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GEOGRAPHICAL VARIATION IN THE SWIFTS
APUS HORUS AND *APUS CAFFER* (AVES: APODIDAE)

by

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Much of the work on which this paper is based was done while holding a Frank M. Chapman memorial grant from the American Museum of Natural History in New York. I am obliged to the workers and museums listed in Brooke (1964, 1969a) for facilities for study and for information on material in their collections, and for the loan of material to Dr. J. Grindley, of the Port Elizabeth Museum and Snake Park, to Miss M. Courtney-Latimer, of the East London Museum, and, last but not least, to Mr. P. A. Clancey, of the Durban Museum. I am also grateful to Dr. A. A. da Rosa Pinto for facilities for study of the swifts in the collection of the Instituto de Investigação Científica de Angola, at Sá da Bandeira.

As in my previous papers on swifts, delta-length means the distance between the tips of the fourth and fifth rectrices.

APUS HORUS, INCLUDING *TOULSONI*

Apus horus (Salvadori and Antinori), 1872: Blue Nile, Sudan, is widely distributed in savanna country from Chad to the Cape Province of South Africa, and breeds, as far as is known, only in holes in vertical banks made by other birds, those excavated by members of the Meropidae, Alcedinidae, Hirundinidae and Sturnidae being largely favoured.

The swift specimen from Fort Archambault, in Chad, reported as *A. affinis* (Gray) (by Friedmann, 1962), proves on re-examination to be a *A. horus*, with which view Friedmann concurs. Dragesco (1961) recorded *A. affinis* breeding in vertical sandbanks on Dugouia

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Island, in the Shari River between Fort Lamy and Lake Chad, but did not collect specimens. This is the normal breeding site of *A. horus* and there is no authentic record of *A. affinis* breeding in this manner. The record of a nestling taken from a nest of *Cecropis daurica emini* (Reichenow) by the Akaki River, in Ethiopia (von Erlanger, 1905), is unacceptable. There is no authentic record of *A. horus* laying in a swallow's nest, whereas *A. caffer* does so freely and *A. affinis* very occasionally in Africa. The specimen was in Frankfurt am Main, but was destroyed in a bombing raid during the war, along with all other swifts collected by von Erlanger (Dr. J. Steinbacher, *in litt.*).

There is no sexual dimorphism or aging criterion discernible in wing- or delta-length in *A. horus*, but there is a clinal decrease from north to south in delta-length. Colour variation, if it exists, is more than masked by abrasion, which is particularly pronounced in this species which frequents burrows made in sandy soils of various colours and consistencies. Juvenals may be recognized by their blunt outer rectrix and a variable tendency for the white rump to be smaller than in adults, and with an infusion of melanin into the shafts and, to a lesser extent, into the webs of the white feathers. I now give wing- and delta-length ranges and averages, dividing the range into three sectors to show the clinal variation in delta-length

(a) *Chad to Kenya*: Adult ♂♂ wing-length 143—161 av. (32) 152.8, delta-length 3—6 av. (31) 4.55; adult ♀♀ wing-length 147—158 av. (18) 151.9, delta-length 3.0—5.5 av. (17) 4.65; juvenal ♂♂ wing-length 147—154 av. (6) 151.0, delta-length 3—6 av. (6) 4.50; juvenal ♀♀ wing-length 142—155 av. (9) 151.0, delta-length 2.5—6.0 av. (9) 4.17; overall wing-length 142—161 av. (65) 152.2, delta-length 2.5—6.0 av. (63) 4.52 mm.

(b) *Angola to Moçambique*: Adult ♂♂ wing-length 144—158 av. (22) 151.9, delta-length 3.0—5.5 av. (20) 4.10; adult ♀♀ wing-length 147—159 av. (14) 152.7, delta-length 2.5—5.5 av. (13) 3.85; juvenals both sexes wing-length 142—150 av. (4) 146.5, delta-length 3—4 av. (4) 3.62; overall wing-length 142—159 av. (41) 151.6, delta-length 2.5—5.5 av. (38) 3.99 mm.

(c) *South Africa including Lesotho*: Only consolidated figures are given in view of the small sample and the pattern revealed in populations (a) and (b) above. All are adult birds. Overall wing-length 148—159 av. (11) 154.4, delta-length 2.5—4.0 av. (11) 3.36 mm.

Weights available may be divided on the same basis as linear measurements—

- (a) *Chad to Kenya*: ♂♂ 23—30 av. (14) 26.32, ♀♀ 24—31 av. (11) 27.64 gm. All are adults save for a male juvenal at 27 gm.
- (b) *Angola to Moçambique*: All classes 23—39 av. (5) 27.0 gm.
- (c) *South Africa*: No weights are known.

A. horus, with type-locality on the Blue Nile above Wadi Medin, is usually treated binomially, e.g. by White (1965). Roberts (1929) proposed two new races, namely *australis*: Koster in the western Transvaal, and *beirensis*: Beira in Moçambique. He also recognized (1935) *finschii* (Bocage), 1881: Angola, as a race of *horus*, but Bocage's (1881) description does not suggest any significant difference from *A. horus*. I can find no variation in colour or measurements on which to recognise subspecies. Roberts's basic error was to regard as typical of northern birds a specimen from Dire Dawa, in Ethiopia, which is far and away the most abraded and grubby representative of this species available. That it is in worn plumage is obvious, and so skilled a taxonomer as Austin Roberts had no business to build an argument on so disreputable a specimen, particularly in a species known to breed and roost in holes in vertical banks, and therefore peculiarly subject to abrasion and staining. Abrasion is in fact rapid in *horus* and affects all parts of the plumage. I know of no reason to recognize *sharppei* (Bouvier), 1876: Banana, in Congo Kinshasa.

P. A. Clancey, *in litt.*, says of the Durban Museum series "South African birds are a little colder and bluer, less brownish than northern ones. The eyebrow is a little more marked. However, I feel it is circumspect to keep the species monotypic." But other series from Kenya do not all show the browner, warmer colour that the Kenya series in the Durban Museum does. The high degree of variation within a population caused by abrasion cannot be too often emphasized in dealing with *horus*. Southern birds (Zambia, Rhodesia, South Africa, but not Moçambique) show a tendency to a clearer grey moustache than do northern birds. Southern birds (this time including Moçambique) have buffier eyebrows and outer webs to the tenth (outermost) primary as a rule, but all these differences are both slight and not always present.

Chapin (1939) pointed out that the only difference between *A. toulsoni* (Bocage), 1877: Luanda, in Angola, and *A. horus* was the dark rump. Lack (1956) went further and suggested that it was a phase or mutant of *horus*. White (1965), following Hall and Moreau (1962), retained it as a full species but noted Lack's suggestion. Dr. da Rosa Pinto, who has collected and had field experience of both forms in Portuguese Congo, believes (pers. comm.) that they

are separate species, *toulsoni* being the scarcer and having a more rapid, fluttery flight reminiscent of *A. affinis*. But since the appearance of a swift in flight is a function primarily of wing- and tail-length and weight, and since, as shown below, there is no difference between the forms in these respects, one would expect both to appear the same in flight unless birds of one group were performing a display when the others were not. *A. toulsoni* has not been found breeding, but when it has the problem will presumably be resolved. If it breeds in holes in vertical banks like *horus* it is a phase of *horus*, the question of mixed pairs not being important for reasons given below. If it has some other breeding site it is not conspecific with *horus* despite those reasons. In *Apus* sympatric species may always be distinguished by a combination of differences in measurements, feather shapes and proportions, whereas these seldom figure prominently in distinguishing subspecies, being unlike differences of colour and shade which are important at this level. Neither I nor anyone else has detected any difference in measurements, feather shapes or proportions between *horus* and *toulsoni*. I therefore conclude that they are not separate species. Since they occur together in Portuguese Congo they cannot be subspecies of the same species but only phases of one species. Since *toulsoni* with its dark rump is the scarce and local form it is a phase of *horus* and not *vice versa*; also *horus* is the older name. *A. horus* is the only swift known to have two colour phases.

The phase *toulsoni* has been collected at Tondo Pata (1) and Landana (3), in the Portuguese Congo, at Luanda (2), in Angola, and at Essexvale (1), in Rhodesia. It is known from seven specimens of which I have seen five. As noted above, Dr. da Rosa Pinto has seen a number alive, and Peter Steyn, who collected the Essexvale specimen in 1963, saw (pers. comm.) another among the many normal *horus* there in March and April, 1967. Portuguese *toulsoni* differ from *horus* in having the rump very dark brown (not blue-black like the back as stated in the literature), not white, and in having the throat-patch slightly smaller and greyer (see also Lack, 1956). The Rhodesian specimen is somewhat browner than Portuguese birds, but not as brown as a race of *horus* to be described below. This may be due to abrasion of the plumage, or to a different staining from the tunnels it frequents, always a problem in studying *horus*. Of the five specimens I have seen, four are adult (two ♂♂, two ♀♀, one unsexed) and one is a juvenal. The range and average wing- and delta-lengths and weights are: wing 149—151, av. (5) 149.8, delta 3—5, av. (5) 3.90 mm, weight 25—28, av. (3) 26.7 gm. These are not separable from the corresponding figures for *horus* population (b) Angola to Moçambique given above.

The Instituto de Investigação Científica de Angola, at Sá da Bandeira, has a series of ten birds taken near Porto Alexandre, in the desert of south-western Angola, which are in measurements, feather shape and proportions *horus*, but are of a generally dark brown colour, including the rump. They are clearly browner all over than Portuguese Congo *toulsoni* in similar condition and lack the blue-black colour of both *horus* and *toulsoni*. No normal *horus* have been collected or seen near Porto Alexandre. The nearest localities at which normal *horus* have been collected are Quiteve, on the upper Cunene River, 250 miles to the east, and at Lobito, 300 miles to the north (Schouteden, 1951). While this population may have resulted from a *toulsoni* like phase of *horus*, it is now stabilized and has its own range in the desert. It is, therefore, a subspecies as commonly understood. Since it only differs in colour from *horus* it is a race of this species. If *toulsoni* were proved to be a good species the new desert form would presumably be a race of *toulsoni*, depending on what its breeding site proved to be. I therefore propose—

***Apus horus fuscobrunneus*, subsp. nov.**

Type: ♀, adult, Rio Curoca, near Porto Alexandre, Moçamedes district, Angola. 12 May 1966. Collected by M. Loureiro at sea level. In the collection of the Instituto de Investigação Científica de Angola, at Sá da Bandeira, Reg. No. 16,161.

Diagnosis: Differs from *Apus horus horus* (Salvadori and Antinori), 1872, in having a dark brown rump, not white, a restricted grey throat with obvious dark shaft-streaks, a generally paler and browner colour, particularly on the head and under tail-coverts, and virtually no blue-black on the mantle and breast. Differs from *Apus toulsoni* (Bocage), 1877, in its generally paler and browner colour, particularly on the head, wing-coverts and under tail-coverts. No significant mensural differences were found.

Material examined: 10, all from the type-locality and taken in May, 1966.

Range: Known only from the type-locality on the arid coast of Moçamedes, Angola.

Measurements of the Type: Wing (flattened) 157, tail 51, tail-fork 15, delta (distance between fourth and fifth rectrix) 4, culmen 7, chord of tomium 17 mm; weight 30 gm.

Remarks: The name *fuscobrunneus*, Latin adjective meaning very dark brown, is given because the dark brown colour of this taxon distinguishes it from the blue-black of its close relatives.

The small sample of ten specimens breaks down into three adult ♂♂, four adult ♀♀, one unsexed adult, one ♂ juvenal and one unsexed juvenal. A breakdown of measurements does not suggest age or sexual dimorphism and is therefore omitted. The overall ranges and averages of the ten specimens are: wing 149—157, av. 153.6, tail 49—56, av. 53.0, tail-fork 21—18, av. 14.95, delta 3—5, av. 3.90, culmen 7.0—7.5, av. 7.20, chord of tomium 16.0—17.5, av. 16.90mm; weight 17—30, av. 24.0 gm.

I am obliged to Dr. da Rosa Pinto for permission to study and name this form.

APUS CAFFER

Apus caffer (Lichtenstein), 1823: Galgenbosch, near Uitenhage, in the Cape Province of South Africa, is widely distributed in the Ethiopian Region savannas and sometimes where the evergreen forest has been broken up by economic development. It also occurs in southern Spain (del Junco and Gonzalez, 1969). It usually breeds in nests of various species of swallow, which it takes over and relines for its own use, sometimes even before the swallows have had a chance to use the nest themselves; it also uses holes in rocks and buildings. The species is migratory in the southern part of its range (Cumming, 1952; Brooke, 1957), and in the far north in Spain (del Junco and Gonzalez, 1969). *A. caffer* is more widely distributed in West Africa than is implied by White (1965), having been recorded from the following territories: *Senegal*: Casamence, Melancoree, Sedhiou, Zekinkior (all Rochebrune, 1884); *Gambia*: Bathurst (Rochebrune, 1884; Sharpe, 1871); *Ivory Coast*: living (breeding?) in the chapel at Pobe (Brunel, 1958); *Ghana*: Axim (Bannerman, 1912), breeding Wenchi (Bannerman, 1951); *Togo*: Aledjo (De Roo, *et al.*, 1969); *Nigeria*: Abeokuta, Ede (both Serle, 1950), breeds widely (Fry and Elgood, 1968); *Chad*: Abeche (Salvan, 1968), sight records from Ennedi (Niethammer, 1955); *Central African Republic*: Fort Crampel (Berlioz, 1939).

Brooke (1964) showed that wing-length, which had been used by workers to distinguish races of *A. caffer* when the species was believed to have a disjunct range, in fact varied clinally, increasing from north to south, and that, therefore, *streubelii* (Hartlaub), 1861: Keren, in Ethiopia, and *ansorgei* (Sclater), 1922: Ndalla Tando, now Vila Salazar, in Angola, should not be recognised. More measurements are now available, and these have been broken down into five areas, thus: (a) north of 5°S, (b) northern Angola and the lower Congo, (c) Huila district of southwestern Angola, (d) southeast Africa (Zambia, Katanga, southern Tanzania, Moçambique north of the

Save River, Malawi, Rhodesia, the Transvaal north of Pretoria) and (e) southern Africa (South-West Africa, South Africa from Pretoria south, Lesotho and the Sul do Save area of Moçambique). For most purposes the figures for the first four areas may be lumped, since the clinal increase from Uganda to the northern Transvaal is small. This also emphasises the step to the longer winged birds of the south.

(a) *Africa north of 5° S. to the Sahara*: Adult ♂♂ wing-length 132—145 av. (34) 137.1, delta-length 9—13 av. (27) 10.94; adult ♀♀ wing-length 128—145 av. (40) 138.2, delta-length 8.5—13.0 av. (31) 10.90; juvenal ♂♂ wing-length 131—137 av. (7) 134.9, delta-length 6.5—10.5 av. (7) 8.93, juvenal ♀♀ wing-length 128—138 av. (5) 134.8, delta-length 7.5—10.0 av. (5) 8.80 mm. No sexual dimorphism appears in these figures. Juvenals average shorter wing- and delta-lengths, but they may be more readily identified by the unemarginate outer rectrices (Brooke, 1969b). At the end of the fourth rectrix, the inner web of the fifth in a juvenal is a good 3 mm. wide, whereas in adults it is 2—3 mm. wide. The figures may be consolidated, thus: wing-length 128—145 av. (98) 137.6, adult delta-length 8.5—13.0 av. (68) 10.99, juvenal delta-length 6.5—10.5 av. (12) 8.88 mm.

(b) *Angola and the lower Congo*: Adult ♂♂ wing-length 133—145 av. (9) 139.0, delta-length 9.0—11.5 av. (9) 9.72; adult ♀♀ wing-length 134—145 av. (8) 137.3, delta-length 8.0—12.5 av. (8) 10.06; juvenal both sexes wing-length 133—139 av. (4) 137.0, delta-length 7.0—11.5 av. (5) 8.80 mm. These figures were taken out since this is the range of the alleged *ansorgei*. Mensurally they are indistinguishable from population (a). There is no suggestion that north Angolan birds are smaller than average, as is the case in many species including *A. affinis*. *A.c.ansorgei* is said to be darker on the frons and crown, and this is true on average, but indistinguishably dark birds occur in eastern Africa, e.g. Nairobi, Amani, and the Zambian Nyika; also in eastern Congo Kinshasa (De Roo and Deheeger, 1966). Recognition on colour differences is not warranted in this case. The figures may be consolidated: wing-length 133—145 av. (24) 137.5, adult delta-length 8.0—12.5 av. (17) 9.88, juvenal delta-length 7.0—11.5 av. (5) 8.80 mm.

(c) *Huila district of south-west Angola*: Wing-length 140—148, av. (15) 142.6; adult delta-length 10—13 av. (11) 11.55, juvenal delta-length 7.0—10.5 av. (4) 9.13 mm. A bird from Chingoroi in central Angola has a wing of 140 mm.

(d) *South-east Africa*: Adult ♂♂ wing-length 133—148 av. (21) 140.6, delta-length 10—12 av. (12) 11.00; adult ♀♀ wing-length 134—

148 av. (16) 141.9, delta-length 9—10 av. (7) 9.64, juvenal ♂♂ wing-length 139—147 av. (8) 142.5, delta-length 9.5—12.0 av. (5) 11.00; juvenal ♀♀ wing-length 139—145 av. (6) 141.8, delta-length 9—11 av. (6) 10.08 mm.

There is a suggestion that in this population female delta-lengths are shorter than male ones but that juvenals of the same sex are not shorter than adults. The figures may be consolidated: wing-length 133—148 av. (54) 141.6, ♂♂ delta-length 9.5—12.0 av. (17) 11.00, ♀♀ delta-length 9—11 av. (13) 9.85 mm.

(e) *Southern Africa*: Adult ♂♂ wing-length 143—157 av. (32) 149.8, adult ♀♀ wing-length 145—155 av. (29) 149.3, adult delta-length 8—13 av. (15) 11.67, juvenal ♂♂ wing-length 142—147 av. (3) 144.0 mm. Adult delta-lengths have been grouped since nearly all have been taken from unsexed birds. It is unlikely that juvenals in this population are really shorter winged than adults, since this has not been disclosed in the preceding populations. The overall wing-length range and average is 140—157 av. (79) 149.2 mm. Nomenclatural recognition of the southern African population is not warranted since the degree of overlap in wing-length far exceeds Amadon's 75 per cent rule and there appear to be no other distinguishing characters.

The racial status of the Spanish (and Moroccan?) birds cannot be established until some are collected and critically examined. They are likely to be subspecifically distinct, since most Ethiopian elements in the south-western Palearctic are taxonomically distinct from the main populations in Ethiopian Africa. Del Junco and Gonzalez (1969) trapped a bird at Zahara de los Atunes whose wing measured 149 mm. and compared it with a specimen taken by myself at Umniati, in Rhodesia, the wing of which they give as 151 mm. I measure wings from the carpal joint straightened against a ruler graduated in millimetres, and found the wing-length of the Umniati bird to be 140 mm., not 151 mm. This makes even more unlikely del Junco and Gonzalez's (1969) suggestion that the Spanish birds are southern African ones that have travelled north rather than back south after their visit to their winter-quarters. It is far more likely that *A. caffer* has long bred sparsely in Morocco, using nests of *Cecropis daurica* (L.), and has followed the swallow northward into Spain.

The winter-quarters of southern African birds remain unknown as do those of the Spanish birds. It may well be that such birds in their winter-quarters do not come down to roost, but spend their entire time high in the air, as Lockley has suggested for *A. apus* (L.) (in

press for *Proc. 3rd Pan African Orn. Congr.*). Even resident swifts are seldom seen outside the breeding season, because they feed high up out of sight of the unaided human eye. They come down low to go to roost in their nests and appear outside them for a moment or so at sunrise before rising high into the sky. There are only three or four minutes in the twenty-four hours when a well-placed observer may see or collect them. No unequivocally long-winged southern African bird has ever been collected in its winter-quarters, and Spanish birds are not so long-winged that they would be distinguishable from tropical African birds.

A number of weights are available—

Populations (a) and (b) (material examined and Moreau, 1944) ♂♂ 18.5—24.0 av. (13) 21.59, ♀♀ 18—25 av. (10) 21.30, overall 18—25 av. (29) 21.51 gm. That females should be lighter than males is unusual but may be due to the small size of the samples.

Population (c) overall 18—24 av. (14) 21.85 gm. Population (d) (material examined and birds ringed by H. D. Jackson pers. comm.), overall 21.7—28.0 av. (11) 24.06 gm. The male at 21.7 gm. was too exhausted by cold and starvation to escape my car and thus it was collected. Population (e) adult male 28 gm.

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