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Aerial casque-butting in the Great Hornbill *Buceros bicornis*

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Recently, Cranbrook and Kemp (1995) drew attention to the phenomenon of aggressive interactions among Asian hornbills (Bucerotidae) involving individuals (males) clashing their casques in mid-air flight. Among the six genera and 31 species of Asian hornbills now recognized (Poonswad and Kemp 1993, Kemp 1995), such aerial casque-butting has been reliably reported only in a single species of large hornbill, belonging to the genus *Buceros*. This is the Helmeted Hornbill, *Buceros* (subgenus *Rhinoplax*) *vigil*, which was only recently placed in this genus (Kemp 1955). A reference to the existence of aerial casque-butting behaviour in the Great (Pied) Hornbill, *B. bicornis*, was made in Poonswad and Kemp (1993, p. 104); this was, however, later reported to be an error (Cranbrook and Kemp 1995). All species of *Buceros* are territorial as adults when breeding, and it is of much interest, particularly in the face of cladistic changes in the taxonomy, to see which aspects of behaviour are shared among the species.

Here, I report field observation of the rare aerial casque-butting behaviour in the Great Hornbill. During a six-month study of the impact of shifting cultivation on tropical rainforest bird communities (Raman 1995), aerial casque-butting was observed in this species in a rainforest region in northeast India. The study area, Dampa Tiger Reserve (c. 500 km^2, 23°20'–23°47'N and 92°15'–92°30'E), in western Mizoram state, contains an extensive tract of tropical evergreen forest vegetation. Two other species of hornbills, the Wreathed Hornbill, *Rhyticeros* (= *Aceros*) *undulatus* and the Oriental Pied Hornbill *Anthracoceros albirostris* (incorrectly called *A. malabaricus* in Ali and Ripley 1987) also occur in the study area and were seen on a regular basis in the rainforest.

On 11 April 1995, while walking a transect in mature rainforest in the Tuichar valley near the Chawrpialtlang range (altitude c. 450 m), four Great Hornbills were spotted. Three of the birds were males and were perched on an emergent *Tetrameles nudiflora* tree. A female was also perched nearby. At 06h21, one of the males took off from the branch where it was perched, flew out just above another perched male, and while still in flight, clashed its casque loudly with that of the perched male. Flying past the perched male, it then settled on another branch. After a few seconds, it took off from the perch and repeated the behaviour, clashing its casque with the perched male. This performance was repeated several times, until 06h30, when all the birds took off and flew away in the same direction. To all appearances, the other male and the female did not participate in the above interaction. It also should be noted that this observation, where one of the interacting males was perched, is different from that reported for Helmeted Hornbills, where both individuals clashed their casques in mid-air flight (Cranbrook and Kemp 1995).

The observed behaviour may have been a territorial interaction among the hornbills, which had the enhanced yellow plumage colouration developed during the breeding season (Ali and Ripley 1987, R. Kannan pers. comm.). It is intriguing that the interaction was seen between only two of the three males present. It is not known, however, whether the other male joined in the interaction after the hornbills disappeared from view (chased by one male?). Could the male-male aggression have been a form of competition or display for securing the female, as two of the males appeared to be unpaired? Unfortunately, the exact breeding season of Great Hornbills could not be determined during the study. Judging from the observation of plumage and vocalizations, however, it appeared that some initiation of breeding activity may have occurred between late February and May and breeding may have continued after the onset of the monsoon (mid-May to June) after I left the study area. Ali and Ripley (1987) report April-May as the (onset of?) breeding season of this species in the Himalayas. Preliminary observations from Pakhui Wildlife Sanctuary in Arunachal Pradesh also seem to indicate that breeding in the Great Hornbill begins around April-May (A. Datta pers. comm). While more definitive evidence is required, it seems likely that the observed behaviour is thus a pre-breeding interaction between adults.

With regard to the recent placement of Helmeted Hornbills in the same genus as the Great Hornbill, the fact that this rare behaviour has so far been reported from only these two species is significant. A notable difference between the two species is, however, that the Helmeted Hornbill, unlike other *Buceros*, has a solid casque (vs. hollow casque) that may be better suited to withstand aggressive casque-butting interactions. It would be interesting to discover if such aerial casque-butting behaviour occurs in the other species of *Buceros* hornbills as well.

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What is *Psittacus borneus* Linnaeus?

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Linnaeus's name *Psittacus borneus*, in the combination *Eos bornea*, has long been used for the Red Lory of the southern Moluccas, and in my view has been wrongly applied. The name is based on a plate by George Edwards (1751: Vol. 4, pl. 173), 'Long-tailed Scarlet Lory', in his *A natural history of birds*. The plate is reproduced on the front cover of this issue, and depicts a dark pink bird with a yellow bill and a grey patch round the eye. The bend of the wing is lime green, as are the primaries, the tips of the secondaries and the tips of the greater wing coverts. The bastard wing is of the same colour. The tail has the outer feather on each side green, and the tips of all the tail feathers green. There is a patch of cerulean blue on the inner secondaries as in other species of *Eos*. Edwards based his description on a stuffed bird that he bought in a toyshop in London. He also explained that it was purchased from him by Sir Hans Sloane, who put it in his gallery, where a gentleman who assured Sloane that he had seen the species alive in Borneo saw it. Edwards had examined it critically, and was satisfied that it was not an artifact. Linnaeus's name (1758: p. 97) was based entirely on this description and plate.

For many years *Psittacus borneus* puzzled authors, and Finsch (1868: Vol. 2, p. 911) listed it among his dubious species, but Salvadori (1874: p. 27, footnote) expressed the opinion that it probably represented a variety of the Red Lory, then called *Eos rubra* (Gmelin 1788: Vol. 1, p. 335). This is a scarlet bird marked with black and blue. The undertail coverts and longest scapulars are blue, as is a band from the thighs to the undertail coverts. The first four primaries are black, with the base of the inner web red, and the others are red with black tips. The tail is dull red above, and beneath is golden red, with the base of the inner web of each feather bright red. Salvadori's suggestion was seized upon by Rothschild (1898: p. 509), who proposed that the name *bornea* be used in place of *rubra* on the grounds that some specimens of *rubra* have greenish tips to the wings and tail. This, however, does not account for the differences between the two descriptions, and Rosemary Low (1977: p. 180) lists no such variety of the Red Lory that could be identified with *bornea*. She confirmed (pers. comm.) that she was unaware of any such variety. Thus *Psittacus borneus* was wrongly applied to the lory currently known by that name.

The oldest name that can be unequivocally taken to apply to the Red Lory is *Psittacus chinensis* P. L. S. Müller (1776: p. 77). This was based on Daubenton (1770-1786: pl. 519), 'Lory de la Chine'. This name, however, has never been in use for the species, and should not be resurrected now. The next available name is *Psittacus ruber* Gmelin (1788), based on the 'Moluccan Lory' of Latham (1781: Vol. 1, pt. 1, pp. 216, 274), in turn based on Sonnerat (1776: p. 177, tab. 112), Daubenton (1770-1786) and the 'Lori rouge' of Buffon (1770-1783: Vol. 6, p. 134). I recommend, therefore, that the name *Eos rubra* (Gmelin) be readopted for the Red Lory.

This leaves the question as to what, if anything, Linnaeus's name refers. It is no stranger to confusion. *Lorius borneus* Lesson (1831: p. 192), *Eos bornea* Souancé (1856: p. 226) and *Eos bornea* G. R. Gray (1859: p. 52) all refer to the bird now known as *Eos reticulata* S. Müller (1841: pp. 107-108). Edwards's description cannot be identified with any extant species, which means that it must either be an error or refer to a now extinct taxon or undocumented population. If the latter, the locality of Borneo is probably wrong, and was probably a place from whence birds in trade were obtained. The genus *Eos* extends over the Moluccas and Western Papuan Islands, but does not occur anywhere near Borneo. Possibly the bird occurred on one of the Moluccas; there are a number of islands within the range of the genus where no representative species actually occurs.