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Brief Communication: Predatory Bird Damage to the Taung Type-Skull of *Australopithecus africanus* Dart 1925

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ABSTRACT In this issue of the *Journal*, McGraw et al. ([2006] Am. J. Phys. Anthropol. 000:00–00) present new data on the taphonomic signature of bone assemblages accumulated by crowned hawk eagles (*Stephanoaetus coronatus*), including characteristic talon damage to the inferior orbits of primates preyed upon by these birds. Reexamination of the Taung juvenile hominin specimen (the type specimen of *Australopithecus africanus* Dart 1925) reveals previously undescribed damage to the orbital floors that is nearly identical to that seen in the crania of monkeys preyed upon by crowned hawk eagles (as reported by McGraw et al., this issue). This new evidence, along with previously described aspects of the nonhominin bone assemblage from Taung and damage to the neurocranium of the hominin specimen itself, strongly supports the hypothesis that a bird of prey was an accumulating agent at Taung, and that the Taung child itself was the victim of a bird of prey. Am J Phys Anthropol 131:166–168, 2006. © 2006 Wiley-Liss, Inc.

In 1995, the author and R.J. Clarke proposed that the Taung child hominin (the type specimen of *Australopithecus africanus* Dart 1925) and the associated faunal assemblage recovered in 1924–1925 from the Taung site in South Africa were collected not by what were perceived to be the traditional agencies of accumulation of hominins in the southern African context (such as big cats; Berger and Clarke, 1995; see also Brain, 1981), but by an avian accumulating agent, i.e., a large predatory bird most probably similar in behavior and size to the living crowned hawk eagle (*Stephanoaetus coronatus*). We reached this conclusion after examination of damage to the nonhominin primate material in the assemblage, which we demonstrated was similar to that found in the remains of faunal material collected and processed by eagles in southern Africa. Additionally, we argued that the distribution of body parts and the overall prey size and composition argued in favor of this novel hypothesis concerning the collecting agent of the assemblage. We further noted a single area of damage on the preserved cranium and endocast of the Taung child itself, which we interpreted as possibly a depressed flap-type fracture commonly found in prey of eagles that we had observed (Berger and Clarke, 1995).

Recognizing the importance of understanding predatory stresses on early hominins, the so-called "bird of prey" hypothesis predictably elicited significant debate in the literature. At the time, weaknesses in our knowledge and understanding of bird-of-prey load-lifting capacities were highlighted, and the very ability of large predatory birds to take such heavy prey as a juvenile early hominin was brought into question (see Hedenstrom, 1996; for our reply, see Berger and Clarke, 1996). More detailed studies, however, of large predatory bird behavior, and more specifically that of primate-hunting large-bodied raptors such as the crowned eagle, seemed to support our general hypothesis that the damage seen on the fossil bones at Taung, prey body parts, and prey body-size distribution were not out of character with the damage and distribution observed in bones collected by crowned eagles in other parts of Africa (reviewed in Sanders et al., 2003; McGraw et al., this issue). Furthermore, previous estimates of these birds' lifting capacities had been underestimated (Sanders et al., 2003).

Nevertheless, while evidence seemed to be mounting in support of our hypothesis concerning the accumulating agent of the Taung faunal assemblage, the critical issue of whether or not the Taung child itself had been collected by a large bird of prey hinged upon the small depressed area of bone found on the superior part of the Taung child skull that we had pointed out in Berger and Clarke (1995). This admittedly minimal and inconclusive area of damage was used to argue vigorously against the "bird of prey" hypothesis by McKee (2001) for the juvenile hominin specimen itself.

In the most recent paper on the topic, McGraw et al. (this issue) provide the most comprehensive study published to date of crowned hawk eagle collecting behavior and the taphonomic signal they leave behind. Their data were assembled from material collected in the Tai Forest, Ivory Coast. Their study adds substantially to the existing literature on the collecting behavior and abilities of this large bird, and further provides the most detailed examination of specific damage to the remains of prey species of *Stephanoaetus*. In particular, McGraw et al. (this issue) highlight several distinctive forms of

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Fig. 1. Anterosuperior oblique view of Taung specimen shows damage to right and left orbital floors (arrows).

Fig. 2. Anterolateral oblique view of right orbit of Taung shows puncture damage to orbital floor.

damage to the skulls of primates killed and eaten by crowned eagles that were not previously given such attention. While concluding that indeed the evidence collected adds weight to the "bird of prey" hypothesis, McGraw et al. (this issue) note (following McKee, 2001) that the lack of distinctive predatory bird-caused damage to the Taung skull itself remains a weakness that prevents final acceptance of this theory.

Fig. 3. Close-up of inferior portion of orbits of Taung. Anterior edge of damage to left orbital floor is highlighted. Posterior extent of damage is obscured by adherent matrix.

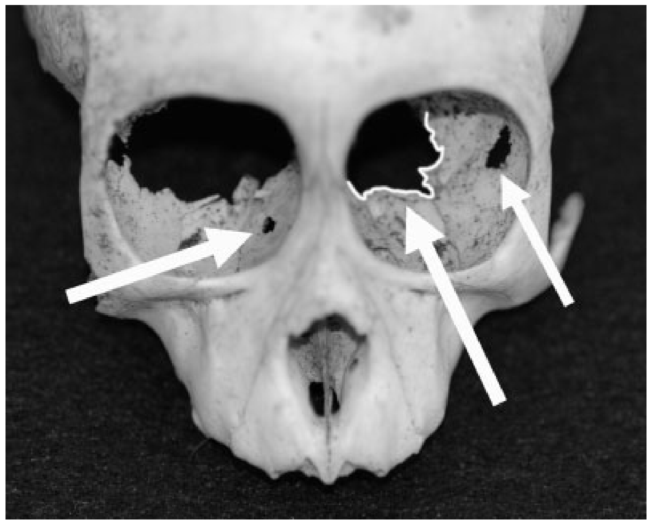

Fig. 4. Frontal close-up of crowned hawk eagle-damaged cercopithecid skull from Ivory Coast's Tai Forest. Arrows indicate talon-made puncture mark and ragged tear in base of left and right orbits. Anterior edge of damage to left orbital floor is highlighted.

Following an examination of an early draft of this article, the author noted with interest the distinctive damage to the orbital floors of select primate skulls highlighted by McGraw et al. (this issue; their Fig. 9c), which seems often to be found in conjunction with superior and parietal cranial punctures or fractures (McGraw et al., this issue; their Fig. 9a,b).

The author, upon being made aware of such characteristic and distinctive predatory bird damage, immediately reexamined the original Taung child skull. Previously unnoted is that the type specimen of *A. africanus* (Dart, 1925) does in fact possess this exact distinctive damage in both orbital floors (Fig. 1). The damage manifests as a single ca. 1.5-mm-diameter puncture of the right orbital floor, positioned approximately 1.5 mm lateral to the lachrymal duct (Fig. 2), and a ragged "tear" across the posterior part of the left orbital floor, apparently removing a significant part of the posterior base of the orbit (Fig. 3). However, the entire extent of this damage is obscured by breccia still present in the back of the orbit. Close inspection shows that the damage is remarkably similar to the crowned hawk eagle-generated damage in the skulls of monkeys shown by McGraw et al. (this issue) in their Figure 9c and attributed by them to "talon damage" (see also Fig. 4). When combined with the previously noted depressed flap of bone on the superior part of the cranium of the Taung child (Berger and Clarke, 1995), the Taung skull itself appears to carry a substantial amount of independent evidence for being collected, processed, and eaten by a large predatory bird.

The newly observed traumatic damage to the orbits of the Taung child provides strong support for the original bird-of-prey hypothesis (Berger and Clarke, 1995), support from evidence that is independent of the original observations (from trauma reflected in the cranial vault and endocast, and from the taphonomy of other primates collected at the Taung lime works) upon which the hypothesis was developed. However, this observation should not be interpreted as indicating that eagles were the sole accumulator of all of the many and diverse fossil-bearing assemblages in the Buxton Lime Quarry at Taung. There are clearly other deposits that may have had different accumulating agents. However, these results do indicate beyond a reasonable doubt that a large raptor was the dominant accumulator of the fauna associated with the Taung child and the Taung child itself. This realization emphasizes the critical need to study more and diverse accumulating agencies and potential predators of early hominins, in order to better understand what stresses and stressors influenced the tempo and mode of early hominin evolution. As McGraw et al. (this issue) correctly point out, predation plays an important role in primate mortality, and many regard it as a prime mover in the evolution of primate sociality (e.g., Boinski and Chapman, 1995; Hill and Lee, 1998; Treves, 1999; Boinski et al., 2003; Janson, 2003). Therefore, in addition to predatory mammals, the appearance of large raptors might also have been a significant factor impacting on hominin adaptations and evolution as a response to predation.

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