, 11 reptile specimens and 13 live tortoises in November 1827, and 11 chelonians in 1830 (Laissus, 1973), though the last lot was too late to have included the *T. dussumieri* lectotype in Leiden, which Gray saw on his visit in 1829 (Bour, 2006a). As an assiduous collector for the Paris museum he would have ascertained its origin, and it is clear from

the citations earlier that the provenance of tortoises was well known in the islands. Matyot (BZN 66: 352–354) argues it would be atypical of Dussumier to collect ‘only a young tortoise and no other specimen from Aldabra’, but given the ubiquity of living Aldabra tortoises on the Indian Ocean islands he visited, he probably assumed they were well enough known as adults, and thus brought back only a juvenile. As Bour (2006a) has enumerated, he also brought adults of the Aldabran form back from Anjouan and native forms from the granitic Seychelles. Matyot further speculates that because of some possible shenanigans in the way Gray acquired specimens, the origin of this specimen should be disregarded, but a) it was not acquired by Gray for the British Museum (now NHM), but held in Leiden, and b) why invent the then extremely obscure (to Europeans) locality of Aldabra if there was no reason to do so? Irrespective of where the specimen was collected, it has been identified by all who have studied its morphology as a juvenile Aldabra tortoise (see photos in Gerlach, 2004a; Bour, 2006b) and has been shown by mtDNA analysis to be an Aldabra-Seychelles tortoise (Austin et al., 2003); hence it remains a valid lectotype for *Testudo dussumieri*. The only other possible origin of Dussumier’s specimen RMNH 3231 would be a native granitic Seychelles tortoise, rare but not extinct in the mid-1820s, of which Dussumier also brought back a juvenile (Bour, 2006a). Although the juveniles are similar (as is their DNA), they are morphologically distinguishable (Bour, 2006a; Gerlach, 2004a), and in any case the granitic Seychelles forms are generally considered (Austin et al., 2003, Palkovacs et al., 2003, Rhodin et al., 2009) to be conspecific with those on Aldabra; even Gerlach (2004a), while treating them as species, conceded that they were probably only subspecifically distinct. Hence *dussumieri* is the earliest valid name for the species as a whole if one accepts that the specimen of *Chelonoidis denticulata* MNHN 9554 is the rediscovered type of *Testudo gigantea* (Bour, 2006b; Bour & Pritchard, BZN 66: 169–174). Those who doubt this identification appear to do so on very weak grounds.

2. It is ironic that the holotype of *Testudo gigantea* turns out to be a *Chelonoidis*, for this brings out an interesting contrast in perception amongst those concerned with tortoises. Until recently the Galapagos tortoise complex, even more iconic and endangered than those on Aldabra, was generally known as *Geochelone elephantopus*, but has morphed in recent decades into *Chelonoidis nigra*, apparently without any of the arguments surrounding the nomenclature of the Aldabran animals—no cases or discussion in the BZN, or other controversy that I can locate. As Bour (2006b) pointed out: ‘Following Pritchard (mainly 1996), among some other changes, the universally used *Testudo elephantopus* Harlan 1827, a name for the Galápagos tortoises, was replaced by *Testudo nigra* Quoy & Gaimard 1824, apparently without major objection from scientists. On the other hand, Frazier (2006) strongly emphasised the general instability and chaos regarding the valid name of the Aldabra tortoise’. Crumly (1982), using morphology, drew attention to the apparent polyphyly of the broad genus *Geochelone*, and Pritchard (1984) first drew attention to the fact that *Testudo nigra* Quoy & Gaimard, 1824 pre-dated *T. elephantopus* Harlan, 1927. Even before Crumly’s conclusions were amply confirmed by DNA studies (e.g. Le et al., 2006), the use of *Chelonoidis* Fitzinger, 1835 had become frequent, and that of *nigra* almost universal. However, the IUCN’s red list still uses *Geochelone* (www.iucnredlist.org/apps/redlist/details/9011/0; accessed online 30/12/2009) despite the SSC’s Tortoise & Freshwater Turtle Specialist Group (Rhodin et al., 2008; 2009) using *Chelonoidis* in their world checklist. CITES used *Geochelone nigra* as early as

1999 without complaint (Charette & Gallegos, 1999). Although the retention of *Geochelone* in the IUCN red list may indicate residual conservationist resistance to name change, there seems to have been no suggestion that changing the Galapagos tortoise nomenclature was going to destabilise conservation measures or otherwise cause irretrievable chaos and misunderstandings as claimed by the proponents of Frazier's case. It is hard to avoid concluding that issues beyond mere science and nomenclature are at issue here.

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I find Pat Maytot's refutation of Marinus Hoogmoed's arguments compelling. I see enough reasons to retain stability (*gigantea*) and no justification to deviate from this.

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We note that despite the extensive discussions and opinions on this issue, one rare point of general agreement seems to be to accept that there is only a single species of 'giant land tortoise' on Aldabra Island, so the problem simply amounts to knowing what it should be called. If we include the original application by Frazier, in 2009 no fewer than 91 persons commented so far on this case in 72 contributions in four instalments of this Bulletin, covering 66 pages. We note that 85 of the intervening parties were in favour of the name *Testudo gigantea* for this species and 6 were in favour of the name *Testudo dussumieri*. However, we are convinced that nomenclatural decisions by the Commission should not rely on polls or on persons of variable expertise and insight, nor on campaigns seeking to gather supporters to form a 'pressure group', but should be based upon due consideration of explicit arguments, even if expressed by a 'minority' of stakeholders.

As the present curator (AO) and the previous two curators (AD, ERB) of the herpetological collection of the Muséum National d'Histoire Naturelle (Paris), one of the oldest and most important herpetological collections in the world, we agree with Gerlach's statement that the comments in favour of each name for the Aldabra tortoise rest on (1) taxonomic arguments regarding the identifications of the type specimens; (2) arguments for 'nomenclatural stability', relating to *usage* of names, irrespective of the identification of the taxa; (3) arguments concerned with the *conservation biology* of these tortoises and (4) arguments relating to the *appropriateness* of each name for the taxon. Let us consider these four sets of arguments in the reverse order.

Name appropriateness

Gerlach and Hansen discussed the respective appropriateness of the names *gigantea* and *dussumieri*, and *Aldabrachelys* and *Dipsochelys*. This discussion is totally irrelevant to the present issue. As pointed out by Dubois & Raffaëlli (2009, p. 18), scientific names are not descriptions, diagnoses, statements of characters, distribution or other characterisations of the taxa they designate, nor models or theories about the hypothesised origin of these taxa, nor praise for their authors, for the discoverers of the taxa or for the persons to whom they may be dedicated. They are just neutral *labels* designating unambiguously and universally given taxa within the frame of a given taxonomy, i.e. allowing automatic reference to the taxa recognised by taxonomists at a given stage of their research. These labels allow storage and retrieval of the information accumulated in taxonomies, but it is not mandatory that the names have any meaning at all. In many cases, factually true information about coloration, body form or geographic range may indeed be encapsulated in either or both of the two terms of a binomen, but in many other cases the name provides misleading statements about the taxon. This is why the Code expressly states that availability (and consequently validity) of names 'is not affected by inappropriateness' (Article 18), and allows a new generic or specific name to be 'empty of meaning', for example for being 'an arbitrary combination of letters provided this is formed to

be used as a word' (Article 11.3). If it were not so, thousands of zoological names would have to be changed. There is no point in further discussing the question of appropriateness of names in the present case.

Conservation biology

This was referred to by 42 of the 85 (49.4 %) supporters of the application, but, as correctly stated by Gerlach (BZN 66: 184–186, June 2009), it is not convincing: 'the tortoises referred to are explicitly the Aldabra tortoises, for which there is no significant identification issue whatever name is applied'. Whenever a decision is made regarding the valid name of this species, it will be a trivial matter to incorporate it in official checklists and documents, as rightly stressed by Hoogmoed (BZN 66: 354–356): 'international bodies like CITES are able to change names of species on their lists with few problems and without jeopardising the protection of the taxa in question. And the same holds true for governments and their agencies'. Such changes of names of taxa on official lists have already occurred on several occasions, without causing any problem for the conservation policy of the taxa concerned. As long as the species is well identified, a unique and universal name is not essential for the conservation of threatened taxa. Whereas the Aldabra tortoise is in Annex 2 of the CITES list, the following three taxa are in Annex 1 and their names, long considered to be 'universal', have changed during the last 50 years: the mammals *Papio sphinx* (Linnaeus, 1758) and *Gazella dama* (Pallas, 1766) have become respectively *Mandrillus sphinx* and *Nanger dama*; the bird *Diomedea albatrus* Pallas, 1769 changed into *Phoebastria albatrus*; the fish *Pangasionodon gigas* Chevey, 1931 is now known as *Pangasius gigas*; and the chelonians *Kachuga tecta* (Gray, 1831) and *Testudo elephantopus* Harlan, 1827 are now on the list respectively as *Pangshura tecta* and *Chelonoidis nigra* (Quoy & Gaimard, 1824). The last example is very similar to that of the Aldabra tortoise: it is also a threatened insular giant tortoise of which both the generic and specific names were changed. In some other cases a single species appears under different names on different lists: for example, the bird mentioned on the CITES list as *Houbaropsis bengalensis* (Gmelin, 1789) appears on the IUCN list as *Eupodotis bengalensis*. We know of no evidence that these changes caused any problem for the conservation policy of these species.

Of course, we agree with Vences (BZN 66: 282, September 2009) that, for conservation (but also other) purposes, stabilising the nomenclature of the Aldabra tortoise will ultimately be important, and that, now that Frazier has challenged the correct nomenclature, it is unlikely that the scientific community will reach a consensus on which name to use without an unambiguous decision of the Commission. But this does not imply in the least that this decision should follow Frazier's suggestion. The merits of Frazier's proposal have to be evaluated in the light of the next two arguments.

Nomenclatural stability

Among the 85 persons who expressed their support for the use of the name *T. gigantea*, 59 (69.4 %) did not challenge the respective identifications of the lectotype of *T. dussumieri* presented by Bour (1984) or of the holotype of *T. gigantea* presented by Pritchard (1986) and Bour (2006). Their opinion rested on the assumption that

usage of *T. gigantea* is sufficiently well established to require conservation of this name through use of the plenary power of the Commission, whatever species its holotype represents. However, comments by Bour & Pritchard and Cheke (BZN 66: 174–176, June 2009) disagreed with this assumption. The statement by Frazier regarding usage of the name *gigantea* was clearly demonstrated to be in error by Bour, Pritchard & Iverson (BZN 67: 73–77, March 2010), through a survey of Google. In recent years, this single species has been designated mostly under 3 different specific names, *dussumieri*, *elephantina* and *gigantea*, and 3 different generic names, *Aldabrachelys*, *Dipsochelys* and *Geochelone*. These data show: (1) that no universality of usage exists regarding these names; (2) that the relative numbers of authors using each of these names are constantly changing; and (3) that, during recent months, the relative frequency of usage has increased for *gigantea* and *Aldabrachelys*, but decreased for *dussumieri* and *Dipsochelys*. As a matter of fact, the figures obtained about nine months after publication of Frazier's application show a strong impact of this application itself upon usage. In addition to the content of the application itself and personal contacts of its author with colleagues, this is clearly due to (1) the fact that the title of this application contains the misleading statement 'currently *Geochelone (Aldabrachelys) gigantea*', and (2) the fact that the *Code* states that while such a case is under consideration the invalid name (under the normal rules) has to be used! On the last check-list of the extant turtles and tortoises by Rhodin et al. (2009), contrary to that by Fritz & Havas (2007), both combinations *Aldabrachelys gigantea* and *Dipsochelys dussumieri* are proposed together as an alternative to name the Aldabra tortoise. Pending the decision of the Commission, this appears to us the best attitude to adopt in the present highly controversial situation.

The arguments of the supporters of Frazier's application are mostly directed against the name *dussumieri*, but this is a biased presentation of the facts. The name *dussumieri* was resurrected as the valid one for the Aldabra tortoise only in 1995 (Gerlach & Canning, 1995; Gerlach, 1997), but the fact that the name *gigantea* does not apply to the Aldabra tortoise had been established 13 years earlier, by Bour (1982). Bour had made an error concerning the biological species to which the holotype of *gigantea* belonged, an error corrected by Pritchard (1986) twenty years before the rediscovery of the holotype specimen by Bour (2006), but nevertheless it has been clear from 1982 that the name *gigantea*, created for a tortoise from Brazil, does not apply to the Aldabra tortoise. Therefore, between 1982 and 1995, pending the resurrection of the name *dussumieri*, it was normal and correct to use the name *elephantina* for this species, which explains why 18.5 % of the Google hits obtained by Bour, Pritchard & Iverson (BZN 67: 73–77, March 2010) concern this name. The Seychelles Island Foundation (SIF), some twenty members of which signed comments in support of the use of *Geochelone gigantea*, still recently used official documents where the Aldabra tortoise was named either *Dipsochelys dussumieri* or *Testudo elephantina* (e.g. Beaver & Gerlach, 1998; Anonymous, 2001). Furthermore, and contrary to the statements of Frazier and his supporters, the name *elephantina* had also been used a long time prior to 1982 by some authors, and there was no period in history when the name *gigantea* was the only one used for the Aldabra tortoise. During the so-called period of 'universality' of usage of the name *gigantea*, the name *elephantina* was regularly used as valid for a species or subspecies by a

minority of authors: e.g. Fritsch, 1871; Günther, 1877; Peters, 1882; G.A. Boulenger, 1889; Strauch, 1890; Schacht, 1903 (as *Testudo elephantina*); E.G. Boulenger, 1914; Geiman & Wichterman, 1937; Evans & Quaranta, 1949; Quaranta & Evans, 1949; Urbain et al., 1951; Wermuth & Mertens, 1961; Georg et al., 1962; Steers, 1968.

The *Glossary* of the *Code* (p. 121) defines 'prevailing usage' of a name as follows: 'that usage of the name which is adopted by at least a substantial majority of the most recent authors concerned with the relevant taxon, irrespective of how long ago their work was published'. This definition is not clear, as it does not provide guidelines to recognise 'the most recent authors' and 'at least a substantial majority', but the minimum that the latter words may mean is that this is a majority of 'much more than 50 %'. It is therefore clear that the argument of 'usage' does not hold in the present case. There has never existed any 'universality of usage' for the scientific name of the Aldabra tortoise, but a diversity of usages, and stabilisation of usage in this case should come from simply following the *Code*. If 'usage' of a specific name in 46.3 % of recent publications and internet documents, including many posterior to an application urging the Commission to stabilise this usage, against 35.3 and 18.5 % for two other names (see Bour, Pritchard & Iverson, 2010), could be retained to nullify the rules of zoological nomenclature, then we might as well get rid of these rules altogether, including the Principle of Priority and, why not, the entire *Code* itself, leaving so-called 'consensus' to decide upon the valid names of taxa.

Identification of the holotypes

Nineteen (22.4 %) of the 85 supporters of the name *T. gigantea* challenged the identification of the holotype of *T. gigantea* and one (1.2 %) did so for the lectotype of *T. dussumieri*. Because giant insular tortoises tend to share many homoplasies due to similar environmental conditions, we consider that the specific identification of museum specimens can be relied upon only if carried out by experienced taxonomists well-acquainted with the group of modern land tortoises. This is stressed by a droll example: one month after publication in this Bulletin of his support for the original application regarding this case, a museum curator sent the Paris Museum for identification a set of photos of a specimen of giant land tortoise, stating that he was 'not too sure' about what this specimen could be. Well, this specimen happened to be unquestionably . . . an Aldabra tortoise!

Among the 91 persons who commented on this case, only three have personally examined the holotypes of the two nominal species here at stake. The lectotype RMNH 3231 of *Testudo dussumieri* Gray, 1831 has been examined only by Hoogmoed (then curator of the RMNH collection), Bour (1984) and Pritchard (during a visit to the Leiden Museum in 2000), and the holotype MNHN 9566 of *Testudo gigantea* Schweigger, 1812 has been examined so far only by Bour (2006), although Pritchard has examined an extensive set of colour photographs of this specimen, sent to him by Bour. All other authors who commented on the taxonomic allocation of these specimens did so only on the basis of the original descriptions (which they presumably read) or possibly of published photographs of the holotypes, if they indeed had access to their publication in a little known journal (Bour, 2006). None of them ever wrote to our Museum to request access to the holotype of *T. gigantea*, or to photographs, radiographs or measurements of it, and we note with some regret that perhaps even the assumption that the contributors to this discussion

read Schweigger's original work, as well as those of Pritchard and Bour, may be in error for some of them.

Among the 16 testudinid taxonomists involved in the discussion beside Bour, 5 expressly mentioned that they agreed with Bour's (2006) statement that the specimen MNHN 9566 is indeed the specimen that had been described by Schweigger (1812), 6 did not question this statement, and 5 (Arnold, Fritz, Meylan, Parham & Rhodin) expressed scepticism about it, but did not identify a single morphological or anatomical character of this specimen that was not compatible with the original description. Another taxonomist (Matyot) questioned the origin of the holotype of *T. dussumieri*, but did not provide a reasonable argument to back up this opinion (see Bour, Iverson & Pritchard, 2010).

Finally, none of these supporters of Frazier's application provided any argument to explain the discrepancies between the original description of *Testudo gigantea* by Schweigger (1812) and the biological species of the Aldabra tortoise. Therefore, following the precise conditions put by Article 75.3 of the *Code* for allowing a neotype designation, it is clear that, as stated by Bour & Pritchard, Cheke, Gerlach and Hoogmoed, the designation of a neotype for this species by Frazier (2006) is invalid, as this specimen does not come from the original type locality (Brazil) and differs in several important characters (see the comments by Bour & Pritchard and by Gerlach) from the original description. Nobody in the world can agree that a specimen from Aldabra qualifies as coming 'as nearly as practicable from the original type locality' (Article 75.3.6) of a tortoise from Brazil. Therefore, even if the holotype of this nominal species had not been rediscovered, this designation would be null and void, and should have been replaced by another one based on a tortoise specimen from Brazil or, if this had turned impracticable (e.g. because of restrictive laws on the export of specimens of this endangered species), from a neighbouring country.

Therefore, we concur with Bour & Pritchard, Cheke, Gerlach, Hoogmoed and Iverson that no evidence has been provided by the supporters of the application that Bour's (1984, 2006) taxonomic interpretations of the holotype of *T. gigantea* and of the lectotype of *T. dussumieri* are incorrect. These data dictate that the Commission should not use its plenary power to set aside all previous type fixations, validate Frazier's neotype for the former, and suppress the latter.

Discussion

As present or past curators of an important natural history museum collection, we are quite worried about the turn that this discussion has taken. Most of its actors based their comments on opinions, tastes, or just 'deep feelings', rather than on the respective merits of rational arguments. In particular, we were very shocked to see the publication of personal attacks against our colleague Roger Bour, questioning his honesty and suggesting that he manipulated scientific data. These published statements will remain available in the literature long after the death of all contributors to this discussion. We have known Roger for about 40 years and we would like to praise his scientific competence, his intellectual honesty and his refusal to make 'political calculations' to allow his opinions to win or to enhance his career. He has devoted a lot of his professional life to clarifying difficult taxonomic and nomenclatural problems in chelonians, identifying old 'forgotten' types in many museums worldwide, and thus permitting genuine nomenclatural stabilisation based on scientific data, not on 'impressions',

‘profound hunches’ or ‘lobbies’. We understand these repeated attacks as a disapproval and a denial of the quality of his work, and we think he deserves better treatment from the part of the many colleagues worldwide who benefited from his help in their research for decades. We consider this failure as a pernicious result of the opening of this unwarranted case in this Bulletin, which is itself a consequence of the emphasis put by the Commission in recent years on ‘usage’ against the rules of the *Code*.

We agree with Hoogmoed’s statement that ‘*Frazier’s proposal is completely unnecessary, because the facts are clear and the rules of the [Code] provide solutions for this situation*’. The case at stake here in fact concerns neither conservation biology nor nomenclatural stability, but simply the accuracy of taxonomic work.

The doubts cast by some authors about the rediscovery of a holotype in an old collection like that of the Paris Museum demonstrate a poor knowledge about such historical collections. As experienced taxonomists, we had on various occasions the opportunity to rediscover specimens that were not labelled as types, not only in the Paris Museum but also in other old historically important collections, like those of London or Berlin. An important part of the herpetological collection of the Paris Museum, but even more so of the mammal and bird collections of that institution, is composed of historical specimens, many of which can potentially be name-bearing types, or at least vouchers of specimens mentioned in ancient publications. Such publications date from the end of the 18th and the 19th century, when no such regulations as the *Code* existed and no proper labelling of specimens as ‘types’ could be done, as such a concept did not exist or was used in a very vague way (e.g. an author could then decide to replace the original ‘type’ by a ‘more appropriate’ specimen). In a work in progress, the type catalogue of hylid frogs in the Paris Museum herpetological collection (Ohler et al., in preparation) covers 156 names; 67 (43 %) were created in works published before 1854, and 90 (58 %) before 1900, at the time of implementation of the first *Code* (the ‘*Règles*’). A similar proportion of old names would probably be found in other parts of the collection, or this proportion may even be higher for a well-studied group like the chelonians. Some of the intervenors in this debate seemed to consider that it would be a crime of lese-majesty to consider that Duméril & Bibron, ‘these two doyens of herpetology’ (Lenin & Frazier, 2009) could have made an identification error on a specimen. However, everybody can make a mistake and, considering the monumental work they produced, there is nothing surprising or shocking to note that Duméril & Bibron (1834–1854) made a number of mistakes, not only about the identity of the holotype of *Testudo gigantea* (e.g. Shea, 2001; Lescure & Ohler, in preparation).

Old museum collections covering the whole of zoology still harbour thousands of historical specimens, including name-bearing types that have not yet been identified as such. Every thorough survey of old specimens of any zoological group in such museums is an adventure which can be as exciting as field work in the remotest places of the earth. Doing so, one sometimes finds unexpected results, e.g. regarding the taxonomic identification of old name-bearing types, and some names have to change. The increased availability and application of DNA sequencing technology to the proper taxonomic identification of name-bearing types promises that the frequency of nomenclatural complications will only increase. Should curators and taxonomists stop exploring these resources to avoid such unexpected findings? Should they throw away these old specimens for fear that they would upset ‘usage’ of the names at stake and then threaten

the personal comfort of some persons long involved in researches dealing with these animals? Should we just close museums in order to please ‘conservationists’ (of names)?

Bouchet (BZN 66: 77, March 2009) rightly stressed that ‘Vertebrate paleontology survived the name *Brontosaurus* giving way to *Apatosaurus*’, and it can be quite safely added that the extinction of these animals was not caused by this synonymisation. All palaeontologists now use the name *Apatosaurus* for this genus, and this change did not create problems for non-taxonomists, who may still use the common English name ‘brontosaurus’ for these animals. Whatever scientific name will ultimately be retained for this species, the Aldabra tortoise is and will remain designated under its common name in many ‘non-taxonomic’ texts, including ‘conservation biology’ documents. Although different scientific names have been used for this species in the recent years, it has been clear to all involved that all those names designated the Aldabra tortoise and stabilisation of its scientific name will be an easy task as soon as the Commission has made its decision.

Conclusion

In conclusion, we urge the Commission to refrain from using its plenary power to suppress the holotype of *Testudo gigantea* Schweigger, 1812 or the name *Testudo dussumieri* Gray, 1831, and to simply place both these names, as defined by their name-bearing type specimens (respectively the holotype MNHN 9554 and the lectotype RMNH 3231), as well as the generic names *Aldabrachelys* Loveridge & Williams, 1957 and *Dipsochelys* Bour, 1982, as defined by their type species (respectively *Testudo gigantea* Schweigger, 1812 and *Testudo elephantina* Duméril & Bibron, 1835) on the Official Lists of Specific and Generic Names in Zoology.

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Having conducted systematic research on reptiles in the Indian Ocean for almost 25 years, I (and many others) have become increasingly frustrated by the ongoing nomenclatural confusion associated with the Aldabra tortoise. And now, it is remarkable to find 58 pages of Volume 66 of the *Bulletin of Zoological Nomenclature* being devoted to this one topic. This is a striking example where a ruling from the Commission is now urgently needed concerning Jack Frazier's Case 3463, which proposes to conserve the species name of the Aldabra tortoise as *gigantea*.

While I am sympathetic to the arguments made by colleagues that the holotype of *Testudo gigantea* Schweigger, 1812 is actually a *Chelonoidis denticulata* (Linnaeus, 1766) collected from Brazil, unfortunately, the rediscovery of this long lost holotype has not been universally accepted by the systematic community (see earlier comments on this case). Further, there is now new doubt that the lectotype of *Testudo dussumieri* Gray 1831 was collected from Aldabra (Matyot, BZN 66: 352–354, September, 2009).

The best solution for dealing with all this uncertainty is the designation of a neotype that clearly originates from Aldabra, and conserving the species name that has the broadest current recognition and usage. Jack Frazier's Case 3463 proposes that *Testudo gigantea* Schweigger, 1812 is conserved to stabilize the nomenclature of the Aldabra tortoise, and that the specimen USNM 269962 collected from Aldabra, is designated as the neotype for this species. I support the designation of this neotype with well-documented provenance from Aldabra and, based on the published comments presented in response to this case, it is clear that there is strongest support for conserving the species name *gigantea*.

Comments on the proposed conservation of usage of *Archaeopteryx lithographica* von Meyer, 1861 (Aves) by designation of a neotype.

(Case 3390; see BZN 64: 182–184, 261–262; 65: 314–317; 66: 87–88, 357–358)

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Padian's (BZN 66: 357–358) suggestion that the isolated fossil feather described by von Meyer (1861a) is a satisfactory holotype for the nominal species *Archaeopteryx lithographica* deserves to be rejected for several reasons. All of these points had already been addressed in the original application and/or in the published comments, but as they have been passed over without discussion, a recap seems to be necessary:

(1) The suggestion that the single feather can be unequivocally identified with the skeleton finds made to date is based on the premise that only one species of feather-bearing animals ever lived at the discovery localities and their surroundings. The taxonomic judgement that the skeleton finds made to date belong to a single