

**COMMENTARY: The correct names of Old World vultures and their sequence.***Peter. J. Mundy*<sup>†</sup>

<sup>†</sup> *Peter Mundy passed away before the final revisions of the article could be completed. The article was accepted for publication in its latest form.*

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“ ... to affix to each species the specific name to which it is by priority entitled, ... “

“ ... that order being such as has appeared ... the most conformable to their natural affinities.”

(Gurney 1864: v)

“Having the taxonomic hierarchy of names reflects evolutionary history ... “

(Mindell *et al.* 2018: 3)

**Introduction**

For very many years I have been interested in, and concerned about, the correct names of vultures (particularly in Latin), and also the sequence of the species in any list. I first delved into this with Mundy (1984), considering at that time that the important works were Brown & Amadon (1968) and Stresemann & Amadon (1979). One of the big arguments back then was whether the Cathartid (New World) vultures were storks (e.g. Rea 1983) or raptors. Four more works have since come on the scene, important in a taxonomic context, being Amadon & Bull (1988), Sibley & Monroe (1990), del Hoyo *et al.* (1994), and Ferguson-Lees & Christie (2001). Indeed, the last one admits that its classification is a “conventional” one (*op. cit.*: 69). Let’s unravel that word and say that all previous and early studies relied on morphology, ecology, behaviour, likeness, etc., to express relationships. A *tour de force* back in those days was certainly Jollie’s work (1976, 1977 a,b,c) based on anatomy and the skeletal system; his conclusion was that the Falconiformes is a polyphyletic grouping. This echoed in much greater detail his earlier position (Jollie 1953).

**“Conventional” classification**

But back to the nearly-present day: the names and sequence of species by Ferguson-Lees & Christie (2001: 6 and 7) are shown in their table of contents (only). The nomenclature of the Cathartids has been stable for many years, but note that these authors agree that the “New World vultures [are] actually closely related to the storks” (*op. cit.*: 69), and in this they are on the same side as Amadon & Bull (1988: 297) and del Hoyo *et al.* (1994: 25 and 52). However, whereas Amadon & Bull (*op. cit.*) noted that the New World vultures had “peculiarities”,

nevertheless they preferred to keep them in the Falconiformes “for now”. But as Sibley & Ahlquist (1990: 484) pithily remarked, how long is that? Confusion is also shown by del Hoyo *et al.* (1994): they maintain the Cathartidae in the Falconiformes (*op. cit.*: 23), but their authors Houston (1994: 25) and Thiollay (1994: 52) accepted its close relationship to the storks. Ferguson-Lees & Christie (2001: 17) even described the New World vultures as “short-necked storks with a hooked bill” and separated them off into the Order Ciconiiformes. At long last, one could say, and not before time. (But wait!, see below).

For the Accipitrid vultures, several changes can be noted. (i) We have stated before (Mundy *et al.* 1992: 27) that up to that time Amadon & Bull (1988) were the first authors to get all the Latin names correct, except for *rueppellii* (see below). (ii) The name Bearded Vulture is surely to be preferred over Lammergeier, from the French Gypaète barbu and the German Bartgeier, in spite of their opinion (Amadon & Bull 1988: 302) that the Bearded Vulture may not be a vulture at all. See Mundy *et al.* (1992: Table 44) for comparisons between the Bearded and Egyptian Vultures, suggesting they are closely related. (iii) Both Amadon & Bull (1988: 310) and del Hoyo *et al.* (1994: 127 and 128) have used “Griffon” for the large cliff-nesting *Gyps* species, as also did Sibley & Monroe (1990: 271-2) (except inexplicably the [Indian] Long-billed Vulture), with the first two authorities considering the five *Gyps* species as forming a superspecies (Amadon 1966), rightly in my view (Mundy 2002). Indeed, this opinion was first stated by Sharpe (1874: 5) though he did not use the term, rather saying “five distinguishable species” of the “Griffon Vultures”. Then Ferguson-Lees & Christie (2001: 77) discarded the word “Griffon”, prompting me to make a case in its defence (Mundy 2002, also Mundy 2017). (iv) In addition, I still maintain my opinion that the two smaller tree-nesting white-backed vultures should rather be separated in their own genus of *Pseudogyps*, from Sharpe (1873). No recent authority or study agrees with that! (v) More seriously, both del Hoyo *et al.* (1994: 129) and Ferguson-Lees & Christie (2001: 439) have wrongly used *tracheliotus* for the Lappet-faced Vulture instead of *tracheliotos*. We explained this correction (Mundy *et al.* 1992: 148 and 150, from Rookmaaker 1986); the correct name originated from François Levillant’s baptism as Oricou for the species (Rookmaaker *et al.* 2004: 213-219). Note that the word for ear in Greek is otos, whereas otus is Latin for owl!

(vi) In the nineteenth century, the Rüppell’s Griffon was consistently called *rueppelli* (e.g. Sharpe 1874: 9) whereas in the twentieth century it was just as consistently spelled *rueppellii*, starting with Sclater (1924: 47, actually as *rüppellii*). The original namer, Alfred Eduard Brehm, used both spellings as *Ruppellii* (Brehm 1852: 44) and *Rüppelli* (*op. cit.*: 47) in his article. I have not been able to discern why one or other of the later authors favoured either *rueppelli* or *rueppellii*, but now it is *rueppelli*. I have recently told the story (Mundy 2016), which also unnecessarily involves the ‘First Reviser’. (vii) Finally, and no doubt following Dean Amadon’s lead (Amadon 1977, Stresemann & Amadon 1979: 308-9, Amadon & Bull 1988: 310), Ferguson-Lees & Christie (2001: 7) put the four large dark/black vultures all together in the genus *Aegypius*. This is a possible if not probable decision: they are solitary (territorial?), tree-nesting, and rather similar in their ecology especially in their approach to carcasses, and two of them (at least) have the same ‘head-twist’ (Kopfdrehen, König 1976). But as yet there is still no comparative behavioural study of these four ‘king’ species, so each should meantime remain in its own genus.

Perhaps the last word in this section could go to Kemp & Crowe (1990) who did a phylogenetic analysis of diurnal raptors, using 37 derived characters from an examination of museum skins and literature. Their main conclusions were: Cathartidae are “most closely related to storks”; within the Accipitridae is a group of eagle-like clades that includes the Old World vultures but with *Gypaetus* included in the “aquilae” and separated from *Neophron* and all the other Old World vultures (here called “aegypii”); and that the primary radiation of diurnal raptors had occurred when the Gondwana continents “were still closely associated” or at least before they became “widely separated” (*op. cit.*: 173). This last conclusion is

astounding and wrong! Gondwanaland, the ancient, southern supercontinent, originally comprised Africa, Antarctica, Arabian Peninsula, Australasia, Indian subcontinent, and South America; it started to split up “around 200 million years ago” (Anderson 2001: 8). By the end of the Cretaceous period, about 69 Mya (and before the asteroid), these continents were already very widely separated (Anderson 2001: 37). Birds of prey, and particularly vultures, date back to the Eocene period, “more than 50 million years ago” (Rich 1983). (Only the New World vultures, not the Old World vultures). Meanwhile mention should be made of Holdaway’s (1994, but presented at a conference in 1992) phylogenetic (=cladistic) analysis of the Accipitridae, using some or other of a marvelous array of 273 osteological characters. *Aegyptius*, *Gyps* and *Necrosyrtes* clustered together as ‘core’ Aegyptiines, but *Gypaetus* was separated from *Neophron*.

Be all that as it may, I take the year of 1990 as a key one in the progress of studies on the taxonomy of birds of prey (next section). Hopefully the correct names of vultures can now be laid to rest (barring my insistence (?) on griffon and *Pseudogyps*!); however the sequence of species is still in a state of flux.

### Molecular studies with DNA

These began with Sibley & Ahlquist (1990). They wrote a detailed history of the classification of diurnal raptors that started with Linnaeus and his first order of birds, named the Accipitres. This method of DNA-DNA hybridization broke the ‘stalemate’ of the previous morphological studies, which had “not achieved a consensus” (*op. cit.*: 484). They concluded that the Cathartidae are more closely related to the storks. They also proposed that the Old World vultures, which are “carrion-eating eagles” (*op. cit.*: 485) (meaning they evolved from eagles?), diverged as a clade from typical

accipitrines round 23.4 Mya, a (very) long time after the break-up of Gondwanaland, and when grasslands (food for grazing ungulates) had expanded in the Oligocene epoch, 38-22 Mya. This (late) date of 23.4 Mya is in line with the known fossil history of Old World vultures (Rich 1983: 17, Mundy *et al.* 1992: 54 and Table 12), with the oldest *Arikarornis* being dated to the Lower Miocene (Howard 1966), about 20 Mya (?).

The hybridization method was quickly overtaken by sequence data of, in the first instance, the cytochrome *b* gene in the mitochondria (Wink 2007: 63), then later to include nuclear genes. A spate of studies on DNA molecules has followed which have in effect also made redundant the earlier phylogenetic work on morphological/anatomical characters. First in the field was Ingrid Seibold’s study, from Michael Wink’s laboratory, of birds of prey, based on “nucleotide sequences of the mitochondrial cytochrome *b* gene” (Seibold 1994: 168). New World vultures are an “offshoot of the storks”, and Old World vultures comprise two different lineages (Seibold *et al.* 1994). These authors stated that “if the cytochrome *b* gene tree accurately reflects vulture phylogeny (!, that is the point), then *Gypaetus* and *Neophron* together are more ancient than the more recent *Aegyptius* and *Gyps*. Interestingly, Seibold *et al.* (1994) had *Aegyptius*, *Torgos*, *Sarcogyps* and *Trigonoceps* clustered together (in her PhD thesis, Seibold suggested uniting them in a single genus), these four species with *Necrosyrtes* being what we called the ‘dark’ or black vultures (Mundy *et al.* 1992: 21 and 28). The dam had now broken, and molecular phylogenetics became the way to go, with studies abounding up until today.

Eventually a nuclear gene was also used (Lerner & Mindell 2005, Griffiths *et al.* 2007), and by the latest study considered here (Mindell *et al.* 2018) no less than six nuclear genes were so employed (along with four mitochondrial genes). Presumably

absorbing the molecular phylogenetics before them, del Hoyo & Collar (2014) produced a list of New World and Old World vultures. In view of the tremendous achievement and importance of this work, their names and sequences (again, not listed separately) are to be emphasised. It is therefore to be regretted that their (non) listing has retrogressed! Nevertheless, they have usefully indicated those species that have subspecies “currently / tentatively / usually / generally recognised” (del Hoyo & Collar 2014: 516, 522, 526, 528) as well as the IUCN’s assessment of endangerment (five categories from critically endangered to least concern), actually done by BirdLife International. In particular they put the New World vultures into their own Order Cathartiformes (following Voous 1985: xii), and they show the two lineages of Old World vultures, viz. Tribes Gypaetini and Gypini, in different Subfamilies. Happily all the Latin names are correct, but ignoring *Pseudogyps*, and for the English names they have disdained “Griffon” for “Vulture”, except curiously for the Himalayan Griffon (on large size?). But most seriously they have inserted the two white-backed vultures (numbers 50 and 51) into the larger *Gyps* group, between number 49 (Himalayan Griffon) and 52 (Indian Vulture), and unforgivably they have separated the four dark/black vultures into two distant pairs, viz. 46 and 47, and 57 and 58. They acknowledge that *Sarcogyps*, *Trigonoceps* and *Torgos* are “often/formerly subsumed within *Aegypius*” (*op. cit.*: 526 and 528), but still they have separated them by eight species of *Gyps* and *Necrosyrtes*. Very strange!

Finally, we can come to the most recent study considered here, that by Mindell *et al.* (2018). Their names and sequence were shown in their Table 1.1. As noted before, the Cathartid vultures are stable in their nomenclature and in their own Order Cathartiformes. The two lineages of Old World vultures (Gypaetinae and Aegypiinae) are shown. In Table 1.1, all Latin names are correct (though it

should be Cape not cape), but in Figure 1.2c the authors have wrongly reverted to *rueppellii* and *tracheliotus*. The order of species is different between Table 1.1 and Figure 1.2c. In particular they have kept the dark/black vultures together, though separating off the Hooded Vulture at the start of the Aegypiinae, and (rightly in my view) maintained each in its own genus. This is surely to be preferred.

Mindell *et al.* (2018) have introduced a significant and crucial criterion, that of the age of a clade, genus and species – “taxonomic categories [should] reflect approximate ages of named taxa” (*op. cit.*: 4). Could we then expect that an earlier species would appear in a sequence before a later one? From Figure 1.2c, it seems that *africanus* is seen first and *coprotheres/indicus* last; *africanus* is listed first in Table 1.1 and *coprotheres* last, but the other *Gyps* species do not have the same sequence. For their Table 1.1, the authors have based it on Gill and Donsker (2017, version 7.1). I was able to refer to version 10.2 (Gill *et al.* 2020, accessed 25 July 2020), and while that sequence also begins with *africanus*, the other *Gyps* are in a different order. All very confusing if not irritating!

In brief then, and in spite of the number of studies that deal with the taxonomy of diurnal raptors, both morphologically (the conventional classification) and in terms of DNA in genes, from perhaps Sharpe (1874) to Mindell *et al.* (2018), no one classification has got the names and sequence of vultures in an agreeable fashion (to me). Probably we should be surprised at that situation. Notwithstanding, I would here like to propose my own version, particularly for the Old World vultures, in Table 1. In this regard, there are seven questions that need to be answered:

- (i) As an Order with several Families, is the Falconiformes (or currently the Accipitriformes) monophyletic or polyphyletic?

- (ii) Are the New World vultures (Cathartidae) closer to the storks than to the diurnal birds of prey?
- (iii) Are the Old World vultures themselves (now 16 species) monophyletic or polyphyletic?
- (iv) Are *Gyps* species, i.e. the true griffons, recognised as comprising a superspecies, and if so what should their names and sequence be?
- (v) Is *Pseudogyps* recognised as the genus for the two smaller, tree-nesting white-backed vultures?
- (vi) How are the dark/black vultures (five species) to be treated?
- (vii) Finally, what should be a nomenclature and sequence for the Old World vultures?
- (iii) The Old World vultures are now generally seen as a polyphyletic group. In particular, *Gypaetus*, *Neophron* and *Gypohierax* all sit comfortably with each other and with the harrier-hawks (gymnogenes) *Polyboroides* spp., and as a different lineage or clade to the core-vultures. Note that the Subfamily for this latter group is Accipitrinae, Tribe Gypini (del Hoyo & Collar 2014) or back to an original name of (Subfamily) Aegyptiinae (Mindell *et al.* 2018).
- (iv) Five large vultures in the genus *Gyps*, viz. *fulvus* (1783), *indicus* (1786), *coprotheres* (1798), *rueppelli* (1852) and *himalayensis* (1869) (with their dates of scientific naming) share so many characteristics (Mundy 2002), and are just about allopatric to each other (Mundy *et al.* 1992: 20), as clearly to form a superspecies (Amadon 1966). This has been recognised by other authorities, e.g. Ferguson-Lees & Christie (2001: 7) and del Hoyo & Collar (2014: 526, but called a “species-group” by them). In my terminology these five species are griffons, which is a special kind of vulture, even a super-vulture. The newly accepted Slender-billed Vulture *Gyps tenuirostris* is not a griffon, rather so far an unusual kind of vulture (Mundy in press), though still a *Gyps* of some sort. What sequence should these five species have? – by history/naming (as above), or on distribution perhaps? Note that *fulvus* and *rueppelli* have the largest ranges and *coprotheres* the smallest (Mundy *et al.* 1992: Table 2). Objectively, they should have the order dictated by the appearance of each taxon in the phylogenetic record. This puts the listing by Mindell *et al.* (2018: Figure 1.2c), as the ‘front-runner’, viz. *himalayensis* first, then *rueppelli*, *fulvus*,

Answers are as follows:

- (i) Earlier called the Falconiformes (e.g. by del Hoyo *et al.* 1994: 23) but now the Accipitriformes (from Ferguson-Lees & Christie 2001 onwards), the Order has included the Families Accipitridae and Pandionidae, and sometimes others, viz. Sagittariidae, Cathartidae and Falconidae. No modern study supports the monophyly of the Order (Griffiths *et al.* 2007: 594, Mindell *et al.* 2018: 12), which harks back to Jollie’s (1976: 285) opinion.
- (ii) Whereas for years the similarities between New World vultures and storks were emphasised (up to Sibley & Monroe 1990: xii) such that Cathartidae were placed in the Order Ciconiiformes (Ferguson-Lees & Christie 2001: 6), today these vultures have their own Order Cathartiformes. This is now considered to be “sister to ... Accipitriformes” (Mindell *et al.* 2018: 5). Indeed these authors put the same age on these two Orders, arising about 60 Mya.

[*tenuirostris*], *indicus* and *coprotheres* last. In fact these species are clustered tightly together, so one wonders how they differentiated them (not explained by these authors)? For example, the Himalayan Griffon is larger than all the others (Bergmann's rule?), was it really the first one to appear? Never mind, their list has something approaching an objective basis, and can be accepted for the time being.

(v) The two white-backed vultures, *bengalensis* and *africanus*, are not griffons but a different kind of bird though with some strong similarities; I have always thought of them as a 'compromise' vulture (Mundy 1982: 282) or perhaps a 'generalist'. Surely they have evolved away from the *Gyps* group which are specialists; how then can they have appeared before this group (Mindell *et al.* 2018: Figure 1.2c)? However, these authors are right to separate them off from the *Gyps* clade. They are similarly separated by Johnson *et al.* (2006: 6). Therefore, I have always appreciated Sharpe's (1873) viewpoint that they deserve their own genus *Pseudogyps*, though he did that distinction only on the number of tail feathers (12 in distinction to 14). Regrettably this distinction of *Pseudogyps* has always been scorned (e.g. Sibley & Monroe 1990: 271, Seibold & Helbig 1995: 163, Johnson *et al.* 2006: 1), or "subsumed into *Gyps*" (Griffiths *et al.* 2007: 598). The white-backed vultures are different from their local griffons, and I don't expect one gene (cytochrome b?) to be able to tell them apart. Arshad *et al.* (2009) used both the cytochrome b and a nuclear gene, and did not even mention *Pseudogyps*; the Indian White-rumped Vulture *bengalensis* showed the "earliest divergence" (*op. cit.*: 419). Mindell *et al.* (2018: 12) used ten genes and

also failed to mention *Pseudogyps*. Was their earliest divergence of *africanus* followed by *bengalensis*, about two million years ago (*op. cit.* : Figure 1.2c)? I wonder how many genes need to be examined before my adherence to *Pseudogyps* can be justified?

(vi) All five species of dark/black vultures are each placed in their own monotypic genus by Mindell *et al.* (2018: Figure 1.2c). The same is done in version 10.2 of the IOC World Bird List. I think this is the correct treatment so far. But as regards the sequence of species, that shown by Mindell *et al.* (2018: Figure 1.2c) is preferable over that shown in their Table 1.1, in that *Necrosyrtes monachus* should be the link between this group of four black species and the larger *Gyps* clade. We previously thought of *Necrosyrtes* as an "excellent link" (Mundy *et al.* 1992: 28) between the two 'super-groups' of vultures, but without specifying our reasons. Lerner & Mindell (2005: 340) stated that *Necrosyrtes* is "more closely related to ... *Gyps* than to the other four [black] monotypic ... genera", though behaviourally and ecologically it is more similar to the latter group. Either way it should follow *Gyps* (actually the white-backed vultures) and link them to the dark/black group. Curiously, *Aegyptius monachus* is named the Cinereous Vulture (Amadon & Bull 1988: 310), Eurasian Black Vulture (del Hoyo *et al.* 1994: 128) and Monk Vulture (Ferguson-Lees & Christie 2001: 7 and 437). The name Cinereous, meaning ashy/ashy-grey, fits the adult bird the best.

(vii) In summary, and considering all the above points, I have shown my preferred nomenclature and sequence for the Old World vultures in Table 1.

**Table 1:** Names and sequence of Old World vultures as preferred by me (P.J.Mundy).

Order Accipitriformes	
Family Accipitridae	
Subfamily Gypaetinae	
Palm-nut Vulture	<i>Gypohierax angolensis</i>
Bearded Vulture	<i>Gypaetus barbatus</i>
Egyptian Vulture	<i>Neophron percnopterus</i>
Subfamily Accipitrinae	
Himalayan Griffon	<i>Gyps himalayensis</i> *
Rüppell's Griffon	<i>Gyps rueppelli</i> *
Eurasian Griffon	<i>Gyps fulvus</i> *
Indian Griffon	<i>Gyps indicus</i> *
Cape Griffon	<i>Gyps coprotheres</i> *
Slender-billed Vulture	<i>Gyps tenuirostris</i>
African White-backed Vulture	<i>Pseudogyps africanus</i>
Indian White-rumped Vulture	<i>Pseudogyps bengalensis</i>
Hooded Vulture	<i>Necrosyrtes monachus</i>
Cinereous Vulture	<i>Aegyptius monachus</i>
Lappet-faced Vulture	<i>Torgos tracheliotos</i>
White-headed Vulture	<i>Trigonoceps occipitalis</i>
Red-headed Vulture	<i>Sarcogyps calvus</i>

Note: those *Gyps* species marked with an asterisk (\*) comprise a superspecies.

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