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## CORRECTION OF ERRONEOUS RECORDS OF CORMORANTS FROM ARCHEOLOGICAL SITES IN ALASKA

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**Abstract.** In previous studies, bones from archeological midden deposits on Kodiak and Amchitka Islands, Aleutians, were erroneously identified as belonging to Great Cormorant (*Phalacrocorax carbo*), Pallas's Cormorant (*P. perspicillatus*), and Japanese Cormorant (*P. capillatus*), none of which is otherwise known from Alaska. These specimens are all re-identified as having come from the Double-crested Cormorant (*P. auritus*), which is much larger in Alaska than in middle and southern latitudes in North America.

**Key words:** *Alaska, Amchitka, cormorant, Kodiak, Phalacrocorax, zooarcheology.*

### Corrección de Registros Erróneos de *Phalacrocorax* en Sitios Arqueológicos de Alaska.

**Resumen.** En estudios previos, se identificaron por error huesos encontrados en sitios arqueológicos en las islas Kodiak y Amchitka, Aleutianas, como pertenecientes a *Phalacrocorax carbo*, *P. penicillatus* y *P. capillatus*, ninguno de los cuales se conoce de otro modo en Alaska. Todos los especímenes mencionados fueron re-identificados como *P. auritus*, el cual es de tamaño mucho mayor en Alaska que en las latitudes medias y sureñas de Norte América.

Through misidentification of bones from archeological midden material, three different species of cormorants have been wrongly attributed to the avifauna of Alaska. In each instance, the bones in question were from birds larger than the more common species expected in Alaskan waters: Pelagic Cormorant (*Phalacrocorax pelagicus*), Red-faced Cormorant (*P. urile*), and Brandt's Cormorant (*P. penicillatus*). The misidentifications probably arose in part from lack of appreciation for the very large size reached by Alaskan specimens of Double-crested Cormorant (*Phalacrocorax auritus*) belonging to the subspecies *P. a. cincinnatus* (type-locality Kodiak Island, Alaska), which is the largest of the six recognized subspecies (Hatch and Weseloh 1999). Investigators were thus probably deceived by making comparisons of Alaskan midden ma-

terial with skeletons of *P. auritus* from lower latitudes, which may be considerably smaller.

### METHODS

I examined all of the original published archeological material and compared it with skeletal collections in the Division of Birds, National Museum of Natural History, Smithsonian Institution (USNM), including the material of the extinct *P. perspicillatus* studied by Stejneger and Lucas (1889). I have relied particularly on two skeletons of *P. auritus*—a male from Aiktak, Aleutian Islands, Alaska (AMNH 22655, *P. a. cincinnatus*) and an unsexed specimen from Pyramid Lake, Nevada (USNM 499388), that is presumably referable to the subspecies *P. a. albociliatus* and was the next largest available skeleton of *P. auritus*. It is worth noting that the skeleton from the Aleutians is markedly larger than 13 skeletons of the Great Cormorant *P. carbo* from Massachusetts, England, Holland, South Africa, China, and New Zealand representing the subspecies *carbo*, *sinensis*, *lucidus*, and *novae-hollandiae*. It is approximately equaled in size only by an unsexed skeleton of *P. c. carbo* from Iceland. I also examined four skeletons of *P. capillatus* and was supplied with measurements from another (see Acknowledgments).

### SUPPOSED *P. CARBO* FROM KODIAK ISLAND

Friedmann (1933, 1934a, 1934b, 1935, 1941) published several papers identifying bird bones from archeological sites in Alaska. He was probably out of his element in dealing with osteology, however, as in looking over this material through the years I have found numerous rather striking errors in identification. The specimens are housed at the Smithsonian Institution, where after Friedmann's day they were transferred from the Division of Birds to the Department of Anthropology.

Among bones from midden deposits on Kodiak Island, Friedmann (1933:30) identified a complete humerus of a large cormorant (USNM 320709) that "matches exactly in every way a humerus of a Chinese-taken specimen" of *Phalacrocorax carbo sinensis*. Although he mentioned the occurrence twice more (Friedmann 1934b, 1935), Friedmann later had second thoughts about the identification and withdrew the record (Gabrielson and Lincoln 1959).

The specimen measures 164.4 mm in length vs. 170.9 mm in the Aleutian skeleton of *P. auritus*, and 165.5 mm in the largest *P. a. albociliatus*. It is thus

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FIGURE 1. Bones of cormorants *Phalacrocorax* (A–C, carpometacarpi in palmar view; D–F, femora in posterior view): A = *P. auritus albociliatus* USNM 560565 (New Mexico); B = *P. auritus* (formerly identified as *P. perspicillatus*) CSULB 7390 (Amchitka archeological); C = *P. perspicillatus* USNM 17041 (Bering Island); D = *P. a. albociliatus* USNM 499388 (Nevada); E = *P. auritus* (formerly identified as *P. capillatus*) CSULB 7388 (Amchitka archeological); F = *P. a. cinctatus* AMNH 22655 (Aikta, Aleutian Islands).

clearly within the size range of larger individuals of *P. auritus*, a species that occurs on Kodiak Island today. The specimen is therefore identified as *P. auritus*.

#### SUPPOSED *P. PERSPICILLATUS* FROM AMCHITKA ISLAND, ALEUTIANS

Siegel-Causey et al. (1991) assigned a single left carpometacarpus (CSULB 7390) from midden deposits on Amchitka to *Phalacrocorax perspicillatus*, the extinct Pallas' Cormorant known historically only from Bering Island. This was said to be "distinctively diagnostic" with the internal ligamental fossa "very deeply excavated" (p. 843). The only carpometacarpus of *P. perspicillatus* available for study is among the series of bones of this species collected on Bering Island by Stejneger and now in the Smithsonian Institution (USNM 17041). This specimen was illustrated in Stejneger and Lucas (1889, pl. II, fig. 5) but not entirely accurately and not at the most favorable angle for comparison. Although about the same length (78.0 mm) as the Amchitka specimen (75.8 mm), the car-

pometacarpus of *P. perspicillatus* is much more robust (proximal depth 16.7 vs. 13.7 mm) with an even more deeply excavated ligamental fossa (Fig. 1A).

The Amchitka specimen is therefore not referable to *P. perspicillatus*. It is much too large for either *P. pelagicus* (52.9–69.6 mm, mean 60.9,  $n = 196$ ) or *P. urile* (58.4–66.9 mm, mean 62.7,  $n = 23$ ). Although it is smaller than in the Aleutian skeleton of *P. auritus cinctatus* (81.8 mm) or in the largest skeleton of *P. a. albociliatus* (80.3 mm), it is well within the normal range of the latter (range of 10 males from New Mexico 72.7–76.7 mm, mean 75.0). Thus there would appear to be no reason to regard this specimen as belonging to anything other than *P. auritus*. Accordingly, there is still no satisfactory evidence for *P. perspicillatus* away from Bering Island (American Ornithologists' Union 1998).

#### SUPPOSED *P. CAPILLATUS* FROM AMCHITKA ISLAND, ALEUTIANS

The supposed Amchitka record of a Japanese Cormorant (*P. capillatus*, Siegel-Causey et al. 1991) was

based on a complete left femur (CSULB 7388) and a largely intact pelvis (CSULB 7389), again from midden deposits. Although not rare where it occurs in eastern Asia, I was initially able to locate only two skeletal specimens of *P. capillatus*—one in Moscow taken near Vladivostok (PIN 16-2-1, sex unknown) and the other in Honolulu (BBM-X 146124, male?). The latter was a formerly unidentified, dataless, pathological zoo bird that was identified as *P. capillatus* by Siegel-Causey (label data). It may actually be that species, as its measurements correspond well with those supplied for the Russian specimen. Three additional specimens from Japan that I later examined in Japanese collections (NSM PO-14; KYU RA-24, KYU RA-30) were much larger than either of the preceding specimens.

Siegel-Causey et al. (1991:843) state that “Double-crested Cormorants are distinctly smaller than Japanese or Pallas’s Cormorants” and that for bones supposedly of Japanese Cormorants from Amchitka “qualitative characters and size were unambiguous.” The situation is rendered far more ambiguous than stated, however, by the apparent great size variation in *P. capillatus* and the large size of Alaskan *P. auritus*. At 63.9 mm, the femur from Amchitka appears to fall within the range of variation of *P. capillatus* (59.1–70.0, mean 65.0) and is intermediate in length (Fig. 1E) between the Aleutian specimen of *P. auritus* (68.5 mm) and the largest specimen of *P. a. albociliatus* (62.0 mm). Therefore, size will not serve to distinguish *P. capillatus* from some specimens of *P. auritus*.

According to Siegel-Causey (1988:903), *P. capillatus* is supposed to differ from other cormorants in having the external condyle of the femur with the “internal surface distinctly narrowed” as opposed to “broad and rounded.” I have had little success in discerning many of Siegel-Causey’s (1988) alleged characters. In this case, I could not make out any qualitative differences in this area of the femur between the Amchitka specimen, the Honolulu specimen of *P. capillatus* (which is pathological on one side), or specimens of *P. auritus*. Nor could I detect any salient qualitative characters of the femur between a Japanese specimen of *P. capillatus* (NSM PO 14) and a specimen of *P. carbo hanedae* (NSM 536).

The pelvis from Amchitka referred to *P. capillatus* is 43.0 mm wide across the antitrochanters, which is practically identical to that in the Aleutian skeleton of *P. auritus* (43.7 mm). The same measurement in *P. capillatus* ranges from 35.6 mm to 43.4 mm (mean 39.6,  $n = 5$ ). Again, it appears that these two species cannot always be distinguished by size, although four of the five specimens of *P. capillatus* were actually smaller than the Amchitka bone or the Aleutian specimen of *P. auritus*. There is no justification for extending the range of *P. capillatus* hundreds of kilometers east of its known range on the basis of two bones that cannot be certainly distinguished from bones of a species that now occurs in the Aleutians. Therefore, the archeological specimens are unlikely to belong to any species other than *P. auritus*.

## DISCUSSION

All archeological records of large cormorants from Alaska are here considered to be referable to *P. auritus*

(Double-crested Cormorant). Although this species is known to breed at Kodiak Island (Friedmann 1935), in the Aleutians it is not known west of the Islands of Four Mountains, except for a few sightings, including one from Amchitka (D. Gibson, pers. comm.). The three bones of *P. auritus* from Amchitka are all from the same archeological site and may be derived from a single individual that could have been a vagrant. All archeological records of other species of large cormorants from Alaska should now be expunged from the record.

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