Evidence that Mute Swans are Native to North America is Lacking

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Mute Swans (*Cygnus olor*) have long been considered a non-native species to North America by the vast majority of professional ornithologists (e.g., American Ornithologists' Union 1998). Introductions during the 1800s have been well documented (Ciaranca et al. 1997), and the subsequent population increase and range expansion follows that expected of an introduced species (e.g., Ellis and Elphick 2007: Fig. 2 therein). In the November 2008 issue of Picoides, however, Alison and Burton (2008) assert that this view is mistaken and claim that they have found evidence suggesting that the species is native to the Americas. Given that their article was not subjected to peer-review, I offer some counterpoints that call into question Alison and Burton's interpretation of the evidence.

My focus is on the documented fossil evidence from the American West and on known movement patterns in modern swans. Others will provide detailed responses to the other points raised by Alison and Burton (2008). In my view, however, none of the evidence purportedly showing that Mute Swans are native to the Americas meets modern scientific standards. For instance, if one were to take the statement attributed to David Beers Quinn that "there would be nothing in the paintings that the artist [John White] did not see, these men were scientists" to be literally and absolutely true, as Alison and Burton apparently do, then one has to wonder why he painted a swan with a pale iris. In addition, the bill shape and the dark colour around the eye and gape of the swan that White painted in 16th century Virginia are not accurate for any modern species of swan. Either John White sometimes painted things that he did not see, or he painted a bird that was neither a Mute Swan nor a Trumpeter Swan (C. buccinator).

The centerpiece of Alison and Burton's fossil evidence is the studies of Hildegarde Howard, who thoroughly reviewed and reanalysed the Pleistocene avifauna from Fossil Lake, Oregon (Howard 1946). In addition to considering new material from the site, Howard's paper makes reference to previous studies conducted by two earlier paleontologists (Cope and Shufeldt) and reassesses some of their work. The paper is long and in places quite technical, with detailed discussions of certain bones. The paper deals with all birds found at the site, although the majority of the fossils come from species of waterfowl.

The discussion of swan bones is seven pages long (pp. 159-165). Prior to Howard's work, four species of swans had been identified from the site: Trumpeter Swan, Tundra ("Whistling") Swan (*C. columbianus*), and two extinct species (*C. paloregonus* and *C. matthewi*). In her reassessment, Howard determined that in fact there was sufficient evidence to recognize only two species, Trumpeter Swan and *C. paloregonus*.

Nowhere in the document does Howard suggest that fossils of Mute Swans have been found at the site, nor that anyone has ever suggested that they have. The paper does, however, make numerous comparisons between modern Mute Swan bones and swan fossils found at Fossil Lake, which is perhaps the source of the confusion. Howard considered the extinct species *C. paloregonus* to be more closely related to the Mute Swan than to either of the extant North American species. At the time this paper was written, the modern *Cygnus* swans were split into two genera, with Mute Swan placed in the genus Sthenelides. Howard considered the extinct species *paloregonus* to belong in the genus *Sthenelides,* rather than Cygnus, and many aspects of the description of its bones refer to similarities to those of Mute Swan to support this classification.

For example, in her summary passage, Howard states that Shufeldt's identification of certain bones as belonging to a species of goose ("*Anser condoni*") were in error because he did not have any Mute Swan specimens for comparison. A careful reading of the detailed fossil descriptions that follows demonstrates that Howard believed that Shufeldt made his misidentification because he thought that all swans have a furcula similar to that of Trumpeter and Tundra Swans. Had he had a specimen of a Mute Swan (or another of the "*Sthenelides*" swans), Howard argues, he would have known that some swans have a furcula that resembles that of a goose. This knowledge would have allowed him to

recognize that the bones he assigned to *Anser condoni* actually belonged to a swan and would have led him to the conclusion that Howard draws, which is that these bones belonged to *paloregonus*.

It is clear from several passages in the paper that Howard did not think that the fossils she assigns to *Sthenelides (Cygnus) paloregonus* (including the bones Shufeldt identified as *Anser condoni*) belonged to Mute Swans. Several quotes from the paper demonstrate that she considered *paloregonus* and Mute Swan to be distinct (though related) species. As Alison and Burton note, most of these statements refer to the larger size of *paloregonus*. For example:

"In length of the skeletal elements, paloregonus exceeds S. olor throughout …" (p. 160);

"The blunt contour of the tip of the blade, with slight dorsal excrescence, has an almost exact counterpart in a furcula of *S. olor* now available (L. A. Co. Mus. no. Bi69), and in the symphyseal area closely resembles another specimen of the same species (L. A. Co. Mus. no. Bi1096). Both modern furculae, however, are smaller than the fossil." (p. 162); and

"The humeri now assigned to *S. paloregonus* are large, exceeding *S. olor* and *C. columbianus* in size …" (p. 163).

Importantly, however, other comments go beyond the size differences between the two species, and refer to shape differences:

"Fossil similar to S. olor, though depression more proximal in extent than in living form and pisiform process itself broader and less pointed; … " (p. 164); and

"Distance from pisiform process to tip of internal edge of trochlea relatively less than in Cygnus or S. olor, and similar to S. melancoriphus." (p. 164).

Probably the best demonstration that Howard did not consider Mute Swan to have occurred at Fossil Lake is the species list that she gives on p. 190, which does not include Mute Swan either in the "List according to Shufeldt (1913)" or in Howard's "List as now amended".

In short, there is no evidence that Howard considered Sthenelides paloregonus to be a "Mute Swan genotype (ancestor)" as described by Alison and Burton (2008: 38). What Howard does suggest is that paloregonus was more closely related to Mute Swan and Black-necked Swan (*C. melancoryphus*) than to the other North America swans. Based on her analysis, it is equally plausible that the closest modern relative of paloregonus is the Black-necked Swan of South America.

In their letter, Alison and Burton also imply that there is a history of natural movements from the current native range of Mute Swans to North America, and that such movements are to be expected. Evaluating many aspects of these arguments is complicated by the fact that Alison and Burton do not follow widely accepted citation norms for scientific documents. Many of their claims lack reference to the source material; for example, the claim that "Mute Swans were known in Yosemite early on". Other items appear to be attributed, but the references are then found to be missing from the citation list. For example, the Abstract refers to sightings in Alaska that are attributed to "Sladen and King 1976, Heilprin 2006", and in Saskatchewan that are attributed to "Greenwood 2000". None of these three references appears in their citation list, so it is impossible to verify what the source documents actually say, or determine whether these hypothetical sightings have been subjected to any form of review. It seems possible, for example, that the Saskatchewan reports involved the breeding attempts in the 1960s that have been ascribed to introduced birds (Lever 2005).

Even those claims that are referenced do not seem to have withstood scrutiny. For instance, various references are made to Mute Swan records from Alaska, yet the species does not appear on the most recent edition of the "Checklist of Alaska Birds" (Gibson et al. 2009: http://www.uaf.edu/museum/bird/products/checklist.pdf), and no reports have ever been submitted to the Alaska Checklist Committee for review (D. D. Gibson, in litt.).

Mute Swan introductions have been described in various places across the continent, including British Columbia, Montana, Saskatchewan, Minnesota, Wisconsin, and Ontario, as well as along the Atlantic seaboard, where the main North American population lies (American Ornithologists' Union 1998). In addition there are "numerous reports elsewhere in North America [that] pertain to local escapes from captivity" (American Ornithologists' Union 1998), some of which result in limited breeding (e.g., in Nevada; Floyd et al. 2007). Thus, careful elimination of such origins for any reported birds would be essential before any modern report could be accepted by the scientific community.

In discussing whether it is plausible for Mute Swans to have reached North America, Alison and Burton pose a question that they attribute to Paul S. Martin: "The question is not, would Mute Swans have come onto this continent? but [sic] rather, why would they not?" Leaving aside the obvious point that the mere ability for something to have happened does not mean that it actually has happened, there is considerable evidence that Mute Swans are unlikely to make long-distance over water movements on a regular basis. Moreover, this evidence demonstrates that the movement behaviour of Mute Swans differs from that of Arctic-nesting swans.

Mute swans are certainly capable of overland movements of hundreds of miles, but such movements over water appear to be exceedingly rare. For instance, out of 82,000 Mute Swans banded in Britain, and >19,700 subsequent reports of those birds, there are only 45 records of birds moving the short over-water distance to continental Europe, with the farthest going little further than Denmark (Wernham et al. 2002). In contrast, in both Bewick's (*C. columbianus bewickii*) and Whooper Swans (*C. cygnus*) there have been more long-distance recoveries from many fewer banded birds, suggesting that the low number of Mute Swan movements cannot be explained by a lack of observers available to record movements. In addition to their much reduced propensity towards long-distance migrations, Mute Swans also have a more southern range than do Bewick's and Whooper Swans, so the overwater distance to North America is much greater for Mute Swans than for the other two species.

For all of these reasons, Mute Swans are far less likely to occur as natural vagrants in North America, than are either Bewick's or Whooper Swans. For such vagrancy to occur, Mute Swans would have to make much longer over water flights than the other two species, or one would have to invoke a northward movement prior to their over water flight. Given the rarity of vagrancy in Bewick's and Whooper Swans, the chance of a natural Mute Swan vagrant to North America must be exceedingly low. Even if such vagrancy did occur, it would not provide evidence for a natural breeding population; many other bird species occur as very rare vagrants in North America without ever establishing populations.

In conclusion, given the absence of evidence that meets the rigours of both peer-review and formal acceptance by the appropriate committees of leading professional organizations (e.g., the American Ornithologists' Union's Check-List Committee), there appears to be no reason to overturn the prevailing view that Mute Swans have only ever established sustainable populations in the Americas as a result of human introductions.

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Speedy Songbirds

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A new study published in Science Vol. 323, no. 5916 announces surprising discoveries about songbird migration. York University biology professor Bridget Stutchbury and her team mounted dime-sized geolocator 'backpacks' on 14 Wood Thrushes and 20 Purple Martins breeding in Pennsylvania in 2007. They were then able to track the birds' fall migration to South America, and their spring 2008 journey back to North America, before retrieving the geolocators from five Wood Thrushes and two Purple Martins last summer.

Purple Martin. Photo by Ron Ridout.

Data from the geolocators indicated that songbirds can fly in excess of 500 km per day – three times faster than previously estimated. As well, the study revealed astonishingly rapid long-distance movements during spring migration; the birds' overall migration rate was two to six times more rapid in spring than in fall. To learn more, visit the York University website at: http://www.yorku.ca/yfile/archive/index.asp?Article=12017.

The paper has been received with enthusiasm, and many bird researchers, including Bird Studies Canada scientists, will be using this technology for future studies.