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THE PALLID FALCON *FALCO KREYENBORGI* IS A COLOR PHASE OF THE AUSTRAL PEREGRINE FALCON (*FALCO PEREGRINUS CASSINI*)

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ABSTRACT.—The Pallid Falcon (*Falco kreyenborgi*), a rare form from southern Patagonia and Tierra del Fuego, has, since its discovery in 1925, gained acceptance as a full species. In 1981, we observed 13 Pallid Falcons on the Patagonian Steppe. Four adult Pallid Falcons were paired with normal Peregrine Falcon (*Falco peregrinus cassini*) mates. Two normal-phased peregrine pairs produced mixed broods of normal and pallid young. One pair of pallid adults produced only pallid young. These observations lead to the conclusion that the Pallid Falcon is conspecific with and a color phase of the Peregrine Falcon. *Received 19 August 1982, accepted 10 December 1982.*

FROM specimens in the Münster Zoo, Germany, taken in 1925 near the Straits of Magellan, Chile, Otto Kleinschmidt (1929) described a new species of large falcon, *Falco kreyenborgi*, commonly known as Kleinschmidt's Falcon, Tierra del Fuego Falcon, and Pallid Falcon. So little became known of the bird in the years following its discovery that Stresemann and Amadon (1963) entitled their review of the subject "What is *Falco kreyenborgi*, Kleinschmidt?" and called for fieldwork to answer the question they posed.

During a 1980 expedition in search of the Pallid Falcon, two observations were made in southern Patagonia that suggest that the Pallid Falcon is perhaps a color phase of the Austral Peregrine Falcon (*Falco peregrinus cassini*). An adult male Pallid Falcon was seen attending the same cliff as an adult female Peregrine Falcon, and at another eyrie a Pallid Falcon fledgling was seen in a family group of normal Peregrine Falcons (Ellis et al. 1981). These observations would have linked the light and dark falcons more conclusively, except that the pallid male and the dark peregrine female were never seen simultaneously on the cliff, and, at the second site, the young Pallid Falcon was well fledged at the time of our observations and could supposedly have wandered in and adopted the peregrine parents, as has been once observed for the Prairie Falcon (*Falco mexicanus*) in Arizona (Ellis and Groat 1982).

METHODS

In two separate expeditions (CPG: late September to mid-November; DHE: early November to mid-December) we searched several widely separate cliff zones in Chubut and Santa Cruz provinces, Argentina. Our general strategy was to locate breeding pairs on our first visit to an area and then to return when the young were larger to determine the reproductive performance of each pair and the color phase of the young. When the contents of an eyrie could not be determined from a distant observation point, we entered the eyrie using standard rappelling and ascending techniques. We also entered four eyries to obtain young birds for future genetics experiments.

FRONTISPIECE. Juvenile Pallid Falcons and normal Peregrine Falcon siblings from two eyries with normal Peregrine Falcon parents: upper left—juvenile female, ventral view; upper right—a more heavily marked nestling female; lower left—juvenile female, dorsal view; lower right—two pallid and two normal siblings. The upper right bird is from Observation 9, Table 1, all others are from Observation 7, Table 1.

TABLE 1. Summary of observations of 15 Pallid Falcons from December 1980–December 1981.

Observation number	Observation dates	Province (Argentina)	Parental phenotype		Reproductive outcome[a]	Nestling phenotype		Age of young on last visit
			Male	Female		Pallid	Normal	
1[b]	11–12 Dec 80	Santa Cruz	Pallid	Normal	U	—	—	—
2[b]	15–16 Dec 80	Santa Cruz	Normal	Normal	4	1[c]	3	ca. 7 weeks
3	6 Oct–5 Nov 81	Santa Cruz	Pallid	Pallid	3	3	—	ca. 2 weeks
4	9, 17 Oct 81 10 Nov 81	Santa Cruz	Normal	Pallid	3	1	2	ca. 2 weeks
5	11 Nov 81	Santa Cruz	Normal	Pallid	NE	—	—	—
6	13–15 Nov 81 6 Dec 81	Chubut	Pallid	Normal	NE	—	—	—
7	17–19 Nov 81	Chubut	Normal	Normal	4	2	2	ca. 5 weeks
8[d]	24–25 Nov 81	Santa Cruz	Pallid	Normal	E	—	—	—
9[e]	28–29 Nov 81	Santa Cruz	Normal	Normal[f]	4	1[c]	3	ca. 3 weeks

[a] Reproductive outcome possibilities: U = unsuccessful, no other details known; E = eggs were laid but failed to produce young; NE = no eggs or egg remains were found in eyrie attended; Number = number of young successfully fledged.
[b] These observations were detailed in Ellis et al. (1981).
[c] These falcons were clearly of the pallid phenotype but were more heavily marked than the lightest pallid birds.
[d] This is the same site as for observation number 1.
[e] This is the same site as for observation number 2.
[f] This adult female was extremely dark ventrally.

RESULTS AND DISCUSSION

During our travels we encountered 13 Pallid Falcons. As summarized in Table 1, most of the possible combinations of light and dark adults and young have now been observed. The observations of normal-phased peregrines producing pallid young (observations 2, 7, and 9) are most noteworthy, because they show that some phenotypically dark birds have genes for pallidism (see Frontispiece). The five observations of mixed pairs show that the pallid birds are successful at obtaining mates from the population of normal-phased birds. In this regard, observation number 4 is especially significant: at this site a normal-phased adult female was seen intruding at the cliff in use by a mixed pair with a pallid female.

Additional evidence linking the Pallid and Peregrine falcons stems from yet another source. In 1980 we made distant observations (observation 1, Table 1) of an adult male Pallid Falcon with a "wedge of light grey . . . on the right side of the breast" (Ellis et al. 1981). When the same area was revisited in 1981 (observation 8, Table 1), a pallid tiercel with a dark right breast patch was again noted. In 1981, however, the tiercel was approached to within 20 m, allowing close inspection of the asymmetrical patch with 7× binoculars. The dark patch appeared as a row of normal Peregrine Falcon feathers on an otherwise nearly immaculate breast. Each feather in the patch had a warm background color and a black central spot like that seen in normal Peregrine Falcons in Patagonia. Also, one of the nestling Pallid Falcons observed in 1981 (observation 9, Table 1) had a scattering of flank feathers that were much darker than others of that tract, approaching corresponding feathers in normal Austral Peregrine Falcons. Finally, in 1980 (observation 2, Table 1) a pair of normal peregrine parents was observed defending 4 fledglings: 1 pallid, 1 dark, and 2 intermediate in color, 1 approaching but distinct from the pallid phenotype (Ellis et al. 1981).

The uniqueness of this situation (i.e. the existence of a discrete color phase in the Peregrine Falcon) accounts for the confusion that has so long surrounded the taxonomy of the Pallid Falcon. Stresemann and Amadon (1963) stated that they found "no significant differences in measurements between it [a series of four Pallid Falcons] and *cassini*." Yet, because the bird was so unlike any Peregrine Falcon in coloration, they were reluctant to say more than that the Pallid Falcon was definitely a member of the peregrine superspecies group. The closest known parallel situation is that of Peregrine Falcons (*F. p. pealei*) from the Queen Charlotte Islands and the Alexander Archipelago, western Canada (C. M. White, pers. comm.). In this portion of the *pealei* range, the juvenile plumage varies, although along a continuum, from a rare form in which the head is blond (streaked with dark) to the more typical form in which

the head is very dark (White 1968). The *pealei* situation also differs from that of the Pallid Falcon in that the blond-headed *pealei* juveniles presumably molt into phenotypically normal (dark-headed) adults. In the Pallid Falcon, adults and young are discretely different from even the lighest normal-phased peregrines, including siblings.

With the observations obtained in 1981, it is possible to state with certainty that *Falco kreyenborgi* is not specifically distinct from *Falco peregrinus*. Because pallid birds have thus far been reported only for the southern portion of the total range of the Austral Peregrine Falcon, the situation is apparently an example of "geographically oriented" polymorphism (Mayr and Short 1970: 89). We hope that the genetic basis for pallidism will be clarified by future captive-breeding studies; the presence of fully pallid young in eyries tended by normal parents, however, suggests monogenic control. All pallid birds observed in this study and all described elsewhere (see review in Anderson and Ellis 1981) exhibited not only pale plumage but also pale bills and talons, suggesting that the pallid phenotype may fit the definition for "imperfect albinism" given by Pettingill (1970: 192). Whatever the genetic basis, the falcon should hereafter be known as the Pallid Form (or color phase) of the Austral Peregrine Falcon. This is the only known example worldwide of the Peregrine Falcon exhibiting a marked color phase.

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