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*The Condor* 91:995-997  
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## A REASSESSMENT OF THE FIRST NESTING RECORD OF THE PEREGRINE FALCON IN ECUADOR<sup>1</sup>

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*Key words:* Peregrine Falcon; *Falco peregrinus*; Ecuador; first breeding record.

Although the Peregrine Falcon (*Falco peregrinus*) was known to nest in parts of South America, generally shown on maps to be south of 30°S (Cade 1982), it was not until 1981 (Jenny et al. 1981) that the first breeding was reportedly documented for Ecuador. The peregrine is now known to have a wide breeding distribution in South America (McNutt et al. 1988). The pair reported by Jenny et al. (1981) nested near the equator at Guayllabamba in a dry mountain valley some 30 km NW of Quito and was presumably near the northern extreme of the South American breeding range. Hilgert (1988) later studied that nesting site in some detail because it seemed to still be the only confirmed breeding pair in Ecuador. S. A. Temple (pers. comm.), however, saw peregrines during the breeding season in other dry mountain valleys of Ecuador considerably south of Quito. Temple's description of them suggests that they were not North American breeders on their non-breeding sojourn in South America but were resident South American birds. In this note I assess: (1) the first

actual documented breeding peregrine record for Ecuador (nestlings collected) that occurred a century ago, (2) the first scientific reporting of those nestlings that occurred over 75 years ago, and (3) a subsequent comment discrediting that record some 40 years ago. Lastly, I provide a brief analysis of the aforementioned nestlings with pertinent comments.

In December 1877 (no day given) Clarence Buckley collected two nestling peregrines (by size appearing to be one male and one female; British Museum [Natural History] Nos. 87.5.1.801 and 802) at a location he called Yanayacu (or Yauayaca), Ecuador. The age of the nestlings (ca. 4 weeks old, rectrices ca. 59 mm out of sheaths) suggested that they were still in the eyrie or at most along the cliff (? presumably a cliff eyrie) near the eyrie. The location of Yanayacu cannot be precisely placed since it is a common Quichua name meaning "black river," which is used for a river, canyon, or farm (Paynter and Traylor 1977). According to a local Ecuadorian (Eduardo Uzcátegui, pers. comm.) "Yanayacu" is an Indian name used only on locations in the highlands of Ecuador and accordingly would not be a location in the extensive Oriente region or western coastal regions. There is, however, a small river in the highlands called Rio "Yanayacu" that enters Rio Cutuchi near San Miguel de Salcedo (E. Uzcátegui, pers. comm.). The Rio Cutuchi enters Rio Patate that in

<sup>1</sup> Received 17 February 1989. Final acceptance 12 June 1989.

turn enters Rio Pastaza. As reported by Sclater and Salvin (1880), Buckley spent 4 years in Ecuador with the greater part of the time on the upper reaches of the Rio Pastaza (drains eastward through the Oriente) and an area between Rio Pastaza and the Rio Bobonaza. The upper reaches of the Rio Pastaza flow through mountainous country that looks almost identical to that near Guayllabamba. The "upper reaches" of Rio Pastaza-Rio Bobonaza country could put that region in foothills/mountainous areas in excess of 100 km SSE of Quito. Although the location Yanayacu is unknown, and while speculative, it seems unlikely that the nestlings collected came from the same nesting site north of Quito reported by Jenny et al. (1981) and studied by Hilgert (1988). The site north of Quito is some 130 km NW of the region frequented by Buckley.

The two nestling Ecuadorian specimens were reported in an obscure manner by Hartert, then a curator at the Tring (to be incorporated into the British) Museum, when he said "At a minimum in the South American Andes the Peregrine Falcon breeds from Ecuador (nestlings examined) to Chile" (1912, p. 1049) (my translation). Unfortunately, South America was out of the region treated by Hartert or perhaps he would have written more about the specimens. Equally unfortunate, Hartert failed to mention anything of the Ecuadorian breeding record in his subsequent treatment of peregrines (Hartert 1915), including *F. p. cassini*. Chapman (1926) did not mention the British Museum specimens nor was he apparently aware of the statement in Hartert (1912, 1915) for he did not indicate that peregrines bred in Ecuador. Then, in 1949 Hellmayr and Conover (1949, p. 303) suggested that the Ecuadorian nestlings mentioned by Hartert (1912) might have been Orange-breasted Falcons (*Falco deiroleucus*) rather than peregrines. Perhaps their speculation resulted from the fact that the accepted northern extension of peregrine breeding in South America was some 2,000 km to the south in Chile. And indeed, the name *deiroleucus* is on the museum labels (subsequently lined through) of the two peregrine nestlings. It is curious that they were ever called *deiroleucus* since they look nothing like juveniles of that species. It is not clear who originally called them *deiroleucus* and whether the specimens were placed in a specimen drawer with other *deiroleucus*, when the error was recognized and *deiroleucus* lined out, nor when the specimens were placed with other *peregrinus* specimens (G. Cowles, pers. comm.). I found them with *peregrinus* specimens in January 1988.

*Falco p. cassini* from South America is described as a dark "blackish"-colored bird with heavy ventral streaking (immature) or barring (adult) and wide extensive malar patches (see Brown and Amadon 1968, White 1968). Certainly specimens from the Falkland Islands, southern Argentina, and southern Chile (excepting the pallid "kreyenborgi" color morph) have this general appearance. *Falco p. cassini* is, however, clinal in color varying from dark (on average) in the south to lighter (on average) northern birds. Visually the two nestling Ecuadorian *peregrinus* specimens do not resemble young *deiroleucus* nor topotypical examples of Fuegian *cassini* as mentioned. Rather, they are a brownish-tan color overall with rusty-brown crowns and somewhat

narrow and restricted (for *cassini*) malar patches. In color they are decidedly reminiscent of darkly pigmented nestling *Falco mexicanus*. Some western North American specimens of juvenile *peregrinus* (examples are three from Converse County, Wyoming, collected 1904, Carnegie Museum) are quite like the Ecuadorian specimens in the brownish-tan color, and therefore, the Wyoming specimens are themselves unlike average western North American peregrines that are much darker brown (White 1968). The Ecuadorian nestlings are then the color of other *cassini* peregrines from northern Argentina (pers. observ., 1984), Peru (fledged young, C. M. Anderson, pers. comm.), and nestlings from the Guayllabamba, Ecuador site. In adult plumage those from Ecuador, Peru (C. M. Anderson, pers. comm.), northern Chile, and perhaps also northern Argentina resemble more adult *F. p. anatum* (sensu lato) from western North America than topotypical *cassini* from southern South America. The description given by Gochfeld (1977) for lightly marked falcons he saw in eastern Peru is consistent with breeding birds from the general region.

It is curious that the Buckley specimens have been obscured so long and that it took a century to record peregrines as breeding in Ecuador. If in fact the nestlings were from a different location than the Guayllabamba eyrie it is of interest that so much time elapsed before the current Guayllabamba eyrie was found. Or, if the Buckley specimens were from the Guayllabamba area, it is curious that so much time elapsed before the site was "rediscovered." It is equally interesting, because of the clumped nature of breeding pairs of *peregrinus*, that other breeding sites have not been discovered in Ecuador in light of the long-standing ornithological work in mountainous regions there.

J. R. Parrish, S. K. Sherrod, J. P. Jenny, and an unidentified reviewer commented on an earlier draft of this note. I thank Graham Cowles, British Museum (Natural History), for help while at that museum.

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*The Condor* 91:997–998  
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## ON THE FLUSHING BEHAVIOR OF INCUBATING WHITE TERNS<sup>1</sup>

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*Key words:* White Tern; *Gygis alba*; flushing; nest sites; behavior; Laysan Island.

White Terns (*Gygis alba*) breed on small islands throughout the tropical Pacific, Indian, and South Atlantic oceans. The single egg usually is laid on a rock, a rock ledge, or a bare branch rather than in a nest built by the adults (Howell 1978). On some substrates (e.g., branches and smooth rocks), eggs are easily dislodged by strong winds or by the sudden departure of incubating adults (Ashmole 1968, Howell 1978, Houston 1979, Rauzon and Kenyon 1984). Perhaps because they are so vulnerable, eggs are seldom left uncovered (Howell 1978), and adults are extremely careful when settling upon and rising from their eggs (Dorward 1963). Hatchlings, which have long toes and sharp claws, cling tightly to the nest substrate (Dorward 1963, Howell 1978, Rauzon and Kenyon 1984) and are less likely to fall from nests than are unattended eggs.

We compared the flushing behavior of White Terns nesting on coral rocks vs. those nesting in trees. We hypothesized that if eggs laid in trees are more vulnerable to displacement, then tree-nesting terns should sit tighter on their eggs than do rock-nesting terns.

We observed nesting White Terns on Laysan Island (25°46'N, 171°44'W) in the Northwestern Hawaiian Islands from September to November 1988. White Terns breed year-round on Laysan and nest primarily on small coral rocks and on rock ledges (Ely and Clapp 1973). Twenty-five of the 30 nests we observed were on coral rocks and five were in trees (four in *Tournefortia argentea* and one in *Casuarina equisetifolia*).

Between 29 September and 3 November, we recorded flushing distances of incubating White Terns at

seven rock nests and five tree nests. Tern nests chosen for observation occurred along a route that we traveled daily in pursuit of other duties. Flushing distances were recorded only during the first half of the 36-day incubation period (Howell 1978, Miles 1986), which we confirmed from known egg-laying dates or by back-dating from hatching dates. Once each day for seven consecutive days, a single observer approached a nest (from the same direction each time) while walking in open view of the incubating adult. The observer stopped when the adult flew, and then paced (each step approximately 1 m) to the nest to measure the flushing distance. Cases in which adults did not flush were given a value of 0.5 m, which was the closest distance that we approached nests. Recording times were staggered so that similar numbers of measurements were obtained for each nest during morning, midday, and afternoon.

White Terns nesting in trees sat very tight on their eggs, always allowing us to approach to 2 m or less and often not flushing at all (Table 1). In contrast, rock-nesting terns flushed at much greater (and more variable) distances, never allowing us closer than 2 m from the nest (Table 1). The mean flushing distance for rock-nesting terns was significantly greater than that for tree-nesting terns (18.4 vs. 0.7 m; Mann-Whitney  $U = 35$ ,  $P = 0.004$ ).

The striking difference in flushing behavior between tree-nesting and rock-nesting White Terns supports our hypothesis that flushing behavior is influenced by the vulnerability of eggs to displacement. On Laysan, all rocks selected by nesting White Terns had shallow indentations in which terns laid their eggs. Eggs rested securely in these pockets and appeared relatively safe from displacement. In contrast, eggs laid on tree branches appeared precariously balanced and could have been easily dislodged by strong winds or by sudden movements of adults. Indeed, one egg fell to the

<sup>1</sup> Received 3 April 1989. Final acceptance 12 June 1989.