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## Systematic Notes on Palearctic Birds. No. 44 Falconidae: The Genus *Falco* (Part 1, *Falco peregrinus* and *Falco* *pelegrinoides*)

BY CHARLES VAURIE

The present paper is a review of the two species named and a discussion of their relationship. I would like to express my appreciation to the following colleagues who have helped me in this study: Drs. D. Amadon, H. Johansen, and E. Stresemann, who have read the manuscript and given me the benefit of their comments; Captain J. Delacour, who examined with me some specimens; and Dr. A. L. Rand and Mr. A. Traylor, who kindly selected and lent me specimens from the collection of the Chicago Natural History Museum.

### *FALCO PEREGRINUS* AND *FALCO PELEGRINOIDES*

The Peregrine Falcon (*peregrinus*) and the Barbary Falcon, or Shaheen (*pelegrinoides*), are closely related and are considered to be conspecific by many authors, among them Kleinschmidt (1912–1927, 1933–1937), Hartert (1913), Peters (1931), Stegmann (1934, 1937a), Steinbacher (1936), and Dementiev (1951). However, other authors, with whom I agree, believe that they are separate species, such as Stuart Baker (1928), Kozlova (1932), Swann (1936), Whistler (1945), and Stresemann (1959 and MS).

These two falcons were considered to be conspecific and were believed to replace each other geographically. They are closely related but are actually sympatric in some regions, differ morphologically, and ap-

parently do not interbreed, as hybrids are unknown. The distribution of *pelegrinoides* presents a strange pattern, being surrounded by populations of *peregrinus*, as stated by Stresemann (1959). The breeding ranges of the two species come into contact in some regions at the periphery of the range and overlap in at least one of them. Zarudny's report (1911, pp. 207–208), which seems to have been overlooked (or was discountenanced), stated that they were sympatric in northeastern Iran, and a study of the literature suggests that the breeding ranges may overlap in other regions as well.

Dementiev, the most experienced student of the genus *Falco*, has discussed it in many papers and considers that the two falcons are conspecific, but in a recent paper (1957) states: "It is evident that the Shaheen [*F. pelegrinoides-babylonicus*] differs anatomically from the northern forms of the Peregrine. The wings are relatively long, the tail short. Both the sternum and the bones of the shoulder-girdle are big and strong. Data on the weight of the Shaheen are scarce: males (Soviet collections, British Museum) 330, 342.1, 350, 354.7, 380 and 398 gm.; females 513.2, 615, 760 gm. Sexual dimorphism is very marked." In another paper (1955) he mentions other anatomical as well as physiological differences. *Peregrinus* is much heavier than *pelegrinoides*. Specimens from Germany for which weights are available vary from 550 or 582 to 660 grams for males and 925 to 1250 for females, according to Kleinschmidt (1912–1927, p. 35), Niethammer (1938, p. 139), and Dementiev (1935b, p. 448). This last-named author mentions also that of two birds from the Taimyr Peninsula in Siberia the male weighed 740 and the female 1300. *Peregrinus* is a larger bird than the Shaheen, but the difference in the average wing length seems insufficient to account for the large difference in weight, as it amounts only to about 21 mm. in males and 31 in females between the specimens of *F. pelegrinoides babylonicus* measured by Dementiev and those of nominate *peregrinus* measured by me from Germany. In the latter, the wing length measures 289–328 (304.3) in 10 males and 348–368 (354) in 10 females, as against 274–302 (283.7) in the 14 males and 312–338 (323.1) in the 23 females of *Falco pelegrinoides babylonicus* measured by Dementiev (1951, p. 99), who adds that the wing length occasionally reaches 310 in males and 343 in females of *babylonicus*. The Mediterranean race (*brookei*) of *peregrinus* is nearer in size to *pelegrinoides*, but, unfortunately, I have found no data about its weight. I believe it is valid to compare nominate *peregrinus* and *babylonicus* (the weights of which were given above), as their breeding ranges apparently approach each other in northwestern Mongolia and Russian Altai.

There are other differences between *peregrinus* and *pelegrinoides*, notably

in the coloration of the plumage and the size of the feet. The feet are weaker in *pelegrinoides*, and the middle toe is proportionately longer. *Pelegrinoides* is paler, much less barred, and much more rufous. The crown is always very strongly mixed with rusty red, and the nape is bright rufous chestnut, whereas these parts are black, slaty, or bluish gray in adult *peregrinus*. In the Mediterranean and Caucasian race (*brookei*) of *peregrinus*, however, some adults have a vague band of rusty red on the nape, and Kleinschmidt (1933–1937, p. 1) holds that this intermediate character proves that the two falcons are conspecific. But one glance at *brookei* is sufficient to show that it is a *peregrinus* and not intermediate between it and *pelegrinoides*.

*Falco pelegrinoides* is said to be a very bold falcon, much swifter on the wing than *peregrinus*, and the fact that the two birds are very distinct has been well known to native falconers for many centuries in Africa and Asia.

A search through the literature shows that the two falcons come or may come in contact in the following regions and overlap in northeastern Iran and perhaps in the northwestern Himalayas.

In northwestern Africa, *F. peregrinus brookei* is said to breed only on the northern peninsula of Morocco in the regions of Tangier and Cape Spartel, and to be replaced by nominate *pelegrinoides* in Morocco from the Moyen Atlas southward, and from the Mediterranean coast southward to the Sahara in Algeria and Tunisia. However, nominate *pelegrinoides* has been reported as breeding at Tangier and *brookei* in northern Tunisia. Swann (1936, pp. 385, 397) states that of three clutches of eggs from Tangier, two were those of nominate *pelegrinoides* and the third, the eggs of *F. peregrinus brookei*. Heim de Balsac (1955, p. 12) states that the specimen of *brookei* reported by Blanchet was collected near Cape Bon, Tunisia, on March 3, 1936, and is a local bird, “*est un nicheur du lieu, étant donné la date de la capture.*” That it is a local bird is not certain, however, and the identification of the eggs by Swann should, perhaps, be accepted with reservation. The only specimen of *pelegrinoides* that I have seen from the breeding range of *peregrinus* in Africa is a young bird collected at Tangier on November 6, 1896, a date at which it probably represents a stray.

The distribution in northwestern Africa has been complicated by Kleinschmidt (1912–1937, p. 35), who recognizes a distinct subspecies in this region which he calls *punicus*, a name given by Levaillant to a color plate which he published in 1850 or earlier. The bird shown on this plate cannot be identified with certainty, but Hartert (1913, p. 1052), who follows the opinion of all the earlier revisers, thinks that *punicus* is a

synonym of *pelegrinoides* Temminck, 1829, an opinion in which I concur. Kleinschmidt believes, however, that *punicus* represents a valid subspecies, similar to *F. peregrinus brookei* but paler and smaller which constitutes "the connecting link (*Bindeglied*) between the peregrine falcons of Europe and the Sahara" (translation). But I do not believe these falcons are conspecific, and the existence of a distinct form in northwestern Africa seems very dubious, judging by some specimens that I have seen which Kleinschmidt says are *punicus*.

Kleinschmidt, who gives a list of all the specimens of *punicus* that he saw, includes among them three specimens from Tangier in the Rothschild Collection. Two of these are, I find, typical specimens of *F. peregrinus brookei* collected on May 7, 1894, and May 14, 1895; the third is the immature *pelegrinoides* mentioned above taken on November 6, 1896. The rest of his series, which I have not seen, consist of another bird from Tangier, four without localities from Morocco, one taken on May 2, 1904, at Kerrata in the Kabylie, northeastern Algeria, and one taken at some unspecified date in May, 1898, at Rabat, Morocco. The last-named, and certainly the one from Kerrata, were collected within the breeding range of *pelegrinoides*, but Kleinschmidt states the specimen from Kerrata is red on the nape. I believe that this bird is probably *pelegrinoides* and was misidentified by Kleinschmidt, as he misidentified the three from Tangier. Nevertheless, the distribution in northwestern Africa is not well known, and it is possible that Kleinschmidt was partly correct and that the breeding ranges of *peregrinus* and *pelegrinoides* will eventually be found to overlap in this region.

South of the Sahara, from about Cap Vert in Senegal in the west and from southern Sudan in the east, nominate *pelegrinoides* is replaced by *minor* Bonaparte, a small and dark race of *peregrinus*, but the exact limits of the northern range of *minor* are unknown. The latter is apparently very local in distribution, and Chapin (1932, p. 656) states that it is not found in the equatorial forests. Most authors mistakenly call *minor* by the name *perconfusus* Collin and Hartert, 1927, a new name proposed for *Falco minor* Schlegel, 1851, on the ground that *minor* Schlegel was preoccupied by *Falco nisus minor* Bekker and Lembke, 1800–1811. However, *minor* Schlegel is a synonym of *Falco minor* Bonaparte, 1850, and *minor* of Bekker and Lembke has no nomenclatural standing, according to Stresemann (MS).

In the Near East, nominate *pelegrinoides* breeds in the Sinai Peninsula and perhaps on Mt. Carmel but Steinbacher (1936, p. 399) states that the falcons of Mt. Carmel have not been identified. I have found no record for Syria, but the Rothschild Collection contains a bird molting

into adult plumage collected on April 16, 1914, at Palmyra. It is *peregrinus*, not *pelegrinoides*, and, if a local bird, contrary to expectation, as Palmyra is in the desert where one would expect to find *pelegrinoides* breeding. The latter breeds in Iraq but the only record of a bird collected during the breeding season that I have found is that of Sassi mentioned by Allouse (1953, p. 32), to wit, an immature bird taken on June 10 at Mosul in northern Iraq. *Peregrinus* has been collected in Iraq but not during the breeding season, although, in view of the fact that it breeds in Armenia, it is quite possible that it breeds also across the border in northern Iraq and northwestern Iran. It was observed with certainty in northwestern Iran by Zarudny (1911, pp. 207–208), but he could not determine its status. Elsewhere in Iran, Zarudny states that *pelegrinoides* [race *babylonicus*] breeds in Kuhistan, Kirman, and northern and southern Khorasan; and *peregrinus*, in northern Khorasan and along the Caspian Sea in the north. The two species are therefore sympatric in northeastern Iran. This region is of great zoogeographical interest where, as I have mentioned (1955) in a discussion of pseudo-subspecific pairs (to which we may add *F. peregrinus* and *F. pelegrinoides*), different elements of the Palearctic avifauna come into secondary contact.

I am aware that some of the statements and records of Zarudny have been questioned by Hartert and other authors who were probably influenced by Hartert, but Zarudny was an unusually expert field man who made many trips to Iran where he collected large series. He was a competent taxonomist and would not have confused the two falcons in the field, much less in skins. I may add that my own studies of large series of many birds from Iran have almost always vindicated the statements of Zarudny.

The two falcons have been reported from the northwestern Himalayas. Stuart Baker (1928, p. 37) states that the range of *F. pelegrinoides babylonicus* extends from the "North-West as far East as the United Provinces and Nepal, though Hodgson's specimens from the latter country may have been tame," but the only breeding records he knows of are from North West Frontier Province and neighboring Punjab. Whistler (1930, p. 263) believes that both species breed in the Rawalpindi district in northwestern Punjab, stating that *peregrinator* [the Indian race of *peregrinus*] undoubtedly breeds in that region and *babylonicus* probably does also.

The Rothschild Collection contains two very interesting specimens which were collected by Dodsworth on April 21, 1912, in a precipice at about 6000 feet in the vicinity of the Shogi Railway station, about 9 miles from Simla, northeastern Punjab. They were discussed by Dods-

worth (1913) who relates the conditions under which they were taken and described the two birds in detail. They appeared to be mated and the male (A.M.N.H. No. 537353) had the "testes enlarged" and was shot off the eyrie which "contained two young, about a couple of days old, and one egg on the point of hatching off." The female (A.M.N.H. No. 537354) which had the "ovaries greatly enlarged" was killed near the eyrie.

The male appears to me to be a typical specimen of *F. pelegrinoides babylonicus*, and the female a typical specimen of *F. peregrinus peregrinator*. Captain J. Delacour, who has examined the two specimens with me and read Dodsworth's paper, concurs in my identifications. The two birds are strikingly distinct and Dodsworth was greatly puzzled. He states: "On laying the two adult birds side by side, the differences in their plumage and dimensions were so great that anyone not acquainted with their history would certainly assign them to different species. I sent this unique pair of Falcons, shot off the same nest, to Mr. E. C. Stuart Baker for comparison with specimens in Europe, and he returned the skins with the remark that he could make nothing of them!"

It is difficult to question that the birds were paired but, in my opinion and that of Delacour, they cannot be identified as other than *babylonicus* and *peregrinator*. Dodsworth called them *Falco peregrinator* Sundevall or *Falco atriceps* Hume. The latter name is now held to be a synonym of *peregrinator* Sundevall. Hartert subsequently labeled them *F. peregrinus peregrinator*, but, when the Rothschild Collection was incorporated in that of the American Museum of Natural History, they were correctly assigned to *babylonicus* and *peregrinator*.

A possible explanation for this mixed pair is that Simla lies to the east of the normal breeding range of *pelegrinoides*, or at the very edge of it, where the ratios between the sexes may be abnormal, the male of *pelegrinoides* pairing with a female of *peregrinus* for the lack of a mate of its own species. We cannot be certain that these individuals had interbred, but, if they had, the reproductive isolation between *pelegrinoides* and *peregrinus* would evidently be imperfect, as the eggs were fertile. However, no certain hybrids are known. Jerdon (1862, p. 26) states that he suspects a specimen he saw from the northwestern Himalayas is "a hybrid between the Shahin and the Peregrine," but his description of that specimen gives me the impression that it was *F. peregrinus peregrinator* in immature, and perhaps aberrant, plumage.

The breeding ranges of *pelegrinoides* and *peregrinus* may overlap on the borders of the Soviet Union and northwestern Mongolia. Sushkin (1938, p. 155) states that he believes that some birds he saw on August 15, 1912, on the Chuya Steppe near Kosh Agach in eastern Russian Altai were

*gobicus* [a synonym of *F. pelegrioides babylonicus*] and that Kozlov reported that the latter ranges westward in Mongolia to the foothills of the Sailu-ghem Range. This range of the Altai forms the frontier of the Soviet Union and Mongolia, and Kosh Agach is located about 50 kilometers to the west of it. *Peregrinus* is known to breed in northwestern Mongolia south to at least the Tannu Ola Range, and Johansen (1957, p. 156) states that it breeds also along the lower Kara Irtysh. This river flows along the southern slopes of the Altai, and it is possible, therefore, that *peregrinus* breeds also in the western Mongolian Altai, in the intervening region between the Kara Irtysh and the Tannu Ola. If it does, it would overlap *pelegrioides*. Stegmann (1937a, p. 268) states also that *peregrinus* breeds in Khangai in western Mongolia, but Kozlova (1932, p. 422) has reported only migrants from Khangai. The distribution and status of the two birds are not too well known in the regions mentioned, but, quite clearly, the possibility that they overlap must be taken into consideration.

To summarize: The morphological differences between the two falcons are mentioned and I discuss in detail the regions where they come into contact and overlap, or may overlap, during the breeding season. It is probable that the ecological requirements will be found to differ in the zones of overlap, *pelegrioides*, which throughout most of its range inhabits very arid regions, selecting sites that are more arid and rocky, *peregrinus*, the sites that are better wooded. With the possible exception of the two birds from Simla mentioned above, the two falcons do not seem to interbreed, as no hybrids have been reported other than the doubtful one reported by Jerdon. Everything considered, it seems to me that these two falcons are probably not conspecific, though they are closely related and, with some exceptions on the periphery of their breeding range, replace each other geographically.

#### *Falco peregrinus*

The geographical variation of the Palearctic populations of the Peregrine Falcon has been discussed by many authors. Some of these studies are mentioned above in the discussion of the relationships of this species to the Barbary Falcon (*F. pelegrioides*), but other reviews or notes were published by Dementiev (1933a, 1933b, 1934a, 1934b, 1935a, and 1935b), and by Spangenberg and Dementiev (1935); notes on nomenclature, by Stegmann (1937b) and Grote (1939); and a list of specimens in the Berlin Museum with a note on nomenclature is given by Dementiev and Stresemann (1955). Nevertheless, the number of races to be recognized is still a matter of some dispute. In some instances the ranges of the races that are generally admitted are uncertain, and, in some cases, the nomenclature is not stabilized. Despite this seeming confusion, the pattern of

the geographical variation is relatively simple and seems to be as follows.

The tundras are inhabited by a large and pale race which is highly migratory and which I call *calidus*. The eastern limit of the range of this race is a matter of dispute, but I believe that it reaches to at least the lower Lena. To the east, the birds apparently vary individually, some being pale and others dark but, generally speaking, are intermediate in characters between the pale race (*calidus*) of the tundras west of the Lena and darker populations in northeastern Siberia. These darker populations (the oldest name of which is *japonensis*) inhabit also eastern Siberia from the basin of the Vilyui eastward through central and southern Yakutia to Japan, and are migratory also. This darker race shows some affinities to the two races of North America (*pealei* and *anatum*) which are also represented in the Palearctic Region, *pealei* breeding on the Commander Islands and *anatum* in eastern Greenland, (which I include in the Palearctic Region). In the woodlands of Europe and western and southern Siberia east to Amurland and Ussuriland, *calidus* is replaced by a dark race (nominate *peregrinus*) which is not migratory or shows only limited movements, nominate *peregrinus* being replaced in turn by a sedentary race (*brookei*) in the Mediterranean region eastward to the Caucasus. *Brookei* is smaller than nominate *peregrinus*, more densely barred and more rufous below in the adult plumage and much darker in the juvenal plumage. Finally, a dark and isolated race (*fruitii*), which is most similar to *pealei*, is restricted to the small Volcano Islands off southeastern Japan, and another isolated race (*peregrinator*) inhabits the Himalayas, ranging southward through India to Ceylon and east to Burma, and western and southern China north to the Yangtze Valley. *Peregrinator* is a very dark race which differs from all others in the adult plumage by being much darker and blacker on the head, including the cheeks on which the black areas of the moustache and ear coverts are confluent.

The specimens that I have examined and those that are reported in the literature suggest that much of the variation is clinal in character on the continent, the populations becoming darker as they range farther east and south across Europe and Asia, and darker and smaller from north to south, at least in the western part of the range and probably in the east as well. The adults that I have measured and those reported by Kleinschmidt (1912-1927) and Dementiev (1951) have the following wing lengths (the populations of Russia and western and southern Siberia are called *brevirostris* by Dementiev, and those of southern Germany and northeastern France, *rhenanus* by Kleinschmidt).

*F. p. calidus* (measurements by Vaurie): Ten males, 315-325 (319); 10 females, 350-370 (361.8)



*F. p. peregrinus*

Russia and western and southern Siberia (measurements by Dementiev): Twenty-three males, 294–334 (313); 21 females, 343–375 (356.6)

Southern Sweden (measurements by Vaurie): Five males, 307–320 (311); four females, 345–361 (353)

Central Germany (measurements by Vaurie): Ten males, 289–328 (304); 10 females, 348–368 (354)

Rhineland, Pfalz, Lorraine, and Alsace (measurements by Kleinschmidt): Fifty males, 298–305 (300.6); seven females, 335–355 (345.4)

*F. p. brookei* (measurements by Vaurie): Five males, 282–295 (288); four females, 308–335 (325)

The geographical variation of the Palearctic races is quite adequately expressed, in my opinion, by recognizing only the races listed below. The discussion is restricted chiefly to the synonyms, if any, with a brief statement of the subspecific characters and of the general range.

1. *Falco peregrinus anatum* Bonaparte, 1838, type locality, New Jersey. This race, which inhabits North America and Greenland with the exceptions of the Aleutian Islands and islands off the coast of southern Alaska that are inhabited by *pealei*, is darker and larger than nominate *peregrinus*. The difference in coloration is especially evident in the juvenal plumage, but the adults, though darker above than nominate *peregrinus*, are usually paler and less heavily barred or spotted on the upper breast. A difference in size between *anatum* and nominate *peregrinus* has been denied by Salomonsen (1950, p. 433), but the specimens that I have measured from North America average distinctly larger than topotypical nominate *peregrinus*; their wing length measures 290–355 (322.2) in 10 males and 356–372 (364.6) in 10 females, as against 295–322 (309.2) in 10 males and 342–363 (352.4) in 10 females from Great Britain.

The birds of Greenland and North America appear to be identical or to vary individually to the same extent, but Manning (1956, p. 52) states that in the birds of arctic Canada the black areas are more restricted on the face, and the cheeks are whiter. He suggests the existence of a circumpolar subspecies which he calls *leucogenys* [a synonym of *calidus*, see below]. However, with the single exception of *peregrinator* from India in which the whole cheek is black, it does not seem to me that the variations in the amount of white on the cheek are sufficiently constant to be a reliable taxonomic character. My material from Canada is insufficient, but I can match the two birds from arctic Canada shown by Manning in his plate 9 with individuals collected during the breeding season in southern British Columbia, Texas, and New York. Friedmann (1950, p. 651) considers that the color of the cheeks is a matter of individual variation in North America, and both he and the authors of the check-list

of the American Ornithologists' Union (1957, p. 119) call the birds of Canada *anatum*. One should note also that the known range of *calidus* is separated from that of the population of arctic Canada by the darker *japonensis* and *pealei*.

2. *Falco peregrinus peregrinus* Tunstall,<sup>1</sup> 1771, type locality, Great Britain, with the following synonyms: *Falco peregrinus brevirostris* Menzbier, 1882, type locality, Moscow; *Falco barbarus germanicus* Erlanger, 1903, type locality, central Germany; and *Falco peregrinus rhiphaeus* Buturlin, 1907, type locality, southern Urals.

This subspecies ranges from the British Isles and continental Europe (south of the range of *calidus* and north of that of *brookei*), eastward through western Siberia (south of *calidus*) and southeastern Siberia (south of *japonensis*), to Amurland and Ussuriland. It varies geographically to a slight extent but cannot be subdivided nomenclaturally. Hartert (1913, pp. 1043–1044) correctly synonymized *brevirostris* and *germanicus* with nominate *peregrinus* but was uncertain about *rhiphaeus* which he did not examine. *Rhiphaeus* has been synonymized with nominate *peregrinus* by Stegmann (1937a, p. 77) and with *brevirostris* by Dementiev (1951, p. 94), but I consider that *brevirostris* is a synonym of nominate *peregrinus*. I have not seen birds from the southern Urals, but I follow Stegmann and Dementiev who consider that *rhiphaeus* is not valid.

Johansen (1957, p. 156) states that the birds of Russia and of western and central Siberia average somewhat larger and darker than nominate *peregrinus*, but that individual variation in these populations is high. It does not seem that *brevirostris* differs sufficiently from nominate *peregrinus* to warrant its recognition. The few specimens that I have seen from Russia are not separable from nominate *peregrinus*. Stegmann (*loc. cit.*) has synonymized *brevirostris* with nominate *peregrinus*, although he is a keen splitter.

The correct type locality of *brevirostris* is Moscow, but Stegmann (1937b) states that Menzbier did not appoint a type in 1882 and based his description on a specimen from France which Stegmann believes represents the type of *brevirostris*. However, Menzbier had also examined specimens from Moscow, together with the one from France, and later (1884, p. 284) states clearly that the birds of France do not represent typical *brevirostris*. He subsequently (1916, p. 60) appointed a specimen from Moscow as the type of *brevirostris*. Grote (1939), who has discussed this question, agrees that Moscow is the correct type locality.

<sup>1</sup> *Falco peregrinus* Tunstall, 1771, has been used for many years in all standard works. I see no need to attribute *Falco peregrinus* to Gmelin, 1778, as Holthuis and Junge (1958) would have us do.

Kleinschmidt (1912–1927), who described several races of *peregrinus* the validity of which is not acknowledged, recognized *germanicus* and influenced Steinbacher (1936, p. 397) in reviving it. Steinbacher was followed by Niethammer (1938, p. 138), Mayaud (1939), and Dementiev (1951). *Germanicus* is alleged to differ from nominate *peregrinus* by being smaller and more heavily but more narrowly barred with black below on a more rufous background. However, the differences in coloration are flatly contradicted by the large series that I have compared from Great Britain and central Germany. No type of coloration predominates in either region, and the range in individual variation is identical. Witherby (1943, p. 15) had already stated that the two populations do not differ in size, which is confirmed by the measurements I have taken and which are mentioned above.

3. *Falco peregrinus calidus* Latham, 1790, type locality, India, on migration, with the following synonyms: *Falco leucogenys* C. L. Brehm, 1854, type locality, Thuringia, Germany, on migration; and *Falco peregrinus caeruleiceps* Stegmann, 1934, type locality, Gydan Peninsula, northwestern Siberia.

This race differs only slightly morphologically from nominate *peregrinus* by being generally paler and by averaging slightly larger. It inhabits the tundras of Eurasia, east to at least the Lena (although the population west of the Lena and east of the Taimyr Peninsula is already slightly darker than that of northwestern Siberia), and east of the Lena intergrades with *japonensis* up to about the lower Kolyma. Typical specimens of *calidus* can be easily distinguished from typical specimens of nominate *peregrinus* by the color of the upper parts, especially the crown which is more grayish blue, less slaty and blackish; the under parts of typical *calidus* are also less heavily barred on a whiter background, and the black areas on the face are more restricted. Many specimens, however, cannot be identified with certainty, and Mackworth-Praed and Grant (1934, p. 349) have questioned the validity of *calidus* and subsequently (1951) did not acknowledge it, calling all the winter visitors to Africa, Arabia, India, and Malaya nominate *peregrinus*. Such action is unfortunate, as it obscures an important aspect of the biology of this species, *calidus* being highly migratory, whereas nominate *peregrinus* is sedentary, or its migratory movements are very limited (some individuals spend the winter in the southern part of the breeding range or a little farther south, reaching occasionally the Iberian Peninsula and Sardinia). I grant that *calidus* is not well differentiated morphologically, but, under the circumstances, it seems desirable to acknowledge the validity of *calidus* on slighter morphological grounds than would otherwise be acceptable.

Some authors have unfortunately followed Kleinschmidt (1912–1927, pp. 54–61) in repudiating the name *calidus* and have adopted *leucogenys*, while others, such as Steinbacher (1936, p. 398), have rejected *leucogenys* as well, and adopted *caeruleiceps*. *Calidus* has been rejected on the ground that its type is no longer in existence and its original description was indeterminate, but Hartert (1913, p. 1046), who appears to be the first reviser, adopted *calidus* and synonymized *leucogenys* with it. The authors who reject *calidus* as indeterminate and adopt *leucogenys* assume that the latter is well founded, but in my opinion *leucogenys* is indeterminate also. Brehm (1854, pp. 51, 60) did not select a type, nor did he give any clues to the type, and the lectotype that was appointed by Hartert (1918, p. 42), on the ground that it was the first specimen mentioned by Brehm, cannot be identified with certainty as *calidus* or nominate *peregrinus*. This lectotype is in the Rothschild Collection and was examined by me. *Caeruleiceps* has the merit of being well founded, but *calidus*, described nearly 150 years earlier, cannot be rejected incontrovertibly and is in use in the great majority of standard works.

4. *Falco peregrinus japonensis* Gmelin, 1788, type locality, at sea off Japan, with the following synonyms: *Falco peregrinus harterti* Buturlin, 1907, type locality, lower Kolyma; *Falco peregrinus pleskei* Dementiev, 1934, type locality, Great Shantar Island, Sea of Okhotsk; and *Falco peregrinus kleinschmidtii* Dementiev, 1934, type locality, southern Yakutia.

This race is darker than *calidus* in all plumages and darker than nominate *peregrinus* or *anatum* in juvenal plumage. It inhabits northeastern and eastern Siberia eastward to Japan, with the exceptions of the region of Lake Baikal, southern Transbaicalia, Amurland, and Ussuriland where it is replaced by nominate *peregrinus*.

I have not examined sufficient specimens from the range of *japonensis*, so I follow Dementiev and Stresemann (1955, p. 345), who state that the name *japonensis* applies apparently to the birds that breed in Anadyrland, and from central and southern Yakutia, east to the coast of the Sea of Okhotsk. These populations are migratory, and Stresemann (1949, p. 253) has shown that *japonensis*, which is the oldest name by far, was based on a migrant which “flew on board off Japan.”

Among the forms synonymized above, *kleinschmidtii* was described from southern Yakutia, but *harterti* seems to represent a form intermediate in coloration between *calidus* and *japonensis*. It was described from the zone of intergradation between these two races but from a locality (lower Kolyma) where the population would be expected to be more similar to *japonensis*. *Pleskei* is said to represent a form with a short wing length, but the validity of *pleskei* was questioned by Stegmann (1934), and Dementiev

(1951, pp. 93–94) has granted that *pleskei* requires further study. Nevertheless, Dementiev has recognized *pleskei* (*loc. cit.*), as it is possible that a distinct race inhabits the Shantar Islands, ranging perhaps also to Sakhalin where the subspecific status of the Peregrine is unknown. However, pending confirmation, it is best to synonymize *pleskei* with *japonensis*.

The winter visitors to southeastern Asia that have been identified as *calidus* in the past should be reexamined, as I believe many probably represent *japonensis*. I have examined migrants and winter visitors of *japonensis* from the Commander Islands, southeastern China, Philippines, Palawan, and Borneo and specimens which appear to be *calidus* from the Philippines, Hainan, India east to Assam, Andamans, Greater Sundas, and New Guinea.

5. *Falco peregrinus pealei* Ridgway, 1873, type locality, Sitka, Alaska, and Oregon, with *Falco rudolfi* Kleinschmidt, 1909, type locality, Hokkaido, on migration.

This race is darker above and more heavily barred below than *japonensis* and is similar above to *anatum* but more heavily and densely barred below in adult plumage. In the juvenal plumage, the under parts are very much darker and much more heavily and broadly streaked than in *japonensis*, *anatum*, or any other race. It breeds on the Commander and Aleutian Islands and the islands off the coast of southern Alaska south to the Queen Charlotte Islands; it occurs also on Saint George Island in the Pribilofs. It is migratory and winters south to the Kuriles and occasionally Hokkaido, and in America south to Oregon and occasionally California to northern Baja California.

Friedmann (1950, p. 668, footnote) states that the birds of the Commander Islands “. . . usually called *pealei*, are a different race for which the name *Falco rudolfi* Kleinschmidt . . . seems to be available. They have the pectoral spots, especially in the female, very much broader than in *pealei*.” However, the single adult that I have examined from the Commander Islands (sexed as a female but probably a male), as well as 14 birds in juvenal plumage from these islands, is identical with corresponding specimens from America. The population from the Commander Islands does not seem to be separable, and Kleinschmidt himself (1912–1927, p. 114) has synonymized *rudolfi* with *pealei*. He compared the type of *rudolfi* to five specimens from America and the series I have mentioned from the Commander Islands.

6. *Falco peregrinus fruitii* Momiyama, 1927, type locality, Volcano Islands.

This race is similar to *pealei*, but two adults that I have examined from the Volcano Islands differ quite distinctly from *pealei* by being darker

and blacker on the tail, less gray. The tail of these two specimens is also less conspicuously barred than in *pealei*, and the head is somewhat blacker. I have not seen specimens in juvenal plumage from the Volcano Islands.

The two specimens show that *fruitii* is a valid race, but Hartert (1913, p. 1048) and also Kleinschmidt (1912–1927, p. 115), who apparently saw these two specimens, consider them indistinguishable from *pealei*. Evidently, these two authors failed to notice the difference in the color of the tail that I have mentioned.

7. *Falco peregrinus brookei* Sharpe, 1873, type locality, Sardinia, with *Falco peregrinus caucasicus* Kleinschmidt, 1907, type locality, northeastern Caucasus, as a synonym.

This Mediterranean race is mentioned above in the discussion of the relationships of *F. peregrinus* and *F. pelegrinoides*, and a brief diagnosis of it is given in the discussion of the geographical variation of *F. peregrinus*. To repeat, it differs from nominate *peregrinus* by being smaller, more densely barred and more rufous below in the adult plumage, and much darker in the juvenal plumage.

Some adults of *brookei* from the western Mediterranean differ also from nominate *peregrinus* by showing a narrow and vague band of rufous on the nape, a character that is said to be shown also in the population of the Caucasus. I have not examined specimens from the Caucasus, the population of which was named *caucasicus* by Kleinschmidt, but I doubt that *caucasicus* is well differentiated, as Kleinschmidt states it is similar to *brookei*, though paler. I follow Hartert in synonymizing *caucasicus* with *brookei*, as its validity has been questioned, and it is not acknowledged by most authors.

*Falco peregrinus brookei* is sedentary and inhabits the northern part of the Mediterranean basin and the islands of the Mediterranean, from the Iberian Peninsula, southern France and southern Italy, Greece, and Asia Minor, eastward to Armenia, Transcaucasia, Caucasus to the southern Crimea, and southern Caspian districts of northern Iran, eastward to northern Khorasan in northeastern Iran. In this last region it is sympatric with *F. pelegrinoides*. *Brookei* breeds also in northern Morocco in the regions of Tangier and Cape Spartel.

8. *Falco peregrinus peregrinator* Sundevall, 1837, type locality, at sea between Ceylon and Sumatra, at latitude 6° 20' N., 70 Swedish miles off the Nicobars, with the following synonyms: *Falco shaheen* Jerdon, 1839, type locality, Travancore, southern India; and *Falco atriceps* Hume, 1869, type locality, Himalayas.

This race was included by Hartert (1913, p. 1051) in the Palearctic fauna, although it is chiefly tropical and ranges from the Himalayas south

to Ceylon and east through Burma to western and southern China north to about the Yangtze Valley. The highest altitude on record for the Himalayas was 11,000 feet, reported by Whistler (1926, p. 763) from Kangra in northern Punjab. However, I have examined two adults that were collected by Walter Koelz on October 22, 1936, at Ruling and Tsambok, in Lahul, northern Punjab. I have not been able to find these two localities, but they would appear to be at an altitude of no less than 13,000 feet, and I may remark that the avifauna of Lahul is very predominantly Palearctic in its affinities. *Peregrinator* differs from all the preceding valid races by being much darker, blacker on the head, including the cheeks on which the black areas of the malar stripe and ear coverts are confluent, not interrupted with white. It is also more ferruginous below and is small, the wing length being similar to that of *brookei*.

The material that I have seen consists of five specimens from India, one from northern Burma, and two from southern China. The bird from Burma is similar to the specimens from India, but the two from China are distinctly paler than the others, more grayish, less blackish above, and less rufous below. This material is insufficient to determine whether more than one subspecies is involved, but if the differences mentioned are substantiated by additional material, the type of *peregrinator* should be reexamined. It remains to be seen whether this name applies to the Chinese or Indian population.

A number of extralimital subspecies are recognized. Peters (1931) recognizes the following: *ernesti* from the Philippines to the Greater Sundas and New Guinea, *macropus* in Australia and Tasmania, *perconfusus* in tropical and southern Africa, *radama* in Madagascar and the Comoros, and *cassini* in South America and the Falkland Islands. Mayr (1941) has reviewed the populations of the Papuan and Australian region and has shown that the birds of New Caledonia and New Hebrides are a distinct race which he named *nesiotes*. He suggests also that the birds of southwestern Australia, named *submelanogenys* by Mathews, may constitute a separate subspecies. Stresemann shows (MS) that *minor* Bonaparte, 1850, is the correct name of the African race, not *perconfusus*.

#### *Falco pelegrinoides*

The geographical variation of this falcon is relatively slight, but it is quite evident that the populations from the eastern half of the range of this species are distinctly redder on the crown than those from the western half. They average also slightly larger. Dementiev (1951, pp. 99–100), who has seen more birds from the east than I have, states that the wing length of birds from Turkestan measures 274–302 (283.7) in 14 males

and 312–338 (323.1) in 23 females, reaching a length of 310 in some males and 343 in some females, whereas the birds I have measured from Africa have a wing length of 270–280 (275) in four males and 315–325 (318.5) in 10 females. Meinertzhagen (1954, p. 333) denies the existence of this variation, but I believe the populations can be divided into two subspecies which differ as stated above. They are:

1. *Falco pelegrinoides pelegrinoides* Temminck, 1829, type locality, Nubia, with the following synonyms: *Falco punicus* Levaillant, 1850, type locality, Algeria<sup>1</sup>; and *Falco barbarus arabicus* Erlanger, 1903, type locality, southern Arabia.

2. *Falco pelegrinoides babylonicus* Sclater, 1861, type locality, northern India, on migration, with *Falco peregrinus gobicus* Stegmann, 1934, type locality, Turfan Depression, Sinkiang, as a synonym.

The general range of this species is mentioned above in the discussion of the relationships of *F. pelegrinoides* to *F. peregrinus*. The nominate race, the English name of which is the Barbary Falcon, extends from the Canaries, Morocco, Algeria, Tunisia, and the Sahara to Egypt south to about latitude 12° N. in the Sudan, Eritrea, northern Somaliland, the western and southern coastal districts of Arabia to Muscat, and from the Sinai Peninsula to Iraq and probably northwestern Iran and the western Zagros. *Babylonicus* is a very famous bird to which the name Shaheen properly belongs, according to Dementiev (1957), rather than to the Indian race (*peregrinator*) of the Peregrine Falcon. It ranges from central and eastern Iran eastward through Afghanistan and northern Baluchistan to the northwestern Himalayas, and north through Transcaspia and Russian Turkestan to Sinkiang and Mongolia. It is partly migratory, wintering in southern Baluchistan, northwestern and northern India south to northern Bombay, and northern Central Provinces.

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<sup>1</sup> See page 3 for a discussion of this name.



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