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The **ORNITHOLOGICAL SOCIETY OF THE MIDDLE EAST** was formed in April 1978 and is a successor to the Ornithological Society of Turkey.

Aims:

1. To collect, collate and publish ornithological data on the birds of the Middle East.
2. To encourage an interest in and conservation of the birds of the Middle East.
3. To develop a mutually beneficial working relationship with all environmental and conservation bodies and natural history societies in and concerned with the Middle East.

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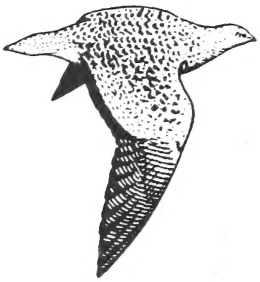

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EDITORIAL

We apologise to members for the late appearance of *Sandgrouse* 7. The production of this number has been beset by difficulties, not least that of a dearth of material in the early stages and papers came in literally at the eleventh hour.

I must once more appeal to members for more papers, as a regular and constant supply of material is a sine qua non for the success of *Sandgrouse*. Observations and records buried in notebooks could well be the basis of significant papers helping to achieve the objectives of the Society.

In this issue we are pleased to welcome again a contribution from Peter Meininger and friends on their work on Egyptian birds and we hope it will not be too long before we are able to review Peter's book: *The Birds of Egypt*. Bill Clark and his associates present an exciting picture of raptor ringing at Eilat in Israel. We are indebted to Graham Bundy for throwing much needed light on the biology and movements of sea birds off S.W. Arabia and for new material on the breeding biology and distribution of two races of the Blackstart *Cercomela melanura* in southern Oman. The remarkable appearance and the recording of numbers of Small Skylarks *Alauda gulgula* in Israel and Saudi Arabia for the first time in the Western Palaearctic is chronicled by Hadoram Shirihai, Geoff Brown and John Palfery. Also from Israel, where clearly exciting ornithological work is gathering momentum, we are pleased to present notes on two more firsts from the Western Palaearctic: the Black Bush Chat *Cercotrichas podobe* and the Rufous Short-toed Lark *Calandrella brachydactyla dukhunensis*. We make no apology for presenting, from Derek Lees-Smith and Colin Harrison, two papers on zoogeographical matters relating to the birds of our area — matters which we are confident will prove of great interest and stimulation to our members, despite our overriding concern with field ornithology.

For the scientific names of birds we follow (unless otherwise stated) the *List of Recent Holarctic Bird Species* by K.H. Voous, B.O.U., London, 1977 and for African species *A Complete Checklist of the Birds of the World* by R. Howard and A. Moore, London, 1980.

I would like to record my debt to all members of the Editorial Committee for their unfailing help and support in the long and arduous preparation of this issue. Also my thanks go to Nigel Collar, Graham Bundy and Derek Lees- Smith, all of whom helped in various ways and to Mike Everett for his continuing support in the production of maps and finally to my wife, Joyce, for general assistance, most especially with proof reading.

DONALD PARR

BREEDING BIRDS OF THE LAKES IN THE NILE DELTA, EGYPT

by

Peter L. Meininger, Uffe Gjøl Sørensen and Gamil Abdel Mowla Atta

INTRODUCTION

Over a quarter of all Mediterranean coastal wetlands are situated along the Mediterranean coast of Egypt, mainly in the Nile Delta. The lakes in the Nile Delta are not only one of the most threatened habitats in Egypt (Mullié & Meininger 1981), but also one of the ornithologically least known areas. Expeditions in the winters 1978/79 and 1979/80 revealed information about the numbers of wintering waterbirds in the Nile Delta lakes (Meininger & Mullié, 1981a, 1981b) and an expedition in November 1981 collected information on waterbirds in the lakes Burullus and Manzala in autumn (Bennett *et al.* 1982).

Very little has been published about the breeding birds of the Nile Delta, the most comprehensive work being that of Meinertzhagen (1930). Moreover, the distribution of breeding birds of the Nile Delta as shown in more recent works (e.g. Cramp & Simmons 1977, 1980; Etchécopar & Hüe 1967) is often erroneous.

In this paper we present the results of a preliminary survey of breeding birds of the Nile Delta lakes in May 1983. These have been combined with information from the literature and with material collected up till now for an updated book on Egyptian Birds (Birds of Egypt Project (BEP): see Meininger & Mullié 1981c; Goodman, Meininger & Mullié 1983).

Figures 1 and 2 show the geographical position of the Nile Delta lakes and some of the localities mentioned in the text.

METHODS

In 1983 short visits to the northern shore of Lake Idku were paid on 24 March and on 11 May. A few observations at Lake Maryut were made when passing this area by car on 25 March and on 12 May.

Lake Manzala was visited from 4 - 8 May: two days by sailing boat in the centre of the lake and several visits by car to the northern, western and southern shores.

From 8 - 11 May we visited the area of Lake Burullus. Only a small area near Baltim was surveyed with a small boat. An extensive saltmarsh area near El Haddadi along the southern shore of the lake was visited by car on 11 May.

DESCRIPTION OF THE AREAS

Along the Mediterranean coast of the Nile Delta are four lakes, from west to east: Lake Maryut Idku, Burullus and Manzala. A more detailed description of these areas can be found in Meininger and Mullié (1981b).

Lake Maryut (Buhayrat Maryut, 31° 08′ N 29° 56′ E).

Lake Maryut is situated south of Alexandria. According to Saad (1974) it used to be considered as a highly fertile lake, but in recent years this lake has suffered much from intensive pollution as a result of the increase in human population and industry around it. Formerly it had an area of about 248 km^2 (George 1972), but in 1961 the area was only about 61 km^2 (Wahby 1961) and it has been decreasing since then.

MEININGER, P.L. *et al* 1986. Breeding Birds of the lakes in the Nile Delta, Egypt. *Sandgrouse 7:1-20.*

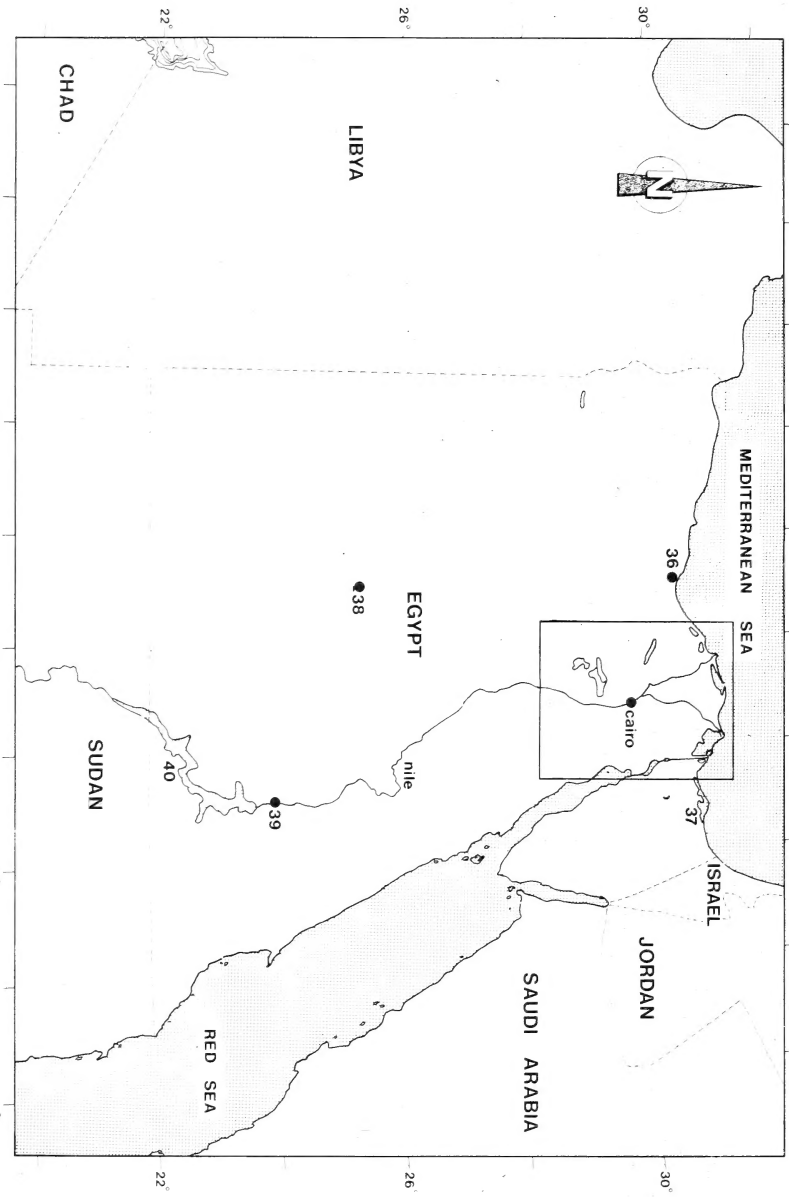

Figure 1. Geographic position of the Nile Delta and some of the localities mentioned
Figure 2. The Nile Delta lakes and some of the localities mentioned. Cultivated areas are shaded

Localities indicated in figures 1 and 2

Figure 1:

36. El Alamein
37. Lake Bardawil
38. Dakhla Oasis
39. Aswan
40. Lake Nasser

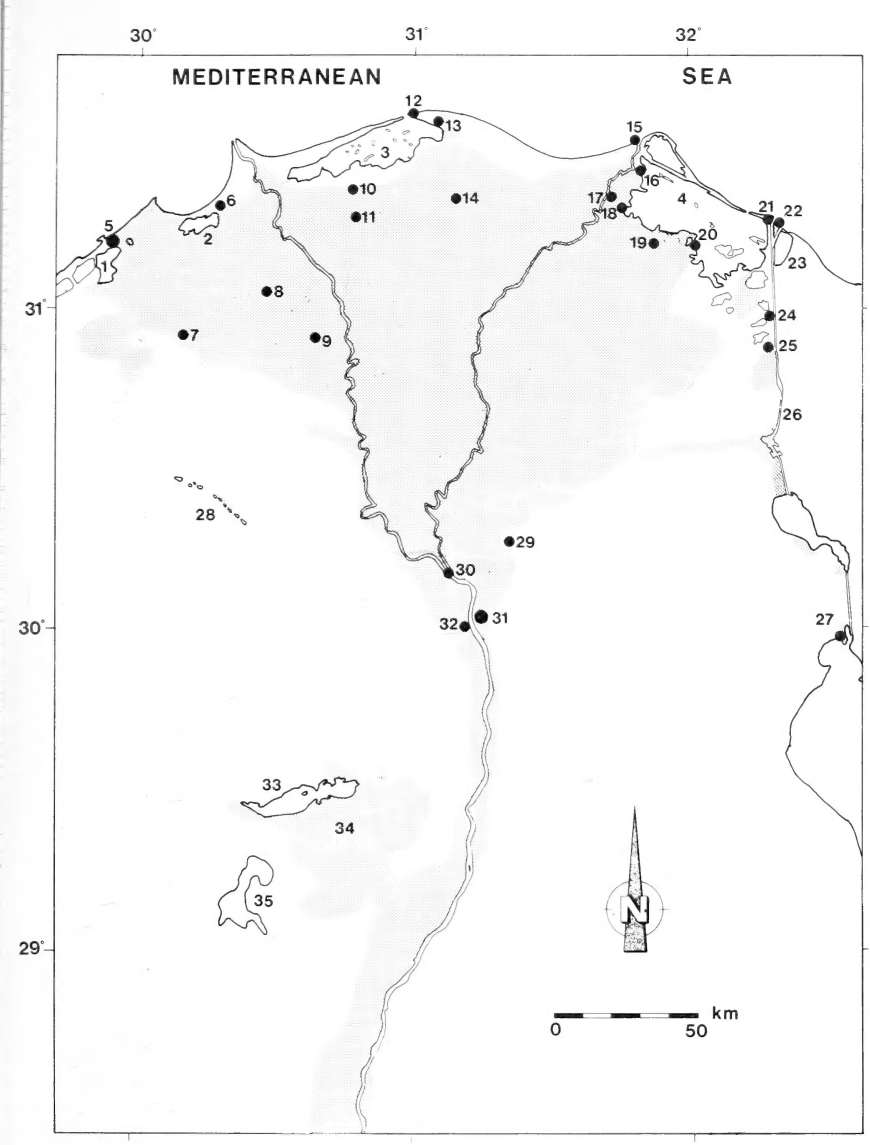

Figure 2:

1. Lake Maryut
2. Lake Idku
3. Lake Burullus
4. Lake Manzala
5. Alexandria
6. Idku
7. Abu el Matamir
8. Damanhur
9. Ityai el Barud
10. El Haddadi
11. Sidi Salim
12. El Burg
13. Baltim
14. El Hamul
15. Ras el Barr
16. Dumyat
17. Fariskur
18. El Rahamna
19. El Gamaliya
20. El Matariya
21. Port Said
22. Bur Fu'ad
23. El Malaha
24. El Cap
25. El Qantara
26. Suez Canal
27. Suez
28. Wadi el Natrun
29. Abu Za'bal
30. Delta Barrage
31. Cairo
32. Giza
33. Lake Qarun
34. El Faiyum
35. Wadi Rayan

Lake Maryut is the only coastal lake without a direct connection to the Mediterranean. The water level in the lake is about 2.8 metres below sea level (Saad 1973). There are extensive reedbeds along the shores.

To the west of Lake Maryut and north of Burg el Arab and Bahij is an extensive saltmarsh and a (periodically) flooded depression. The length of the depression is about 30 km. and the total area is probably more than 110 km^2. We did not visit the depression.

Lake Idku (Buhayrat Idku, 31° 15′N 30° 15′ E).

Lake Idku is situated east of Alexandria. It is connected with the sea by an outlet. According to George (1972) the original area of the lake was about 150 km^2, but this has decreased to 71 km^2 due to successive reclamation for agricultural purposes. It has to be expected that land reclamation will continue in the future and thus further reduce the significance of the area for birds. (Meininger & Mullié 1981b). The salinity of the water is relatively high, particularly near the outlet. It varies from 4.28‰ in January to 14.80‰ in July, with an average of 8.17 (El Hawary 1960). In the southern part of the lake the water is nearly fresh.

The lake sustains a luxuriant growth of the hydrophytes *Potamogeton pectinatus* and *Ceratophyllum demersum*, which covers about half of the total area of the lake. Most of the lake margins and the shores of the islands are covered with extensive reedbeds.

While visiting Lake Idku, it was noticed that large numbers of fishermen were active in the lake with small, canoe-like (sailing) boats. Hence the disturbance is high.

Lake Burullus (Buhayrat Burullus, 31° 30′N 30° 50′E).

Lake Burullus is situated along the Mediterranean coast and occupies a more or less central position between the two branches of the Nile. It is a shallow brackish lake, connected with the sea by a small outlet (boughaz), about 50 metres wide near the village El Burg. The length of the lake is about 65 km and the width varies between 6 and 16 km, with an average of about 11 km. The depth of the lake varies between 0.5 and 1.6 metres. The eastern part of the lake is the shallowest, giving an average depth of 0.8 metres. Lake Burullus occupied an area of 588 km^2 in 1913, 574 km^2 in 1956 and 462 km^2 in 1974. This decrease is due to continuous land reclamation projects along the southern periphery.

The western part of the lake is nearly fresh (0.2-3 g Cl^-/l), while the mean chlorinity near the outlet to the sea is 6-8 g Cl^-/l and maximum 9-10 g Cl^-/l (Dr. A.H.Darrag, *pers. comm.*).

In the lake sometimes dense flocks of midges Chironomidae are to be seen above the islets and the water surface.

The lake is separated from the sea by a bar, covered with low sandy dunes.

There is a high production of submerged aquatic plants, especially in the mouth of the drains of adjacent cultivated areas, around the islets and in the eastern part of the lake. *Potamogeton pectinatus* and *P. crispus* constitute over 90 per cent of the submerged plants in the lake (Darrag 1974).

The southern shore is to a large extent dominated by commercial salt pans and shallow enclosed basins that are seasonally opened and closed for the capture and rearing of fish. To the south of these 'fish farms' (hoshas) is an east-west orientated belt of several kilometres of unreclaimed brackish water marsh. Prominent halophytes of this area are *Suaeda fruticosa, Salicornia fruticosa, Inula erithroides, Phragmites australis, Juncus acutus* and a number of other species, composing what might be considered the most virginal community of the delta. South of this '*Suaeda-Salicornia* marsh' a band of recently reclaimed land begins to stretch some fifteen to twenty kilometres southward (George 1972). Land reclamation, particularly along the southern and southeastern periphery of the lake, may be considered the main threat. In 1974 the area of the lake had decreased from 588 to 462 km^2. After 1981 an area of 30 km^2 was reclaimed near El Kasha in the eastern part of Lake Burullus, while there are plans for (partial) reclamation of the rest of the lake (Prof. Dr. B. Verhoeven, *in litt.*). It is uncertain when these will commence.

Lake Manzala (Buhayrat Al Manzilah, 31° 08′N 31° 56′E).

Lake Manzala is the most eastern and the largest lake in the Nile Delta, situated between the Dumyat Nile branch and the Suez Canal. Like Lake Burullus it is a shallow brackish lake, with an average depth of about one metre. It is connected with the Mediterranean by an outlet at El Gamil, five km. west of Port Said. The lake has a maximum length of 64.5 km. and a maximum width of 49 km., while the area is about 1,200 km^2 (F. Meth, *pers. comm.*). The original area was about 1,710 km^2 (George 1972). At the end of December 1979 the chlorinity in the lake ranged between 0.32 g Cl^-/l. near Matariya to 9.4 g Cl^-/l at the exteme northwest of the lake. For the greater part of the lake the mean was 0.9 g Cl^-/l (F. Meth *pers. comm.*).

The general shape of the lake is rectangular, traversed by numerous islets arranged into lines, representing ancient shorelines. These islets divide the lake into several parts, known to the local fishermen as 'bohour' (basins).

In the greater part of Lake Manzala the vegetation consists of *Phragmites australis* and *Typha sp.*. Vegetation and open water are alternating. The most abundant water plants are *Ceratophyllum demersum* and *Potamogeton pectinatus.*

In the northern part of Lake Manzala, along the coastal road between Dumyat and Port Said, there are dry mud and sandflats and extensive *Salicornia* marshes. The islets in the surroundings of Port Said also have tnis *Salicornia* vegetation. The other islets in the central and southern parts of the lake are bordered with *Phragmites australis* and *Typha sp.*.

Many of the 'islets' in the lake are not islets in the real sense of the word, but 'hoshas': a kind of (illegal) fishfarm. Large fishfarms and mudflats are also to be found along the eastern shore of the lake, west of the road Port Said-El Cap, and in the southeastern part of the lake between El Cap and El Matariya. This area is a complex of lakes, marshes, mudflats and small cultivated fields, which seems of great ecological importance. The Bahr el Bakr drain (sewage drain from Cairo) crosses the area.

The main threat to Lake Manzala comes from land reclamation. The area of the lake has decreased from 1,710 to 1,200 km.^{2}, a decrease of 30 per cent. In recent years a number of plans have been considered for reclamation of the greater part of the lake. Until now, only a few of these plans have been executed.

On Lake Manzala at least 98,000 waterbirds are being caught or shot annually (Mullié & Meininger 1983). This means a high rate of disturbance and an unknown impact on the species affected. A high rate of disturbance is also caused by the 35,000 - 40,000 fishermen active on the lake.

RESULTS

TABLE 1 shows a summary of the status of breeding birds of the lakes in the Nile Delta. Species whose occurrence as a breeding bird has not been substantiated, but mentioned as breeding in the literature, are placed in brackets. Additional information on most species is given in the species accounts.

Tachybaptus ruficollis **Little Grebe**

The Little Grebe is a fairly common breeding bird in the marshes of the Nile Delta lakes. The breeding population comprises at least several hundred pairs. In May 1983 this species was mainly recorded (mostly heard) in extensive reedbeds.

Manzala: A total of 13 vocalizing birds were noted between 4 and 8 May 1983 in the area between El Matariya and Port Said and along the southwestern shore near El Rahamna. Relatively high densities occur in some areas for we noted four calling birds in a swampy reedbed during a 200 metre walk on 5 May 1983. An adult with a full-grown young was seen near an island northwest of El Matariya and an empty egg was found here as well. Little Grebes may already have started to breed in mid-winter: a small chick was purchased in the Port Said market on 21 December 1982 (S. M. Goodman).

TABLE 1. BREEDING BIRDS IN THE LAKES IN THE NILE DELTA

Abbreviations:

SC	scarce	?	possibly breeding
FC	fairly common	( )	status not certain
CO	common	-	not recorded breeding
AB	abundant	[ ]	breeding not authenticated
FB	formerly breeding		

Species		Manzala	Burullus	Idku	Maryut
Little Grebe	*Tachybaptus ruficollis*	FC	FC	FC	(SC)
Great Crested Grebe	*Podiceps cristatus*	B	-	-	-
Little Bittern	*Ixobrychus minutus*	CO	CO	(CO)	(CO)
[Squacco heron	*Ardeola ralloides*	?	-	-	(FB)]
Cattle Egret	*Bubulcus ibis*	-	-	-	FB
[Little Egret	*Egretta garzetta*	-	-	-	-]
Greater Flamingo	*Phoenicopterus ruber*	FB	-	-	(FB)
Egyptian Goose	*Alopochen aegyptiacus*	FB	-	-	-
[Mallard	*Anas platyrhynchos*	-	-	-	-]
[Marbled Teal	*Marmaronetta angustirostris*	(?)	-	-	-]
White-tailed Eagle	*Haliaeetus albicilla*	FB	-	-	-
[Marsh Harrier	*Circus aeruginosus*	-	(?)	-	(?)]
Water Rail	*Rallus aquaticus*	FC	FC	?	(FC)
[Spotted Crake	*Porzana porzana*	-	-	-	-]
[Little Crake	*Porzana pusilla*	(?)	(?)	(?)	(?)]
Baillon's Crake	*Porzana parva*	FB	(?)	(?)	(?)
Moorhen	*Gallinula chloropus*	CO	CO	(CO)	CO
Purple Gallinule	*Porphyrio porphyrio*	CO	CO	(FC)	(FC)
Coot	*Fulica atra*	FB	FB	-	-
Painted Snipe	*Rostratula benghaiensis*	(FC)	(FC)	(?)	(FC)
[Black-winged Stilt	*Himantopus himantopus*	-	-	-	-]
[Avocet	*Recurvirostra avosetta*	-	-	-	-]
Collared Pratincole	*Glareola pratincola*	FC	FC	(FC)	(FC)
[Little Ringed Plover	*Charadrius dubius*	(?)	-	-	-]
Kittlitz's Sand Plover	*Charadrius pecuarius*	(SC)	(SC)	-	(SC)
Kentish Plover	*Charadrius alexandrinus*	AB	CO	CO	CO
Spur-winged Plover	*Hoplopterus spinosus*	FC	FC	FC	(FC)
Slender-billed Gull	*Larus genei*	FB	-	-	-
Little Tern	*Sterna albifrons*	AB	CO	?	FC
Turtle Dove	*Streptopelia turtur*	FC	FC	?	FC
Palm Dove	*Streptopelia senegalensis*	FC	FC	FC	FC
Senegal Coucal	*Centropus senegalensis*	(SC)	FC	FC	(FC)
Pied Kingfisher	*Ceryle rudis*	CO	FC	(FC)	FC
Blue-cheeked Bee-eater	*Merops superciliosus*	CO	(FC)	FC	-
Lesser Short-toed Lark	*Calandrella rufescens*	(CO)	CO	(FC)	FC
Crested Lark	*Galerida cristata*	CO	CO	CO	CO
Sand Martin	*Riparia riparia*	CO	FC	FC	-
Swallow	*Hirunda rustica*	FC	FC	FC	FC
Yellow Wagtail	*Motacilla flava*	CO	FC	FC	FC
Fan-tailed Warbler	*Cisticola juncidis*	CO	CO	CO	CO
Graceful Warbler	*Prinia gracilis*	AB	AB	AB	CO
Reed Warbler	*Acrocephalus scirpaceus*	(FC)	?	?	-
Clamorous Reed Warbler	*Acrocephalus stentoreus*	AB	AB	AB	AB
House Sparrow	*Passer domesticus*	FC	?	?	FC
Streaked Weaver	*Ploceus manyar*	-	CO	CO	-
Avadavat	*Amandava amandava*	SC	-	-	-

Burullus: On 10 May 1983 seven different vocalizing birds were heard during a 3 km. long boat trip in the reedbeds southwest of Baltim and on 11 May 1983 one in reedbeds 15 km. north of El Haddadi.

Idku: On 28 January 1979 four individuals were seen and heard in the reedbeds of Lake Idku (Meininger *et al.* 1979).

Maryut: Between 1963 and 1966 it was not common in Lake Maryut; one immature bird was caught (J.W. Wall).

Meinertzhagen (1930) mentioned the Little Grebe as a fairly common resident in the Nile Delta. There is no basis for quantitative comparison between past and present abundance.

Podiceps cristatus **Great Crested Grebe**

There are no recent breeding records and this species is probably extinct as a breeding bird in Egypt. We did not meet with the species in May 1983. Although small numbers were seen on Lake Manzala in July and August 1979 (E. Muller) these may well have been early migrants or summering birds.

Meinertzhagen (1930) mentioned this species as a rare resident in Egypt, occurring in small numbers on the Faiyum and Delta lakes. The only definite breeding record he mentioned was of two chicks being fed by two adults on Lake Manzala in June (year unknown). Pairs were noted on 4 March 1935 in Lake Manzala (Jourdain & Lynes 1936). There are no other breeding records from Egypt.

The Great Crested Grebe is a locally common winter visitor to Egypt, specially on saline lakes such as Lake Qarun (3,400 counted in January 1980), and small numbers were seen on Lake Manzala, Lake Burullus and Lake Idku during the winters 1978/79 and 1979/80 (Meininger & Mullié 1981a).

Considering that this species has less secretive habits than the Little Grebe and the enormous disturbance of the area by fishermen, it seems unlikely that Great Crested Grebes still breed regularly on the Delta lakes.

Ixobrychus minutus **Little Bittern**

Frequently observed in the reedy areas of all lakes. Many birds were actively foraging during the day, perhaps indicating that they had young in the nest. The lakes in the Nile Delta undoubtedly hold a breeding population of many hundreds, and probably well over a thousand pairs.

This species is present in the Delta lakes in fairly large numbers throughout the year (Meininger & Mullié 1981a), though in winter numbers are probably augmented by migrants wintering in the area.

Manzala: A total of 80 individuals was seen between 4 and 8 May 1983. In one place there were at least five pairs on less than 20 hectares.

Burullus: On 10 May 1983 at least 18 birds were seen during a three km. long boat trip through the reedbeds southwest of Baltim and on 11 May 1983 seven were seen during a short walk in reedbeds 15 km. north of El Haddadi.

Idku: On 30 January 1979 one was seen (Meininger *et al.* 1979), on 31 January 1984 one (S.M. Baha el Din) and on 30 March 1981 one male (W. Suter).

Maryut: Six individuals were seen on 12 May 1983. Between 1963 and 1966 it was most commonly seen in spring, and was active throughout the day (J. Tennent, J.W. Wall).

Meinertzhagen (1930) mentioned this species as a common resident in Egypt in suitable locations.

[*Nycticorax nycticorax* **Night Heron**

There is no indication that Night Herons breed in the northern Nile Delta (*contra* the maps in Cramp and Simmons 1977 and in Etchécopar and Hué 1967). Meinertzhagen (1930) mentioned a breeding colony at the Delta Barrage, just north of Cairo. In the Nile Delta lakes the species is only known as a passage and winter visitor in small numbers.]

[*Ardeola ralloides* **Squacco Heron**

There is no proof for the breeding of Sqacco Herons in the Nile Delta. In May 1983 we saw a total of nine Squacco Herons in Lake Manzala and on 8 May a flock of 14 in Lake Burullus near Baltim, presumably all migrants. On 5 May 1983 we found a dead male in Lake Manzala northwest of El Matariya, which based on gonad size was in or approaching breeding condition.

Ticehurst (1912) saw 50 birds in a large tamarisk swamp in Lake Maryut on 15 May 1909 and shot a female that had an enlarged oviduct and a well-defined incubation patch. Ticehurst (1912) mentioned that according to local people the birds nested locally. Meinertzhagen (1930) mentioned that the species had been observed in the Delta during every month of the year, but no nest had been found in Egypt. Etchecopar and Hue (1967) erroneously indicated breeding throughout the Nile Delta and Nile Valley.

The only area in Egypt where Squacco Herons are known to breed regularly is Upper Egypt near Aswan. Records include: several birds on 2 and 3 May 1978 in a colony of Cattle Egrets on Lord Kitchener Island (PLM), one perched on a nest on 6 March 1979 (Short & Horne 1981), several breeding records from 1980, one in 1981 (S.M. Baha el Din) and at least five nests on 24 April 1983 (PLM).

A colony of 40 nests was discovered near the Old Dam at Aswan on 25 June 1981 (S.M. Baha el Din); this colony appeared to have been destroyed by April 1983 (PLM).]

Bubulcus ibis **Cattle Egret**

In May 1983 we did not see a single Cattle Egret on the lakes of the Nile Delta. In other parts of the northern Nile Delta the species was also completely lacking, except for 100 individuals on 24 March 1983 near Abu el Matamir, 40 km. south of Lake Idku. In the winters 1978-79 and 1979-80 Cattle Egrets were rarely observed in the Delta lakes (Meininger & Mullié 1981a).

Raw (1921) and Meinertzhagen (1930) mentioned several large colonies in the Delta, without giving exact localities. Until 1978 there was a large colony near the Alexandria Zoo, north of Lake Maryut (Kattinger 1971, B. Orchanian) and another, near Ityai el Barud, 25 km. southeast of Damanhur, disappeared during the 1970s (G. Abdel Mowla Atta).

At present Cattle Egrets still commonly breed in the Nile Valley from a little north of Cairo to Aswan, near Suez, in the Faiyum and in several Western Desert oases (Goodman, Meininger & Mullié *1986*). The apparent decline of this species in the greater part of the Nile Delta may be a result of the extensive use of pesticides in the area (Mullié & Meininger *1985*).

Etchécopar and Hüe (1967) indicate as a breeding area of Cattle Egrets in Egypt the only irrigated area in Egypt where the species does not breed.

[Egretta garzetta **Little Egret**

In May 1983 we saw small numbers of Little Egrets, presumably all migrants or summering birds, in the lakes Manzala and Burullus.

There is no indication that Little Egrets breed in the Nile Delta (*contra* the maps in Cramp and Simmons 1977 and Etchecopar and Hüe 1967). Meinertzhagen (1930) considered it an abundant breeding resident throughout the Delta, Upper-Egypt and the Faiyum, but only specifically mentioned a colony in the Giza Zoo. However, the breeding of this species in the Giza Zoo is open to question for no other mention of it nesting there is known, except White (1949), who counted small numbers there during the summer of 1945, but does not mention breeding.

At present the only colonies known in Egypt are in Wadi Rayan, where six nests were found in

summer 1984 (S.M. Baha el Din) and near Aswan, where 27 nests were found on Lord Kitchener Island in 1978 (Meininger & Dielissen 1979), 25 in 1980 (J. Visser), 30 in 1981 (S.M. Baha el Din), 70-100 in 1982 (J. Wittenberg) and 120 in 1983 (PLM). A colony near the Old Dam at Aswan, where 600 nests were counted in 1981 (S.M. Baha el Din) had been abandoned by 1983 (P.L.M). A presumed colony with 75 Little Egrets on a rocky island in Lake Nasser south of Abu Simbel was found in April 1983 (PLM).]

[*Plegadis falcinellus* **Glossy Ibis**

Etchécopar and Hüe (1967) mention this species as breeding in the Nile Delta, but there is not a single observation supporting the statement. The Glossy Ibis is only a passage migrant in Egypt]

Phoenicopterus ruber **Greater Flamingo**

The Greater Flamingo no longer breeds on the lakes of the Nile Delta proper.

On 14 May 1909 Ticehurst (1912) observed a flock of about a hundred flying over Lake Maryut and the local people assured him they bred on the lake and described accurately the nest and egg. The actual breeding site seems likely to have been in the depression west of Lake Maryut, where hypersaline habitats occur. According to Meinertzhagen (1930) the species formerly bred on both Lake Manzala and Lake Bardawil (North Sinai), where eggs were taken in May 1894, but ceased to breed in Egypt by 1929. Two eggs were collected on 10 May 1898 in Lake Bardawil (Koenig 1932). A colony of 500-600 pairs was (re-)discovered in northwest Sinai in 1970 (Cramp & Simmons 1977) where it has probably been breeding near El Malaha since.

Russell (1905), Nicoll (1908), Raw (1921) and Koenig (1932) reported flocks of thousands on Lake Manzala during the winter. Nicoll (1908) was unable to ascertain for certain, by interviewing local fishermen, whether Flamingos nested on Lake Manzala or not.

The species is still a regular visitor to Lake Manzala, sometimes in large numbers, and to the salt-lagoon west of Lake Maryut. In El Malaha 6,300 were counted in January 1980 (Meininger & Mullié 1981a) and on Lake Bardawil a maximum of 290 was present in August and September 1981 (Petersen & Sørensen 1981).

Alopochen aegyptiacus **Egyptian Goose**

The only record indicating breeding in the lakes of the Nile Delta is a clutch of six eggs taken near Dumyat (Lake Manzala) on 14 April 1894 (Koenig 1932). According to Meinertzhagen (1930) the Egyptian Goose was formerly a very abundant resident throughout Egypt, but became scarce in Lower Egypt.

Nowadays the species breeds only along the shores of Lake Nasser, where it is common.

[*Anas platyrhynchos* **Mallard**

According to Meinertzhagen (1930) a few may breed on Lake Manzala, where it can be seen throughout the year. There are no other records indicating breeding in Egypt, except for a female collected at Dakhla Oasis in the Western Desert, which "had huge ovaries, and appeared about to lay" (Meinertzhagen 1930).]

[*Marmaronetta angustirostris* **Marbled Teal**

According to Meinertzhagen (1930) this species was often collected in the Nile Delta, but was only known to breed in Wadi el Natrun, the Faiyum and Dakhla Oasis.

On 16 January 1978 one individual, shot on Lake Manzala, was found in the Port Said market (Meininger *et al.* 1979). In July and August 1979 two small flocks of brown ducks, possibly family groups of Marbled Teal, were seen on Lake Manzala (E. Muller). There are no other records from the Nile Delta, but the species has been recorded in recent winters in the Nile Valley (e.g. Short & Horne 1981).]

Haliaeetus albicilla **White-tailed Eagle**

Meinertzhagen (1930) stated that this species bred on Lake Manzala during the 19th Century. The nests were large structures on the ground in reedy marshes. There are no records indicating breeding in Egypt since.

[*Circus aeruginosus* **Marsh Harrier**

There is no proof of this species breeding in Egypt. In May 1983 we noted a few Marsh Harriers on Lakes Manzala and Burullus. Two birds were seen soaring together from a great distance over a reedbed near Lake Burullus on 10 May 1983. The extensive reedbeds in the area seem to be suitable nesting habitat, but breeding has yet to be proved and migration is recorded until the end of May (Mullié & Meininger, *1985*.). Ticehurst (1912) saw two or three adult birds on 15 and 18 May 1909 flying low over the swampy reedbeds of Lake Maryut and stated that they were probably breeding.]

Rallus aquaticus **Water Rail**

Probably not an uncommon breeding bird in the marshes and reedbeds; although it is impossible to know to what extent records in spring concern spring migrants or wintering birds from northern populations.

Our study does not give a good impression of distribution and numbers of the night-active rails. Our only activity after sunset was when we crossed by boat an extensive reedbed in the middle of Lake Manzala on 5 May 1983. However, an immense chorus of amphibians drowned all other possible sounds.

The few records of the noisy Water Rail are from day-time or very early evening.

Manzala: On 5 and 6 May 1983 three were heard calling near El Matariya.
Burullus: On 9 May 1983 one was heard calling near Baltim.
Idku: Not seen or heard in May 1983.
Maryut: On 1 April 1981 at least five birds were calling from a *Scirpus* marsh (W. Suter).

According to Meinertzhagen (1930) the Water Rail was an abundant resident in many suitable localities in the northern part of the Nile Delta. Eggs have been found in Egypt from late March on (R. Sparrow in Raw 1921). In winter the species is common in all Delta lakes (Meininger & Mullié 1981 a and b). An estimated total of 630-835 birds are trapped or shot annually on Lake Manzala (Mullié & Meininger 1983).

[*Porzana porzana* **Spotted Crake**

We did not see or hear this species in May 1983.

According to Meinertzhagen (1930) this species is common in Egypt between early September and March, but had not been found nesting. There are several recent records from all Delta lakes, the latest being one individual along Lake Idku on 24 March 1983 (PLM).]

[*Porzana parva* **Little Crake**

According to Meinertzhagen (1930) this species is not uncommon in Egypt during the winter. Raw (1921) collected several specimens and noted probable breeding near Abu Zabal (near Cairo) in 1916-18. A clutch of six eggs taken in April 1916 is ascribed by Raw (1921) to *P. pusilla*, but Meinertzhagen (1930) identified them as *P. parva*.

On 15 October 1980 one Little Crake was found in the Port Said market (PLM). Breeding in the Delta lakes seems not unlikely.]

Porzana pusilla **Baillon's Crake**

Meinertzhagen (1930) collected an adult bird with downy chicks on 1 May 1920 at Qantara (south of Lake Manzala) and mentioned a clutch of six eggs taken by Borman in the Delta, without giving a locality. Raw (1921) collected a bird in breeding condition on 19 April 1917 at Abu Zabal (near Cairo).

Although there are no recent records from the Nile Delta, breeding in the lakes seems likely.

Gallinula chloropus **Moorhen**

The Moorhen breeds commonly in reedbeds and marshes of all Delta lakes. It is difficult to estimate its population size because of its shyness. The lakes probably hold several thousand breeding pairs. There is no basis for comparison of numbers between the past and the present.

Porphyrio porphyrio **Purple Gallinule**

The green-backed subspecies,*P.p.madagascariensis*, is a characteristic resident breeding bird of the Delta lakes and of the Nile Valley from Cairo to Aswan (*contra* Meinertzhagen 1930 and Cramp & Simmons 1980). Lakes Manzala and Burullus are probably the most important areas for this species in the Western Palaearctic and may hold several thousand breeding pairs.

Manzala: Raw (1921) found the bird numerous on the shores of Lake Manzala near El Qantara. In May 1983 we heard only two birds calling from a reedbed near El Matariya. The numbers of individuals shot and caught in the lake (including pulli) and offered for sale in the markets of Port Said and Dumyat (440-700 per winter season) indicate a considerable breeding population (Mullié & Meininger 1983).

Burullus: During a three km. long boat trip through a reedbed southwest of Baltim on 10 May 1983 we heard at least 15 calling Purple Gallinules. Bennett *et al.* (1982) observed from 13-15 November 1981 a total of 24 individuals, six of which were feeding next to a 200 metre long reedbed. These records illustrate high densities.

Idku: On 27 January 1979 four birds were found in the market of Idku (Meininger *et al.* 1979). On 24 March 1983 one was heard calling along the lake (PLM).

Maryut: Although Meinertzhagen (1930) stated that "their main station is Maryut", there are only a few recent records from this lake. Kattinger (1971) saw birds in immature plumage on 17 and 19 August 1966.

Fulica atra **Coot**

In May 1983 we did not observe a single Coot and the species may well have disappeared as a breeding bird from the Delta lakes. Meinertzhagen (1930) mentioned that this species breeds on the larger lakes of the Delta, based on observations of adults with chicks.

Rostratula benghalensis **Painted Snipe**

Probably not an uncommon breeding bird of marshes in the Delta lakes, but it is difficult to get an impression of the abundance due to the elusive behaviour of the species. Painted Snipes were mainly seen when flushed in sparsely vegetated saltmarshes with small patches of mud. *Figure* 3 shows the localities in northern Egypt where the species has been recorded since 1970 (BEP.).

Manzala: Whymper (1909) saw the species in April in Lake Manzala. There are several recent records of small numbers around Lake Manzala, with a maximum of ten near Fariskur on 6 December 1978 (J.J. den Held). Other localities include El Matariya, El Rahamna and 20 km. east of Dumyat.

Burullus: On 11 May 1983 we found a nest with four eggs in the saltmarsh 15 km. north of El Haddadi and flushed one individual nearby.

Idku: On 31 January 1984 seven individuals were seen at Barsiq (S.M. Baha el Din).

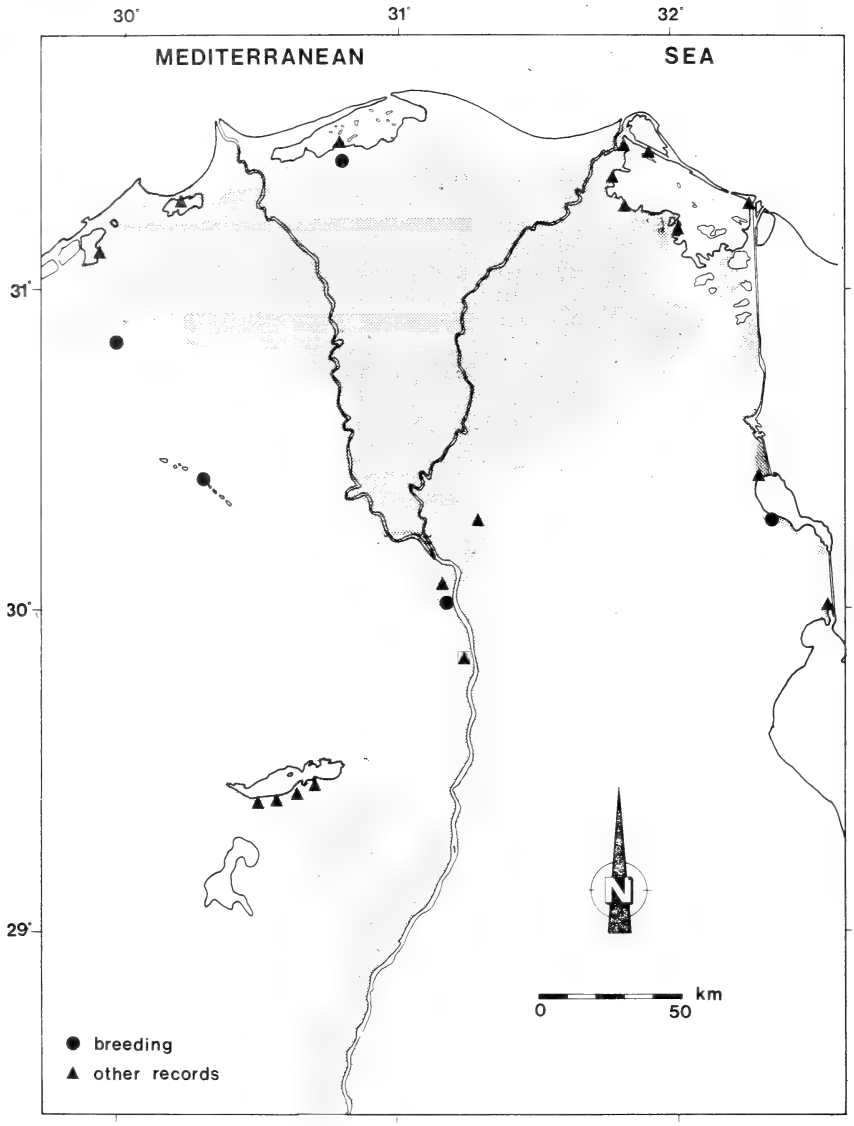

Figure 3. Localities in northern Egypt where Painted Snipe *Rostratula benghalensis* has been recorded since 1970

Maryut: From 1963 to 1966 it was regularly seen, usually two or three birds together (J.W. Wall). Koenig (1928) mentioned four eggs in a collection in Alexandria, taken at an unknown locality.

[*Himantopus himantopus* **Black-winged Stilt**

Meinertzhagen (1930) mentioned this species as a resident in small numbers, breeding in Wadi el Natrun and possibly in the Faiyum and in several places in the northern Delta. There are no recent records indicating breeding in Egypt and we did not see it in the Delta lakes in May 1983.]

[*Recurvirostra avosetta* **Avocet**

Nicoll (1919) stated that it probably breeds or used to breed in the lakes in the Nile Delta. According to Meinertzhagen (1930) this species formerly bred in some numbers in Egypt, but by the late 1920s only small colonies were active in the Faiyum and Wadi el Natrun. There is no definite proof of breeding in the Delta lakes.

We saw only two Avocets in the Nile Delta lakes in May 1983 and these were not breeding. The only recent indication of breeding in Egypt is a female with an egg in her ovary, shot in spring 1979 at El Mahala (Meininger & Mullie 1981b).]

Glareola pratincola **Collared Pratincole**

Fairly common breeding bird of saltmarshes around all Delta lakes.

Manzala: On 27 June 1977 two were seen in the eastern part of Lake Manzala and on 30 June 1977 six near Dumyat (PLM). About 110 were seen flying over cultivated land on 7 May 1983 near El Rahamna and 75 along the new Port Said - Dumyat road. In the latter locality distraction displays and injury feigning of several pairs strongly suggested breeding.

The breeding sites were located on a sparsely vegetated sandflat with shell-banks.

Burullus: Raw (1921) found the species breeding near Sidi Salim, south of Lake Burullus. On 10 May 1983 ten birds were calling flying over the saltmarsh southwest of Baltim; on 11 May 37 birds, of which several showed distraction displays, 15 km. southeast of Baltim; nine near El Hamul and four north of El Haddadi.

Idku: On 11 May 1983 two were seen flying over a saltmarsh west of Lake Idku.

Maryut: Eight birds were observed on 12 May 1983 near the airport, close to Lake Maryut.

Meinertzhagen (1930) mentioned this species as breeding along the north coast of the Nile Delta only.

[*Charadrius dubius* **Little Ringed Plover**

There is no proof of breeding in the Nile Delta lakes. Meinertzhagen (1930) mentioned this species as a "not uncommon resident" in Egypt. However, definite breeding records are only known from Wadi el Natrun (Nicoll 1912, Meinertzhagen 1930).

During our 1983 survey we saw only one Little Ringed Plover on 4 May near El Matariya (Lake Manzala). This bird did not show any breeding behaviour.]

Charadrius pecuarius **Kittlitz's Sand Plover**

In the lakes in the Nile Delta this species is probably an uncommon breeding bird.

Manzala: Records include one on 29 June 1977 between Port Said and Dumyat (PLM); four on 25 December 1979 (PLM, W.C. Mullié); ten on 1 February 1979 at Ras el Barr, northwest of Lake Manzala; and one on 7 February 1979 in the Port Said market (Meininger *et al.* 1979).

Burullus: Raw (1921) found three nests near Sidi Salim, south of Lake Burullus, on 29 May 1918.
Idku: No records known.
Maryut: Jourdain and Lynes (1936) noted the species near Alexandria on 19 March 1935. McLaren (1944) recorded it on 8 October 1942 and Kattinger (1971) saw a few individuals here on 19 August 1966. We saw one bird on a sandy dyke in Lake Maryut on 12 May 1983. It was probably a breeding bird as it appeared anxious and seemed connected to a small defined area.

Meinertzhagen (1930) mentioned the Kittlitz's Sand Plover as a fairly common resident in the Delta, the Faiyum, Wadi el Natrun and Upper Egypt.

Charadrius alexandrinus **Kentish Plover**

This species is a common breeding bird of sparsely vegetated sandflats of all Delta lakes. In May 1983 we found nests with eggs and saw almost full-grown young (still incapable of sustained flight) on all four lakes. On 7 and 8 May 1983 we located at least 100 breeding pairs along the north coast of Lake Manzala between Dumyat and 15 km. east of Dumyat. There may be well over a thousand breeding pairs in the Nile Delta.

Meinertzhagen (1930) mentioned the Kentish Plover as a quite common breeding bird.

Hoplopterus spinosus **Spur-winged Plover**

This species seems to be more widely distributed in the Nile Delta than indicated by Flower (1933). We found it quite common in cultivated areas, with single pairs along canals in newly reclaimed areas.

Manzala: In May 1983 it was mainly seen on cultivated land along the southern shore of Lake Manzala (total 60). Only a few were present on the islands in the central part of the lake.
Burullus: In May 1983 about 60 individuals were seen in several cultivated areas and saltmarshes bordering Lake Burullus. On 11 May 1983 a nest with two eggs was found 15 km. southeast of Baltim.
Idku: On 11 May 1983 four birds were observed along the northern shore of Lake Idku and responded to our approach with alarm behaviour.
Maryut: We did not see the species during our short visit in May 1983, but on 23 July 1966 a pair with young were seen (J. Tennent).

Larus genei **Slender-billed Gull**

Almost all Slender-billed Gulls (400) observed between 4 and 8 May 1983 on Lake Manzala were in immature plumage. El Negoumi *et al.* (1950) mentioned a colony on the Dib Island near Port Said (probably in Lake Manzala). In 1979 200- 400 nests were found in El Mahala, east of Port Said (Meininger & Mullié 1981).

Sterna albifrons **Little Tern**

Von Heuglin (1873) mentioned that eggs had been collected from lagoons in the Nile Delta. Ticehurst (1912) stated that it did not breed in Lake Maryut and Meinertzhagen (1930) made no mention of definite breeding in Egypt. Alexander (1943) found a small colony of "not more than half a dozen pairs" near El Alamein in 1942. Hutson (1944) stated that "colonies on the Mediterranean coast reached their nesting sites at the end of April", without giving details. In 1955 the species probably bred in the Gebel Maryam Lagoon along the Suez Canal (R. Norman).

More recent records, including ours in May 1983, indicate the presence of a

considerable breeding population of Little Terns on the lakes of the Nile Delta, possibly even over a thousand pairs.

Manzala: From 27-29 June 1977 at least 160 Little Terns were seen in the eastern and northern part of Lake Manzala, where they were undoubtedly breeding (PLM). From 4 to 8 May 1983 we counted at least 800 Little Terns, of which many showed aggressive and alarm behaviour, and found several nests with eggs along the north coast of Lake Manzala.

The species breeds in loose colonies on shell banks and on barren mudflats.

Burullus: On 9 and 10 May 1983 30 individuals were seen near Baltim and another 30 near El Burg. The coastal sandbar, separating Lake Burullus from the Mediterranean, seems a very suitable nesting place. This area was, however, in military hands and access was not allowed. On 11 May 1983 we saw 75 individuals, of which several showed alarm behaviour, in the saltmarshes 15 km. north of El Haddadi.

Idku: On 11 May 1983 about thirty Little Terns were observed along the north coast of Lake Idku, but did not show any signs of breeding.

Maryut: On 12 May 1983 at least 30 individuals were seen calling upon our approach on a small sandy peninsula in the Maryut lagoon and another eight were seen fishing in Lake Maryut.

Centropus senegalensis **Senegal Coucal**

In May 1983 this species was seen and heard several times in the extensive reedbeds of Lake Burullus (four individuals) and Lake Idku (one). On 12 May 1983 we saw one on cultivated land just east of Lake Maryut. This species seems to have extended its range during the last few decades. The distribution of this species as given by Flower (1933) and all known sites where it has been recorded since 1970 are mapped in *Figure* 4.

Ceryle rudis **Pied Kingfisher**

Pied Kingfishers (total 300 in May 1983) were found breeding commonly in steep sandbanks and banks of canals bordering the Delta lakes. We found several colonies: near El Matariya (25 holes), near El Rahamna (15 holes) and along the Dumyat - Port Said road. Although birds were seen frequently in the centre of the lakes, we were unable to find nests there.

Merops superciliosus **Blue-cheeked Bee-eater**

This species was commonly seen flying over cultivated land along the southern shore of Lake Manzala. On 7 May 1983 700 burrows were located along a stretch of dyke, a few kilometres long, near Abu Gridi, and a small colony was seen northeast of Dumyat. Near the Lakes Burullus and Idku the species was seen less frequently. A colony of 12 burrows was found east of Idku village.

Calandrella rufescens **Lesser Short-toed Lark**

The subspecies *Calandrella rufescens nicolli* is confined to the northern Nile Delta and coast from Alexandria to Port Said. We found the bird common in the saltmarshes of Lake Burullus, between Baltim and El Burg, and along the southern shore. On 11 May 1983 it was one of the most abundant passerines in the saltmarsh north of El Haddadi, with 22 individuals counted along five km. of road.

Ticehurst (1912) found the species breeding around Lake Maryut in May 1909. On 28 March 1981 Lesser Short-toed Larks were present along the north coast of Lake Manzala, between Port Said and Dumyat (W. Suter) and there are several records in winter from Lake Manzala, Lake Idku and Lake Maryut. Breeding in suitable habitats is probably regular at all lakes.

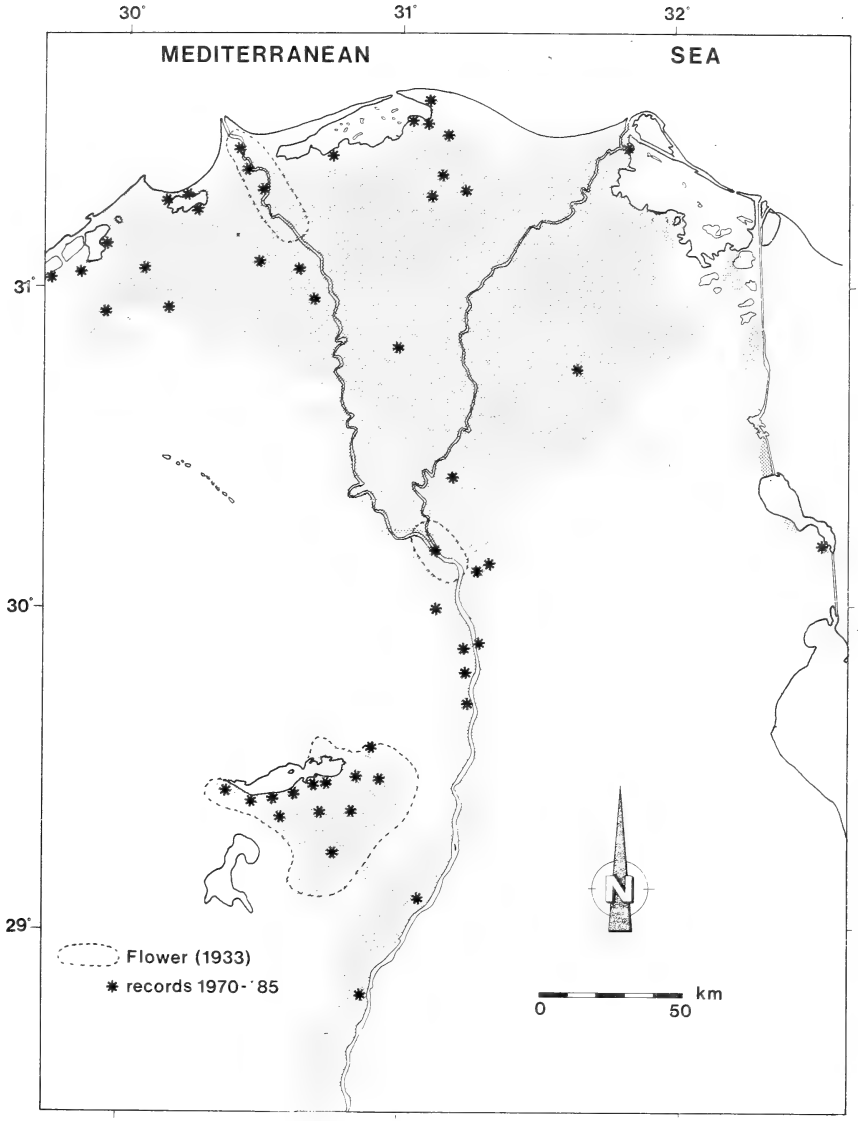

Figure 4. Localities in northern Egypt where Senegal Concal *Centropus senegalensis* has been recorded since 1970, and the distribution in Egypt as given by Flower (1933).

Motacilla flava **Yellow Wagtail**

In May 1983 the Egyptian subspecies *Motacilla flava pygmaea* was locally abundant at Lake Manzala. Loose colonies of up to 15-20 pairs per hectare were found in small areas with short halophytic vegetation, grazing cattle and surrounded by reedbeds. We saw it feeding regularly on floating plant material.

Yellow Wagtails were frequently observed at the other lakes as well.

Cisticola juncidis **Fan-tailed Warbler**

We found this species uncommon in the reedbeds, but more frequent in open *Salicornia-Tamarisk* scrub and common on adjacent cultivated land.

Prinia gracilis **Graceful Warbler**

Graceful Warblers were common in reedbeds and cultivated areas and abundant in *Salicornia-Tamarisk* vegetation of all lakes.

Acrocephalus scirpaceus **Reed Warbler**

Previously this species was unknown as a breeding bird in Egypt. On 6 May 1983 we heard two singing birds on an island in Lake Manzala north east of El Matarîya and saw four other birds, one carrying nest material and one food.

On 10 May 1983 two singing Reed Warblers were heard along a canal southeast of Baltîm and on 11 May 1983 another along the southern shore of Lake Burullus. Some of the latter birds and several singing along Lake Idku in March 1983 may have been migrants.

All Reed Warblers were seen in dry reedbeds on land, while Clamorous Reed Warblers *A. stentoreus* were abundant in reed standing in water.

Meinertzhagen (1930) only mentioned *A.s.fuscus* as an autumn and spring migrant and accidental in winter. This subspecies breeds on Cyprus (Flint & Stewart 1983), in Turkey, northern Syria, Iran and Israel (Hüe & Etchécopar 1970). The Reed Warblers breeding in Egypt most likely also belong to *A.s.fuscus*.

A.s.scirpaceus breeds in Europe, Morocco, Algeria and perhaps Tunisia (Etchécopar & Hüe 1967, Thomsen & Jacobsen 1979).

Acrocephalus stentoreus **Clamorous Reed Warbler**

This species is an abundant resident of wet reedbeds in all Delta lakes. Densities of 10-20 singing birds per hectare were usual, indicating a potential population of tens of thousands of pairs in the Nile Delta.

Ploceus manyar **Streaked Weaver**

On 11 May 1978 about 20 birds were observed and several nests found near El Mahmudiya, Lake Idku. Several were seen at Barsiq, Lake Idku in February 1983 (S.M. Baha el Din).

From 9 to 11 May 1983 we saw this species at several places along Lake Burullus and found a few small colonies in reedbeds.

There were no former records of this species in Egypt. The occurrence here is likely to be connected to some kind of introduction, but no details are known. See Meininger and Sørensen (1984) for details on the occurrence in Lake Burullus and potential sources of introduction of this Asian species.

Amandava amandava **Avadavat**

The natural range of this species is in southern and south-eastern Asia (Long 1981). The first

mention of the occurrence of this species in Egypt is by Antinori (1862), who shot several near Alexandria on 17 December 1861. At present the species is a fairly common breeding bird of reedbeds in parts of the Nile Delta, the Suez Canal and the northern Nile Valley (BEP). Between 1979 and 1984 there were several observations of small numbers near Alexandria and at Lake Idku (B. Orchanian, S.M. Baha el Din). There are no records from the other Nile Delta lakes.

DISCUSSION

The breeding bird community of the lakes in the Nile Delta is characterized by two groups: solitary breeding species in reedbeds and species breeding in saltmarshes and sparsely vegetated sandflats. The absence of large colony breeders (e.g. herons) is striking, and probably caused by the lack of isolated, quiet areas: there is an enormous degree of disturbance caused by the presence of a large number of small fishing boats and there are human settlements on even the smallest islands. The only large colony breeding species, Greater Flamingo and Slender- billed Gull, have disappeared from the lakes, and currently only breed in El Malaha, an isolated area east of the Suez Canal. The present absence of Great Crested Grebe and Coot, which build relatively open and easily detectable nests in margins of reedbeds, may also be caused by disturbance. Moreover for both species Egypt is situated on the edge of the breeding range and they probably always have been rare or even irregular breeding birds in the Nile Delta. Although there are high densities of small fish, the water may not be translucent enough for Great Crested Grebes to locate them. Also in winter there were only small numbers of Great Crested Grebes on the Delta lakes (Meininger & Mullié 1981a).

There is heavy hunting pressure on the lakes, which is likely to have a deleterious effect on the local breeding birds. Large numbers of Water Rail, Moorhen and Purple Gallinule are offered for sale in the markets of Dumyat and Port Said (Mullié & Meininger 1983).

Although the species diversity of breeding birds is potentially higher, the present value of the Nile Delta lakes as a breeding area is significantly high.

The area undoubtedly holds one of the largest populations in the Western Palaearctic of Little Bittern, Purple Gallinule, Little Tern and Clamorous Reed Warbler. The occurrence of relict populations of Painted Snipe, Kittlitz's Plover and Senegal Coucal is unique in the Western Palaearctic.

It should be stressed that none of the lakes - or parts of them - have a legal status as a nature reserve. All lakes are seriously threatened, mainly by large scale reclamation projects (Meininger & Mullié 1981a, 1981b). Alternatives for these reclamation plans are urgently needed. Not only a wintering, staging and breeding area of international importance for birds is heavily threatened, but a very rich and productive area for fisheries is also threatened.

During a short visit to the lakes in May 1983 a reasonable impression could be obtained of the breeding birds of the Delta lakes. More detailed research is desirable and will undoubtedly reveal the presence of more breeding species.

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SUMMARY

This paper deals with the breeding birds of the lakes in the Nile Delta, Egypt. It is mainly based on observations in the area in spring 1983, a survey of literature and data collected for the Birds of Egypt Project. Breeding of 29 species has been proved. The lakes hold important populations of Little Grebe, Moorhen, Purple Gallinule, Kentish Plover, Little Tern and Clamorous Reed Warbler.

The breeding of Reed Warbler, Streaked Weaver and Avadavat has been proved for the first time in recent years. Several species seem to have disappeared from the lakes during this century.

All the lakes are seriously threatened, mainly by reclamation.

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RAPTOR RINGING AT EILAT, ISRAEL[1]

by

William Clark, Katharine Duffy, Edna Gorney, Michael McGrady and Christopher Schultz

INTRODUCTION

The Old World's largest recorded raptor migration occurred at Eilat, Israel during the spring of 1977 when Christensen *et al.* (1981) counted over three-quarters of a million raptors. These authors were able to identify as to species most raptor migrants, but could only speculate as to their destination. One way to discover the wintering and breeding grounds of these migrants, is through ringing ('banding' in North America.)

With this in mind and to learn more about raptor migrants and migration, particularly that through the Middle East, we set up and operated a raptor ringing station at Eilat, Israel during the spring of 1984 under the sponsorship of the Israel Raptor Information Center. Our objective was to test the feasibility of operating a long-term migratory raptor ringing project. In this article we will report the results of capturing and ringing almost 1,000 raptors of 16 species in 1984.

METHODS AND MATERIALS

Raptors were captured and ringed from 8 March to 16 May 1984 in the fields of Kibbutz Elot, a few kilometres east and north of the town of Eilat, Israel.

Personnel. The ringing team included four experienced raptor ringers from the United States: Clark (project leader), Duffy, Mcgrady and Schultz; and Gorney as Israeli project leader. They were assisted by more than 25 Israeli volunteers, most of whom participated for one week, and a full- time coordinator of volunteers.

Capture Techniques. Experiments were made with a wide variety of raptor capture techniques. Two stations (north and south) were set up using bow-nets, mist nets, and Dho-gazas which were operated from a hide (blind) as described by Clark (1970; 1981). In addition, Bal-chatri traps, as described by Berger and Mueller (1959) and Berger and Hamerstrom (1962), were used. Two other sets of mist nets were used, one set of six placed on 6 metre poles on the south side of a tree line and another set of seven nets set up in a date palm grove. Two other methods, VerBail pole traps (Stewart *et al.* 1945) and padded-jaw traps (Harmata 1984) were used experimentally. Finally, raptors caught by passerine ringing stations were handed to this project for processing.

Processing of Raptors. All raptors captured were fitted with appropriate sized Tel-Aviv University rings. The species, age, and sex of each raptor were noted on a ringing form. The following measurements were taken and recorded: wing chord, wing spread, length of culmen, hallux, and tail, overall length, and weight. The date, time, and capture device were also recorded, as was anything unusual about the raptor. Recent moult of flight or tail feathers was noted on a moult form with individual feathers recorded as old, new, missing, or growing.

Daily Record. Each ringing station recorded daily, on an hourly basis, all raptors sighted and those making passes but not captured. The number captured and hours of operation were entered on this form at the day's end.

1 An article on this subject was published in Hebrew in *Torgos* 4(2); 61-78. *Ed.*

CLARK, W. *et al* 1986. Raptor ringing at Eilat, Israel. *Sandgrouse* 7: 21-28

RESULTS

A total of 918 raptors of 16 species were ringed from 10 March to 16 May 1984 (TABLE I). TABLE II shows raptors captured by species and capture device. TABLE III is a listing of raptors captured by species and age and sex. TABLE IV is a list of raptors retrapped by species and days after initial ringing. *Figure 1* depicts the raptors captured by hourly intervals.

Three individuals of three species were found to have supernumerary remiges or rectrices. These results will be combined with results from North America and reported separately.

Recent moult of flight and tail feathers was noted for most adult Steppe Buzzards *Buteo buteo vulpinus*, Long-legged Buzzards *Buteo rufinus*, and Booted Eagles *Hieraaetus pennatus*. Recent moult was noted on some adults of the other species captured, including many Levant Sparrowhawks *Accipiter brevipes*.

Some of the immature Steppe Buzzards had replaced one or two innermost primary feathers. All three Barbary Falcons *Falco pelegrinoides* and all the immature Levant Sparrowhawks captured were moulting into adult body plumage, but had retained their immature flight feathers. Several immature Marsh Harriers *Circus aeruginosis* had replaced their central tail feathers with adult feathers.

Seventeen Steppe Buzzards and one Long-legged Buzzard captured had tar on their feet or plumage.

A number of abnormalities were noted on Steppe Buzzards: one adult was missing its left eye, another adult was missing talons on its centre and outer toes, an immature's broken leg had healed crookedly, but it still had use of its feet, an adult had no use of its centre toe (apparently it was arthritic), and several had recent lacerations, usually on the underside of the wing. One Steppe Buzzard had a 10cm. piece of clothes line attached to its left leg. The other leg showed signs of having a similar jess. Many Steppe Buzzards had external parasites, such as ticks, lice, or mites.

DISCUSSION

The total of 918 raptors ringed at Eilat during this pilot study indicates that sufficient raptors can be captured to justify a long-term raptor migration ringing project. Additionally, much information was gathered on individual migrants which will help shed light on some of the mysteries of raptor migration, as discussed below.

Do Raptors Feed on Migration? Some people believe that the vast majority of raptors fast during their entire migrations. Since our capture techniques appeal to a raptor's hunting instincts, our results indicate that many are indeed hunting; some actively, others opportunistically. Thus the question now becomes, not "do they feed?", but "how many feed and how important is feeding en route?".

Black Kite *Milvus migrans* Every one of the Black Kites captured exhibited a strange response to being handled. They went limp, drooping their heads and wings. In our combined experiences of handling numerous individuals of over 40 raptor species, none of us has noted similar behaviour. Clark, however, has noted the same response when handling Greater Roadrunners *Geococcyx california*. When released, however, all of the kites flew away normally.

Montagu's Harrier *Circus pygargus* The immature male Montagu's Harrier ringed had a noticeable yellow eye-ring. We found no mention of this character in raptor handbooks, such as Cramp and Simmons (1980).

Sparrowhawk *Accipiter nisus* Although Sparrowhawks were seen almost every day hunting the kibbutz fields, we were unable to lure any into the ringing stations. This behaviour was extremely different from the responses to lures of its North American congener, the Sharp-shinned Hawk *Accipiter striatus*, which we have had great success in luring in and capturing, in North America. The Sparrowhawks which were captured were passively captured in mist nets.

Levant Sparrowhawk Our ringing sample of 155 is probably the largest to date of this little

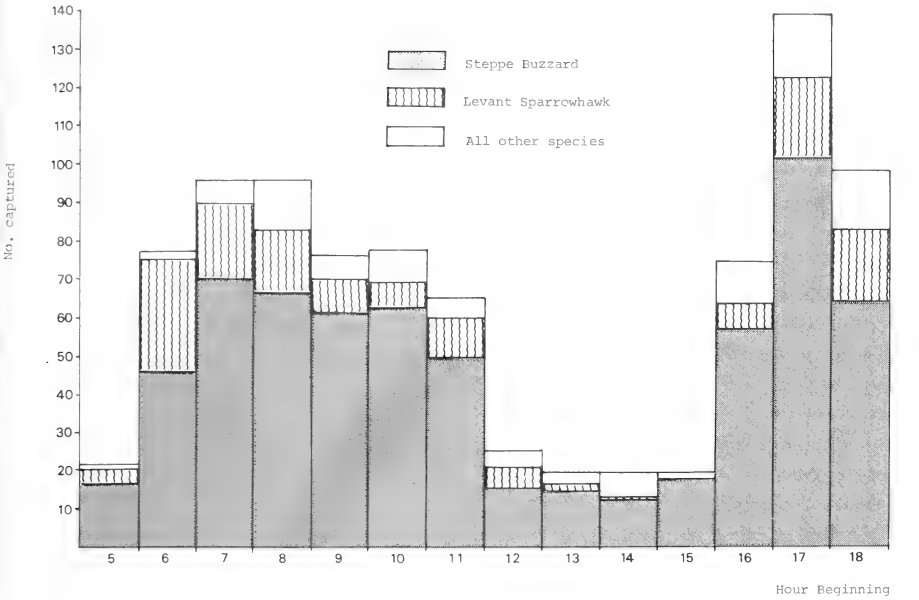

Figure 1. Raptors Captured by Hourly Intervals

studied species. It is hoped that this and subsequent ringing results will help identify their wintering area in Africa, which at present is unknown (Cramp & Simmons 1980). Many of the adults had undergone moult of flight and tail feathers, others had not. Perhaps those that had not were in their first adult plumage. All immatures had extensive body moult, some appearing almost like adults, but all retained their immature flight and tail feathers.

During the eight-day period from 20 to 27 April, 81% (127 of 155) of the Levant Sparrowhawks were captured. The migration of this species is the most compressed of the species captured. We plan to analyse and publish the timing and demographic data after another year's field work.

Buzzard *Buteo buteo* All but three of the 661 Buzzards captured were judged to be Steppe Buzzards *B. b.vulpinus*. These three were thought to be intergrades with the Common Buzzard *B. b. buteo*.

Broekhuysen and Siegfried (1970) report that adult Steppe Buzzards were moulting flight and tail feathers in South Africa during the northern hemisphere winter. Our findings of recent moult on most adults are consistent with their results and support their contradiction of the statement in Dement'ev *et al.* (1966) that adult Steppe Buzzards complete their moult before beginning their autumn migration.

Long-legged Buzzard Both dark-phase adult Long-legged Buzzards captured had unbanded off-white tails with dusty tips. The tails of this phase of this species as shown from above in *figures* in Cramp and Simmons (1980) and Porter *et al.* (1981) have banded tails. All of the several dozen specimens in the British Museum at Tring also had banded tails. Dark-phase immatures are not pictured in Cramp and Simmons (1980) or Porter *et al.* (1981). The two we captured had dark tails with numerous fine white bands.

Peregrine The adult male Peregrine captured on 9 May was judged to be of the tundra-inhabiting race *Falco peregrinus calidus*. A breeding male of the race *F. p. peregrinus* would be expected to be in territory by that date. Dement'ev *et al.* (1966) reported that tundra Peregrines return to their breeding areas during the middle third of May. The greyish, not blackish, cap and whitish, not creamy, breast colour of this bird are also more typical of the tundra race.

Capture Techniques. The most effective trap used was the Bal-chatri. Over half, 51% (466 of 918), were taken with this trap (*TABLE* II). The station setups were fairly effective, catching 30% (271) and, with 14 species captured, provided more variety than the other techniques combined. The high nets were effective for the capture of Levant Sparrowhawks, but caught very few other raptors. The nets in the palm grove were fairly effective, but only for Buzzards and Levant Sparrowhawks. The VerBail and padded-jaw traps were the least effective.

Time of Day of Captures. Most of the raptors were captured either early in the day or late in the day (*Figure* 1), particularly after mid-April, when during midday the temperatures were very high and few raptors were sighted. It is believed that the migration continues during midday, but at such a great altitude as to be invisible from the ground or on a different flight path. Moreover, after mid-April, we ceased operation during the hottest part of the afternoon.

Retraps. Some Buzzards stayed in the kibbutz fields for as many as 17 days after initial capture (*TABLE* IV). Many immatures appeared to spend several days feeding before continuing their migration. The few Kestrels *Falco tinnunculus* and Levant Sparrowhawks retrapped only stayed a day or two. Two Long-legged Buzzards remained three and four days. This correlates with our observations of known birds of this species that remained in the fields from four to six days.

Non-migrants Captured. Two immature Bonelli's Eagles *Hieraaetus fasciatus* and three Barbary Falcons were captured. These were most likely not migrants, but just dispersing immatures.

Age Ratio. We captured almost twice as many immature as adult Steppe Buzzards (*TABLE* III), most likely because more immatures were stopping to feed in the kibbutz fields. For the other species approximately as many adults as immatures were captured.

Future Plans. The ringing team will continue this project during the spring of 1985. Rocket nets and box traps will be used in addition to the capture techniques used successfully in 1984.

Closing Remarks. This long-term raptor migration ringing study has and will continue to yield information which will help in the understanding of some of the mysteries of raptor migration. In addition, important raptor demographic data will be gathered and more will be learned about the condition of individual migrant raptors.

ACKNOWLEDGEMENTS

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Special thanks are extended to the many Israeli volunteers who were hard workers and great company and to Tami Shohat who did an excellent job as volunteer coordinator. Gratitude is extended to passerine ringers Bruria Gal, Yaron Bazer, and Hadoram Shirihai, who assisted us in many ways and gave us additional raptors to ring and process. Rueban Haffner and Yuval Peled of the Nature Reserves Authority are thanked for providing carcasses and rehabilitating injured raptors which we picked up. And finally we are extremely grateful to the managers and workers of the Kibbutz Elot for allowing us to operate in their fields and for their extreme tolerance of our activities.

SUMMARY

A raptor ringing station was operated at Eilat, Israel during the spring of 1984. A total of 918 raptors of 16 species were ringed. The majority were Steppe Buzzards, but many Levant Sparrowhawks were captured.

The results indicate that raptors feed on migration, particularly when an opportunity occurs to do so. Recent moult on many of the raptor migrants was noted.

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TABLE 1. SPECIES BANDED BY DATE.

S = South station, N = North station

Species		March 10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Black Kite	*Milvius migrans*					1						2		1	1	
Marsh Harrier	*Circus aeruginosus*												1			2
Pallid Harrier	*Circus macrourus*										1					
Montagu's Harrier	*Circus pygargus*															
Sparrowhawk	*Accipiter nisus*												1			
Levant Sparrowhawk	*Accipiter brevipes*															
Buzzard	*Buteo buteo*	1	2	1	1	1	2	1		6	9	6	2	3	4	1
Long-legged Buzzard	*Buteo rufinus*	1													1	
Steppe Eagle	*Aquila nipalensis*															
Booted Eagle	*Hieraaetus pennatus*															
Bonelli's Eagle	*Hieraaetus fasciatus*			1												
Lesser Kestrel	*Falco naumanni*															
Kestrel	*Falco tinnunculus*	1	1		1	1		1						1		2
Hobby	*Falco subbuteo*															
Peregrine	*Falco peregrinus*															
Barbary Falcon	*Falco pelegrinoides*												1			1
Total		3	3	2	2	3	2	2	0	6	10	8	5	5	6	6
Stations		S	S	S	S	S	S	S	S	S	S	S	S	S	S	S

Species	March 25	26	27	28	29	30	31	April 1	2	3	4	5	6	7	8	9	10	11	12	13
Black Kite			1			1				1		1							1	1
Marsh Harrier		3	1			1	1		1	1	1	2				1				1
Pallid Harrier								1												
Montagu's Harrier																				
Sparrowhawk										1										
Levant Sparrowhawk																				
Buzzard		7	5	7	3	14	10	8	12	12	20	9	5	8	10	11	5	11	8	9
Long-legged Buzzard					1	2		1	1	3										
Steppe Eagle																				
Booted Eagle								1							1				1	
Bonelli's Eagle																				
Lesser Kestrel																				
Kestrel						1						1								
Hobby																				
Peregrine																				
Barbary Falcon																				
Total	0	10	7	7	4	19	11	11	14	18	21	13	5	8	11	12	5	11	10	11
Stations	S	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN

Species	April 14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2
Black Kite										1									1
Marsh Harrier													1						
Pallid Harrier			1																
Montagu's Harrier																			
Sparrowhawk										2		2	1		1				
Levant Sparrowhawk			1	1		2	14	13	10	15	13	32	23	6	2	3	2	3	3
Buzzard	4		3	10	12	3	7	15	13	33	14	31	38	31	4	9	23	28	14
Long-legged Buzzard			1	1					1				1	1					1
Steppe Eagle									1			1							
Booted Eagle								2					1						
Bonelli's Eagle																			
Lesser Kestrel							1												
Kestrel						1	1			1									
Hobby							1												
Peregrine																			
Barbary Falcon										1									
Total	4	0	6	12	12	6	24	30	25	53	27	66	65	38	7	12	25	31	19
Stations	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	S	S	S	S	S	S	S	S

	May														
Species	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Black Kite								3							16
Marsh Harrier							1					2			20
Pallid Harrier															3
Montagu's Harrier							1								1
Sparrowhawk															8
Levant Sparrowhawk		1		6	3			1		1					155
Buzzard	14	7	5	8	7	13	24	24	22	11	6	3	10	1	661
Long-legged Buzzard															16
Steppe Eagle															2
Booted Eagle							1								7
Bonelli's Eagle							1								2
Lesser Kestrel				1											2
Kestrel			2	1							1	1	2		20
Hobby															1
Peregrine							1								1
Barbary Falcon															3
Total	14	8	7	16	10	13	29	28	22	12	7	6	12	1	918
Stations	S	S	S	S	S	S	S	S	S	S	S	S	S	S	

TABLE II. SPECIES CAPTURED BY TRAP

	Bal-Chatri				Station						Other		
Species	Spar-Ms	Dv-pg	Lb	Sg	Sb	Dg	Nt	Vb	Hi	Pn	Pj	Sb	Total
Black Kite	2	5	2	4					1		1	1	16
Marsh Harrier	3	6	2	9									20
Pallid Harrier		1										2	3
Montagu's Harrier												1	1
Sparrowhawk							2		4	2			8
Levant Sparrowhawk	34				12	6	10		56	33		4	155
Buzzard	369	25	105	75	1		12	2	8	55		9	661
Long-legged Buzzard	5		4	7									16
Steppe Eagle		1	1										2
Booted Eagle			1	5							1		7
Bonelli's Eagle			1	1									2
Lesser Kestrel	1				1								2
Kestrel	14				5							1	20
Hobby							1						1
Peregrine			1										1
Barbary Falcon							3						3
Total	428	38	117	101	19	6	28	2	69	90	2	18	918

Total Bal-chatri - 466
Total Stations - 271
Total Other - 181

Legend:

Spar-Ms	- Sparrow and/or mouse	Nt	- Mist Net
Dv-pg	- Dove or Pigeon	Vb	- VerBail pole trap
Lb	- Large Bownet	Hi	- High Mist Nets
Sg	- Large Bownet using bungy cord	Pn	- Mist Nets in the Palm Grove
Sb	- Small Bownet	Pj	- Padded Jaw traps
Dg	- Dho-gaza	Sb	- Captured at songbird banding station

TABLE III. SPECIES BY AGE AND SEX.

Species	After SY M	After SY F	After SY U	Total ASY	SY M	SY F	SY U	Total SY
Black Kite			9	9			7	7
Marsh Harrier	7	2		9	7	4		11
Pallid Harrier	2			2		1		1
Montagu's Harrier					1			1
Sparrowhawk		3		3	3	2		5
Levant Sparrowhawk	41	26		67	55	33		88
Buzzard			225	225			436	436
Long-legged Buzzard			5	5			11	11
Steppe Eagle					2			2
Booted Eagle	1		2	3		2	2	4
Bonelli's Eagle					2			2
Lesser Kestrel					1	1		2
Kestrel	11	2		13	2	5		7
Hobby			1	1				
Peregrine	1			1				
Barbary Falcon					3			3
Total	63	33	242	338	76	48	456	580

SY - Second Year (Immature)
After SY - After Second Year (Adult)
M - Male, F - Female, U - Unsexed

TABLE IV. RECAPTURES OF RINGED RAPTORS.

Species	Days after initial capture 0	1	2	3	4	5	6	7	8	9	10	11	14	15	16	17	Total
Levant Sparrowhawk	3	6															9
Buzzard	35	43	16	9	6	8	6	4	6	3	1	1	2	1	1	1	143*
Long-legged Buzzard	3	2		1	1												7*
Kestrel		2															2

* 27 Buzzards were recaptured more than once, 18 twice, seven thrice, one four times and one seven times. Two Long-legged Buzzards were recaptured twice.

NOTES ON SEABIRDS IN SOUTH-EASTERN ARABIA

by

Graham Bundy

INTRODUCTION

These notes are intended to supplement the important recent contributions to the ornithology of the Arabian Sea: a review by Bourne (1963) and especially Bailey (1966) who described the marine avifauna and investigated the relationships between the numbers of seabirds and an upwelling area off the Arabian coast. Bailey's studies were made from a research ship in March, May and during the south-west monsoon from June to August. During the monsoon period there is an upwelling of cold sub-surface water, rich in nutrients, principally off Dhofar in southern Oman. Bailey noted a dearth of seabirds in March 1964 in comparison with the upwelling period of the previous year and noted a significant correlation between the total number of seabirds (all species) and the volume of zooplankton.

From August 1983 to September 1985 shore-based observations were made in southern Oman involving prolonged 'seawatching' (TABLES I-II)- probably the first since Bailey's voyages in 1963-1964. Regular counts of loafing gulls and terns on the beaches in eastern Arabia were made by the writer during 1977 to 1985. A review of these is given with some additional data on breeding times where they seem to vary from region to region. Where no published or other source is given, it may be assumed that the writer is responsible for any inaccuracies.

The seawatching sessions were conducted from a headland at Ras Mirbat (or Marbaat) 55°E 17°N some 80Kms east of Salalah. Curiously few pelagic species or seabird movements can be seen elsewhere along this coast (eg.Walker 1981b). TABLE I shows the hours spent seawatching and the seasonal bias towards the upwelling season when seabirds reach peak numbers. Seabirds were so scarce in other months (when shorter watches were made from November to February for the sake of completeness) that some visits to Mirbat are omitted from TABLE II to save space. Only from Ras Mirbat could definite and sustained movements of seabirds be detected and even these were variable. The reasons are not known for the fluctuations in 'passage' of pelagic species as these could not be correlated with the monsoon weather and winds. Mirbat lies on the fringe of the monsoon mists and conditions were variable. The southward bulge of Ras Mirbat is a projection of low-lying gravel plain backed by the spectacular, south-east facing escarpment of the Jebel Samhan. Birds, presumably orientating north-eastwards towards Kuria Muria Bay, are confronted with the headland at Mirbat, swing southwards to avoid land, and pass the observation point just south of Mirbat village, often closely, before turning east again (*Figure 1*). In misty monsoon conditions it was thought initially that heavy passage around Mirbat Bay was due to birds merely following the coast but subsequent counts in clear weather did not bear this out. The strong south-west to north-east bias in seabird movements through Mirbat Bay was evident even in autumn, Wilson's Storm Petrel *Oceanites oceanicus* and Bridled Tern *Sterna anaethetus* being notable examples. Exceptions were, perhaps significantly, those species which breed nearby on the only islands in the region, the Kuria Muria group (56°E).Socotra Cormorant *Phalacrocorax nigrogularis*, Masked Booby *Sula dactylatra* Red-billed Tropicbird *Phaethon aethereus*, Swift Tern *Sterna bergii* and Sooty Gull *Larus hemprichii* were all seen to pass Mirbat casually in small numbers - probably on local feeding journeys. Audubon's Shearwater *Puffinus lherminieri persicus* also breeds on Kuria Muria (Gallagher 1985) but, unlike the other local breeding species, tends to show a definite SW-NE bias in its movements (TABLE II). Seabirds were rarely seen feeding off Mirbat, and the observed 'passage', with the possible exception of large spring and autumn migration of terns and storm-petrels, was most likely movement along the plankton-rich continental shelf between favoured feeding areas in the upwelling region. R. Hedley and R. Woodley saw many tubenoses Procellariidae feeding close to their small fishing boat some 2-

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6kms off Raysut (54°E.17°N) and their observations proved helpful in identifying some dark petrels. Bailey stressed the need to give some indication of identification methods so that subsequent workers can evalute sight records but he did not elaborate in any depth. Some difficulty with identification was experienced during the present study, especially with the dark tubenoses. In recent seabird literature there are conflicting accounts, as well as some ambiguity, with regard to flight characteristics etc. Because of this, and so that this small contribution may be better evaluated, an attempt has been made to give identification criteria where appropriate.

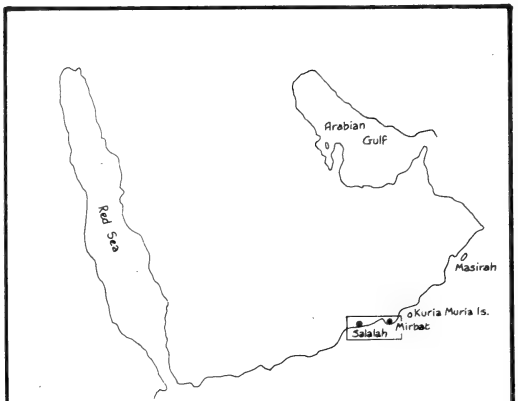


Figure 2. South-eastern Arabia with area of Oman observation shown enclosed.

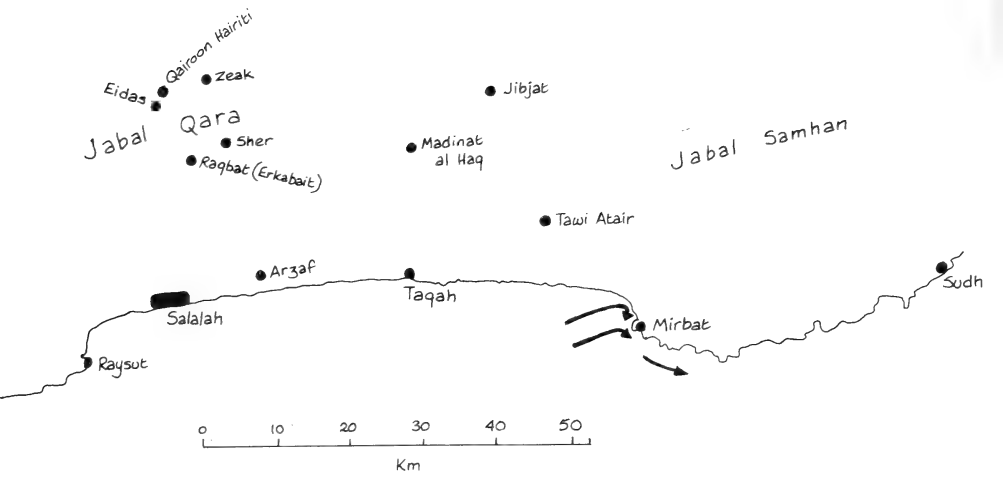


Figure 1. Directions of sea-bird movements off Mirbat in southern Oman (*see text*).

TABLE II

SEAWATCH RESULTS 1983-85. COUNTS of SELECTED SPECIES, MIRBAT S. OMAN 1983-85*

		1983		1984															
SPECIES	Flight Dirn	2/9	9/9	13/4	4/5	18/5	29/6	1/7	6/7	13/7	10/8	17/8	24/8	10/9	14/9	21/9	5/10	19/10	20/11	SPECIES
AUDUBON'S	NE	14	87	12	47	360	36	17	82	33	63	86	10	1	36	150	26	1	4	*Puffinus*
SHEARWATER	SW						5	2							5		20	10		*lherminer*
PALE-FOOTED	NE	10+	?	?	5+	10+	20	9	36	12	25	13	20		2	1	188	5		*Puffinus*
SHEARWATER	SW																			*carneipes*
JOUANIN'S	NE	?	?			50+	150+	10+	240	332	83	50	22				3			*Bulweria*
PETREL	SW																			*fallax*
CORY'S	NE						1	4	1											*Calonectris*
SHEARWATER	SW																			*diomedea*
SHEARWATER	NE	85	12		15	30	50	10	32	12	18		6					4		*Puffinus/*
Sp.	SW																			*Bulweiria etc*
WILSON'S	NE	1440	43			30		3	8	33	25	24	76	1450		560		1820		*Oceanites*
STORM PETREL	SW										5+								2	*oceanicus*
BROWN	NE				1	1	1		6+	4		2						1		*Sula*
BOOBY	SW					3			4	3	2	1								*leucogaster*
MASKED	NE	4	71	6	3	2	30	2	12	56	6	120	31	8	3		4	1		*Sula*
BOOBY	SW						8	1	3	2	5	2	2	3	1	1			3	*dactylatra*
GREAT	NE														1					*Stercorarius*
SKUA	SW																			*skua*
POMARINE	NE				14		2										3			*Stercorarius*
SKUA	SW				2											1				*pomarina*
SANDWICH	NE																		30+	*Sterna*
TERN	SW																60			*sandvicensis*
COMMON	NE				1460	440	56	90	134	51	4	6								*Sterna*
TERN	SW	110	120+								48		1	?	125					*hirundo*
BRIDLED	NE	480	1240	10	8	8	10	12	7	2	1	2	6	16	14	255	1510	2		*Sterna*
TERN	SW																			*anaethetus*
SAUNDERS/	NE	1	18	6	11			4											14	*Sterna albifrons/*
LITTLE TERN	SW																			*saundersi*
WIND/		S	S	SW	W	SW	SW	SW	SW	W	WSW	WSW	WSW	SW	SW	SW	W	VAR	VAR	
		3	3	1	2	4	4	5	4	3	3-4	4-5	3-4	2	1-2	3-4	0-2	0-1	0-1	
VISIBILITY		Poor	Mod	Ex	Ex	Good	Good	Good	Mod	Mod/ Poor	Mod/ Poor	Mod/ Poor	Mod/ Poor	Good Poor	Poor	Ex	Ex	Ex	Ex	
HOURS OBSERVATIONS		2	2	1	4	3	3	3	5	5	3	4	3	3	2	4	2	2	1	

1985

SPECIES	Flight Dirn	18/4	3/5	24/5	7/6	14/6	19/6	21/6	28/6	5/7	19/7	2/8	23/8	29/8	SPECIES
AUDUBON'S	NE		3	36	93	45	34	7	5	12	67	35	97	64	*Puffinus*
SHEARWATER	SW			8	6	2						3	1		*lherminieri*
PALE-FOOTED	NE		1	156	34	9	45	4	23	6	13	5	94	10	*Puffinus*
SHEARWATER	SW														*carneipes*
JOUANIN'S	NE	15	1	4	12	34	139	47	38	102	230	238	18	48	*Bulweria*
PETREL	SW														*fallax*
CORY'S	NE					2			1		2				*Calonectris*
SHEARWATER	SW														*diomedia*
SHEARWATER	NE	10	10+	10		20	7	4			10	18			*Puffinus/*
Sp.	SW														*Bulweria etc.*
WILSON'S	NE				116	33	28	1	25			46	18	121	*Oceanites*
STORM PETREL	SW								3						*oceanicus*
BROWN	NE			2	2	7		3			4	1	3		*Sula*
BOOBY	SW			7				3				1			*leucogaster*
MASKED	NE		4	16	6	4	23	50	1	12	270	16	6	4	*Sula*
BOOBY	SW	3		1	3			9		11		9	11	2	*dactylatra*
GREAT	NE			1			1		2						*Stercorarius*
SKUA	SW														*skua*
POMARINE	NE			4	1	2		3	1		3				*Stercorarius*
SKUA	SW														*pomarina*
SANDWICH	NE	3													*Sterna*
TERN	SW														*sandvicencis*
COMMON	NE	160	470	130	230	156	270	110	60	10	30	13			*Sterna*
TERN	SW		10	12											*hirundo*
BRIDLED	NE			8	40	2	3	2	5	1	7	1	2		*Sterna*
TERN	SW														*anaethetus*
SAUNDERS	NE	10	5	10	2	1	10	3							*Sterna albifrons*
/LITTLE TERN	SW														*/saundersi*
WIND/		WSW	W	W	W	W	SW	W	W	W	SW	SW	SW	WSW	
		4-5	3-4	1-2	4-5	3-4	2-3	2-4	2-4	4	3	3-4	2-4	3-4	
VISIBILITY		Ex	Ex	Good	Good	Good	Good	Good	Poor	Ex	Mod	Mod	Mod/ Poor	Mod/ Poor	
HOURS OBSERVATIONS		1	2	3	4	4	4	4	3	3	4	4	2	2	

*Some dates with negative results, Oct-Feb, omitted

Observers:
G. Bundy
S. Tibbett
R. Hedley

COMMENTS ON SPECIES

Procellariidae

The coastal waters off Oman are inhabited by three common representatives during the upwelling period. Several more species may be scarce but regular visitors. The three common species include a large-billed and a small shearwater feeding on, but presumably not competing for fish and cephalopods (Bourne 1963) and a thick-billed Gadfly Petrel feeding on cephalopods (Bailey 1966). Although there are some sight records claimed for the Gulf (F.E.Warr *pers.comm.*) and a specimen from Aden (Bailey 1966) there is still no unequivocal evidence for the occurrence of Wedge-tailed Shearwater *Puffinus pacificus* in the upwelling area. Its status remains in doubt because of problems in identifying birds at sea - birds are seldom seen well enough to allow critical examination of bill shape and colour. Like Bailey, I would consider Pale-footed Shearwater *P. carneipes* reasonably easy to identify but difficulties arise with Wedge-tailed Shearwater and Jouanin's Petrel *Bulweria fallax* which are easily confused. Bailey pointed out that flight characteristics of Jouanin's Petrel varied considerably in different wind conditions. Most published accounts describe the flight of Jouanin's as typically Gadfly in character, eg. Bourne (1960): "very fast, swooping and mobile" and "rising high on the upswing". Harrison (1983) describes it as "bounding in high zig-zagging arcs" and "careening on high broad arcs" *etc.* My own limited experience of Gadfly Petrels in the south Atlantic, mostly *Pterodroma mollis*, would concur with the described flight characteristics of this group. Experience in southern Oman, however, showed that Jouanin's Petrel does not conform very closely with Gadfly flight and is closer to the "buoyant, drifting and unhurried" action of Wedge-tailed Shearwater (Harrison 1983). Furthermore, there is some ambiguity in the published accounts of flight action in Jouanin's cogener, Bulwer's Petrel *Bulweria bulwerii*. Cramp and Simmons (1977) for example describe Bulwers flight as "like other Gadfly Petrels, fast with swooping, careening action, towering on the upswing..." Harrison describes it differently, "buoyant, erratic and twisting...normally weaves and twists close to surface, rather prion-like, two to five rapid wing beats followed by a short twisting glide..rarely higher than 2 metres above the waves". The three Bulwers I saw in the north Atlantic in 1957 flew rather as described by Harrison.

In southern Oman during the present study, Jouanin's Petrel was seen passing Mirbat closely (TABLE II). R.Woodley and R.Hedley noted birds feeding by a small boat at sea. The short, stout bill could be appreciated by RH when the birds were seen at a few feet range, but this is not easy to see at ranges of more than 50 metres. At greater distances the head looks rounded and the bill points down at an angle. The tail looks pointed in flight, the wedge- shape only obvious when birds are feeding on the sea at close quarters (RH). It is blacker than Pale-footed Shearwater and some birds show some paler brown on the upperwing coverts. When seen at sea close to Pale-footed Shearwater it looked smaller and slimmer, with tapered tail, more angled narrow-based wings and different flight action. Pale-footed could usually be identified by its slower flight, straighter wings, stiffer flight action and heavy build with shorter-looking rounded tail. Jouanin's Petrel was almost dwarfed by passing Cory's Shearwaters but usually size was not taken much into account, being so difficult to assess with birds at sea. In winds of up to force 4-5, Jouanin's Petrel flies in a casual, unhurried, weaving manner, rising into the wind with tern-like wing-beats before turning, often with a sharper twist of the body than exhibited in the larger shearwater. The downward glide into the wave troughs varies from a gentle tilt on bowed wings during which it proceeds to weave in one or more 'S' bends close to the surface, to a fast swoop in stronger winds. There tends to be more wing-beating in calmer conditions and dark birds, beating between wave troughs, resembled small dark skuas. Even in strong winds, Jouanin's Petrel could hardly be described as "rising in high zig-zagging arcs" or "careening and soaring in typical Gadfly manner". It seldom rises above an estimated 5 metres even in strong winds.

The Wedge-tailed Shearwater is probably a warm water species, as suggested by Bailey, and may not occur regularly in the Arabian upwelling region. According to Harrison (1983) it might also be confused with *P. carneipes* if the bill cannot be seen, but it has broader-based wings with more bulging secondaries. It remains uncertain whether distant Wedge-tailed Shearwaters can be distinguished from other dark tubenoses by flight mannerisms.

Bulweria fallax **Jouanin's Petrel**

Apparently endemic in the north-western Indian ocean and suspected breeding on Kuria Muria islands (Bailey 1966). Bailey found it most numerous close to the coast during the upwelling but noted it from March and concluded that it was with "little doubt" common off Oman throughout the year. He also collected eight between late June and late August, all of which had brood patches. TABLE II reveals significant peaks of 'passage' off Mirbat between late June and early August after which it became scarce. After September it was usually absent off Mirbat until April although observations were negligible in March. The birds with brood patches and the near absence offshore from October suggests a breeding season from about June to November. This likehood is heightened by the remarkable discovery, 80kms. from the sea in December, of three dead birds, one of which was a recently fledged juvenile with some down (Walker 1981b.) The breeding places remain undiscovered.

Calonectris diomedea **Cory's Shearwater**

Seen closely off Mirbat in June-July 1984 and 1985 (TABLE II) by GB and S. Tibbett both of whom are familiar with this species in the Mediterranean and Atlantic. These are the first for the region although Harrison (1983) mentions a dispersal into the Indian Ocean and recent occurrences in the Red Sea. Birds were seen well and full descriptions obtained; distinguished from *C.leucomelas*, perhaps the only species with which it could be confused, by brown cap. Most birds showed a narrow white rump patch and two-toned upper-wing with sandy coverts, the latter perhaps indicating wear.

Puffinus carneipes **Pale-footed Shearwater**

Well documented as a common tubenose off Arabia during the up- welling period (eg. Bailey 1966). Numbers varied and some unidentified shearwaters in earlier watches were probably this species (TABLE II). A non-breeding visitor from the southern hemisphere (Bourne 1960) from April to October. Bailey cites only three October records but our maximim count (for any month) was 188 on 5 October 1984: the birds passing north-east close to shore in near windless conditions.

Puffinus griseus **Sooty Shearwater**

Not suspected off Mirbat but one found long dead in northern Oman in June 1982 (Colston & Gallagher 1983).

Puffinus lherminieri **Audubon's Shearwater**

Recently proved to breed in the Kuria Muria group (Gallagher 1985): this was the only shearwater seen feeding regularly close to the Dhofar coasts. Regular off Mirbat but very scarce between October and March (TABLE II). Passage was seldom heavy and the hourly average was only 12. One exceptional movement of 360, in three hours on 18th May 1984, was not repeated the following May. Birds were presumably passing between feeding areas but there was a bias (23:1) towards the north-east and Kuria Muria.

Hydrobatidae

Three southern species occur in the Arabian Sea during the upwelling period but only Wilson's Storm Petrel *Oceanites oceanicus* is common close to coasts. The Frigate Storm Petrel *Pelagodroma marina* and Black-bellied Storm Petrel *Fregatta tropica* occur offshore in warmer waters, between 80 and 160kms, from land (Bailey 1966). Swinhoe's and Leach's Storm Petrels *Oceanodroma monorhis* and *O.leucorhoa* are only vagrants (Gallagher & Woodock 1980) while sight records of White-bellied *F.grallaria* require confirmation.

Oceanites oceanicus **Wilson's Storm Petrel**

Common off the Oman coast from May to October often feeding close to shore and visiting harbours. Usually small numbers off Mirbat (TABLE II) but a conspicuous heavy passage in September 1983 and October 1984. The counts shown in TABLE II are almost certainly low as birds are easily missed in heavy seas. All birds during these large autumn movements were passing north-east in purposeful flight.

Phaethonitidae

Phaethon aethereus **Red-billed Tropicbird**

Present near coastal cliffs some 20kms west of Mirbat and near Raysut almost throughout the year, presumably breeding there. No pattern of movements emerged from Mirbat watches. Birds were probably more numerous around presumed breeding cliffs between April and September while in March Bailey saw it commonly well offshore in warmer seas.

Sulidae

Only one representative breeds in the Arabian Sea: the Masked Booby *Sula dactylatra* breeds on at least two islands in the Kuria Muria group (Bailey 1966). Regular watching at Mirbat and elsewhere along the Oman coast has shown the Brown Booby *Sula leucogaster* to be regular in small numbers although referred to as "rare" by Bailey (1966) and Gallagher and Woodcock (1980). There is currently only one record of Red-footed Booby *Sula sula* in Oman waters: a bird travelling with a vessel through the Gulf of Oman in August 1979 (P.W.Chilman *per* F.E.Warr). Bailey (1968) mentions several immatures in the southern Arabian Sea in September.

Boobies often passed very close to observation points and excellent views were obtained. Even distant views of immatures did not, as a rule exclude specific identification. Size is a very dubious character for seabird identification but Masked always looks bulkier than Brown. On several occasions the two species passed together and then the size difference is obvious. Immature Masked usually shows a greyish shawl across the nape, a two-toned upperwing and white breast. Brown Boobies were mostly immatures but all showed a brown breast with clearly demarcated white underpants, clear-cut underwing pattern and usually blue-grey bill. Two juveniles off Mirbat looked almost uniform brown below and these might be confused with the dark morph of Red-footed Booby.

Sula dactylatra **Masked Booby**

The breeding season on Kuria is March to October (Gallagher & Rogers 1980) and there may be little relevance to the Mirbat observations (TABLE II). Adults outnumbered immatures by about 20:1. Very few were seen close to shore between October and February and highest numbers passed Mirbat from mid-June to September when it might be assumed that adults were feeding young at the Kuria Muria colonies. Watches at Mirbat were invariably made before 13.00hrs and during the morning period; birds were usually (8:1) passing north-east towards Kuria Muria.

Sula leucogaster **Brown Booby**

Formerly considered rare in the Arabian Sea (eg. Gallagher & Woodcock 1980). Small numbers were seen off Mirbat between May and October (TABLE II) with slightly more passing north-east (38) than passing south-west (24). Elsewhere on the Oman coast, up to four fishing off Mughsail (40kms west of Salalah) in January and February 1985 (writer) and two in Kuria Muria Bay near Shuwaimya on 9 August 1985 (S.Tibbett). It is probably a regular visitor to the Arabian Sea in small numbers most likely from the colonies in the Red Sea and the Gulf of Aden. The map in Nelson (1978) illustrating the existence of a breeding colony on Kuria Muria is presumably an error.

Phalacrocoracidae

Phalacrocorax carbo **Great Cormorant**

Not seen passing Mirbat during the study period. Only a scarce winter visitor to Southern Oman, chiefly from November to February; up to eight in Salalah wadis during December 1984.

Phalacrocorax nigrogularis **Socotra Cormorant**

Breeds on Al Hasikiya in Kuria Muria islands from July to October (Gallagher & Rogers 1980). In Arabian Gulf it has a more protracted breeding season with eggs from late September to May at different colonies with a peak in November and December (Bundy & Warr 1980). No obvious pattern of movements off southern Oman, only small numbers passing Mirbat between June and September. An assembly of up to about 2,000 was seen regularly, however, off Mughsail between December and March.

Fregatidae

Fregata minor **Great Frigatebird**

One seen well and photographed in Raysut harbour from 25 March into early April 1983 (C.M.Greaves, R.Hedley *et al*).

Phalaropodinae

Phalaropus lobatus **Red-necked Phalarope**

The Arabian Sea is an important wintering area (*eg.* Cramp & Simmons 1983). It was only seen off Mirbat on 5 October 1984 when flocks of up to about 50 were seen making short flights over the sea. On the same day R.Woodley (*pers. comm.*) saw very large rafts, probably thousands, off Raysut to the west. Most are present from August to April (Bailey 1966) but keep well away from the coasts during this period. Migrants in the Arabian interior are regular in small numbers and the vast majority must overfly the peninsula.

Stercorariidae

Skuas were not common off Mirbat. Both Arctic and Pomarine *Stercorarius parasiticus* and *S.pomarina* occur off Oman and the Gulf of Aden (Bailey 1966, Walker 1981a). There does not appear to be a concentration in the upwelling area and Bailey saw only four Pomarines during extensive observations at sea during this period. Gallagher and Woodcock (1980) suggest Arctic, is commoner but this requires confirmation. Almost all the 'small' skuas identified off Mirbat proved to be Pomarine while photographs of loafing flocks on Masirah (J.Bryan *pers. comm.*) showed all birds to be this species. The closer birds off Mirbat were usually identified by the bulky outline, heavy flight, deep chested appearance and broad-based wings. The broad-based wings gives the Pomarine a shorter-tailed jizz than Arctic and Long-tailed Skua *S.longicaudus* but some passing skuas remained, inevitably, unidentified. On a few close adults the twisted tail streamers could be seen but this is often a difficult character to see on distant birds. The only record of Long-tailed Skua in this region remains the four adults seen in northern Oman in May 1977 (Walker 1981a). One small juvenile skua just off Ras Suwadi, northern Oman, in July 1983 (writer) was probably Long-tailed.

Stercorarius pomarina **Pomarine Skua**

Noted off Mirbat from May to July, in September and October (TABLE II). A small peak in May sugggests some true passage at that time.

Stercorarius parasiticus **Arctic Skua**

Rare off Mirbat in southern Oman, but possibly overlooked. A single bird passed north-east on 18th May 1984 (writer; S.Tibbett) and two on 19 July 1985 (ST).

Stercorarius skua **Great Skua**

Small numbers are evidently regular in the upwelling region (Bailey 1966) and birds passed Mirbat sporadically between late May and September (TABLE II).

Laridae

The taxonomy of gulls in the *argentatus-fuscus* complex has a capricious history. Taxonomic re-shuffling has resulted in some confused accounts in recent Arabian faunal works, eg. Bundy and Warr (1980), Walker (1981a) and Gallagher and Woodcock (1980). A major cause has been the switching of the southern *cachinnans* group of 'herring gulls' from *L.fuscus* (eg. Voous 1960), to which they are closely allied, back to *L.argentatus* (Voous 1973) and resulting in the unwieldly account of that species in Cramp and Simmons (1983). Southern forms of 'herring gulls' have recently spread north in the Bay of Biscay and overlapped with *L.argentatus* on the French coast without hybridising (Nicolau-Guillamet 1977). These events have strengthened the case for the preferable treatment of these gulls given in Glutz *et al* (1977) and reviews by Devillers (1977,1983 and *Le Gerfaut in prep.*) a treatment now widely accepted in Europe and currently under review by the British Ornithologists' Union Records Committee. The Arabian status of large gulls is reviewed here following the treatment in Glutz *et al* and Devillers. It is hoped that the field workers in the Middle East, as a result, might take more notice of wintering gulls. Identification of adult gulls should cause few problems but first winter examples of

L.fuscus and *L.cachinnans* are very similar: see Dubois and Yesou (1984). Because of the 'lumping ' of pale-mantled gulls in Cramp and Simmons (1983) several forms are not even illustrated in this work, including the winter visitors to the Arabian seas *L.f.heuglini* and Armenian Gull *L.armenicus.* The latter is smaller than *L.fuscus* on average, adults have a dark eye, more black and less white in the wing-tips than *L.cachinnans* and a different bill pattern. Adults and sub-adults in winter have a black sub-terminal band and a whitish tip to the yellow bill. See also Hume (1983).

Larus hemprichi **Sooty Gull**

Present throughout the year on coasts of southern Oman. It breeds on offshore islands from April to October (Gallagher & Woodcock 1980) but peak breeding period may be later, from July to October, as suggested in Bailey (1966). Estimates of coastal flocks in southern Oman over two years revealed a peak in numbers from late October to December when thousands were present including recently fledged juveniles. The lowest numbers were from January to March after which there was evidently a build-up, especially of adults. Few obvious and sustained movements were seen from Mirbat with one exception: on 14 June 1985 thousands of adults were seen passing along the coast towards Kuria Muria and presumably their breeding sites.

Larus ichthyaetus **Great Black-headed Gull**

Only regular on eastern Arabian coasts between December and April, relatively few seem to remain throughout this period. There a small peak in December but numbers vary annually. Small numbers overwinter but a regular increase in numbers during March suggests a considerable passage. Numbers during the pre-nuptial passage may exceed 100 in the Gulf (Bundy & Warr 1980) and on Masirah (J.Bryan *pers. comm.*)

Larus ridibundus **Black-headed Gull**

A regular winter visitor to the Gulf region and Oman but not common until early December. There is an exodus in late February and small parties away from the coast during March suggests some cross-desert passage. Summering immatures are more numerous in the Gulf than in southern Oman (*pers.obs.*)

Larus cirrocephalus **Grey-headed Gull**

Curiously there are no records in south-western Arabia for this afrotropical gull but one was at Qatif, on the Arabian Gulf in Saudi Arabia, on 23 April 1981 (writer). This example wa a tired, grey-hooded bird, seen closely and well. It was probably a sub-adult.

Larus genei **Slender-billed Gull**

Regular winter visitor to the Gulf and southern Arabia. Large numbers of immatures remain in the Gulf during the northern summer. In southern Oman small numbers are regular on coasts but it is outnumbered by Black-headed Gull from December to February by about 10:1 (*pers.obs.*)

Larus fuscus **Lesser Black-backed Gull**

In the Arabian Gulf numbers vary from year to year (*pers.obs*). Nominate *L.f.fuscus* were present, for example in 1977-78 in fair numbers, maximum 60 adults at Dammam, but in 1980-81 they were scarce with a maximum of only ten. This black- backed form is distinguished from the slaty-backed *L.f.heuglini* by having the back colour as black as the primaries, it is also smaller on average. In southern Oman, the nominate form is decidedly scarce, but adults were seen in June, August and November in 1984-85. The Siberian *L.f.heuglini* however, is probably the commonest large gull wintering in the Arabian Sea and the Gulf. Large assemblies were seen in eastern Saudi Arabia as well as southern Oman. The main arrival in Oman is from mid-October and most depart during March but small, variable, numbers of immatures remain on coasts after the main departure. Adults, on average, amount to over 60% of wintering flocks in southern Oman. The coastal passage of adults was seen in northern Oman from August in 1983 and birds were passing Mirbat from early September that year. Some variation in the colour of the upperparts, especially in these early autumn adults, suggests a more eastern origin as there is a dark to pale cline across Siberia. Eastern birds merge into *L.f.taimyrensis.* (Cramp & Simmons 1983). It is also a regular, but not a numerous, winter visitor to the Red Sea, both *L.f.fuscus* and *L.f.heuglini* occur there (Meinertzhagen 1954).

Larus cachinnans **Yellow-legged Herring Gull**

In the Arabian Gulf it is a regular winter visitor in varying numbers. Between 1977 and 1982 coastal flocks were outnumbered by *L.fuscus* by about 5:1 - usually more. However, in 1983-84 this species outnumbered *L.fuscus* on the Gulf coast as deduced from pale-mantled adults (J.Palfery *pers.comm.*). Its status further to the south and east is uncertain. It is probably only a scarce visitor to Oman and the Arabian Sea. No adults were seen but odd pale immatures, normally in heavy moult, remained on Dhofar shores from April to July. Similar examples were seen in eastern Saudi Arabia in May and June. In the Red Sea area it is a regular winter visitor, presumably *L.c.michahellis*, but more critical observations are required there. (Jennings 1981).

Larus armenicus **Armenian Gull**

A relict species breeding from central Turkey east to Iran (Glutz *et.al* 1977) and said to be resident there (Cramp & Simmons 1983). Recent observations in the east Mediterranean however, (Hume 1983), suggest some dispersal away from breeding areas. J.Palfery (*pers.comm.*) has noted individuals in eastern Saudi Arabia which probably belong to this species. In southern Oman a sub-adult was seen at Mughsail on 22 November 1984 and up to two adults were at Mirbat from 6-28 December 1984 (*pers.obs.*).

Rissa tridactyla **Kittiwake**

One was on Taqa beach, southern Oman, with other gulls, 18 April 1985 (writer). This example had no trace of black on the yellow bill and thus may have been a second year bird. The dark edgings to the greater upper wing coverts and primaries looked less well defined than in first winter birds. It had a dusky smudge on the ear coverts and dark terminal bar to the tail. This is the first record for Arabia but there are records in south Baluchistan and the Caspian (Scott *et al* 1975).

Sternidae

Terns are conspicuous in many coastal areas and eight species breed in eastern Arabia. Most withdraw for the northern winter but some 'crested' terns remain in Arabian seas throughout the year. In at least two species there would appear, on present evidence, to be different breeding seasons in parts of the Arabian Gulf and southern Oman. The 'marsh terns' *Chlidonias and Gelichelidon* are not considered here.

Sterna caspia **Caspian Tern**

Common resident along Arabian Gulf coasts, breeding on islands off Kuwait April-July (Bundy & Warr 1980) while off Bahrain and Qatar from September-January (T.J.Hallam, F.E.Warr *pers.comm.*). On Gulf coasts I have counted up to 80 together in February. Relatively scarce on Oman coasts except Masirah, where up to 100 in 'winter' (Griffiths & Rogers 1975). In Dhofar a regular small passage noted from August to October and March- April: usually small number with a maximium of 12 (Walker 1981a). In other months it tends to be irregular in occurrence.

Sterna bergii **Swift Tern**

Generally scarce on Arabian Gulf coasts but it breeds on islands well offshore from May to July. Colonies of up to about 1000 pairs noted 1979 and 1980 (R.J.Connor). Most of the Gulf population departs between October and March. In southern Oman it breeds on the Kuria Muria Islands from July to October (Gallagher & Rogers 1980). On Dhofar coasts it was present throughout the year but in relatively small numbers from October to about mid- May after which there was a big build-up. The beached assemblies from late May to July consisted mostly of adults and a good deal of display and copulatory behaviour was noted. No offshore movements of any significance were noted during the seawatching sessions.

Sterna bengalensis **Lesser Crested Tern**

A common summer visitor to the Arabian Gulf islands, present from March to October but scarce in other months (Bundy & Warr 1980). On islands north of 26°N most eggs were laid between 25 and 31 May 1978-1982 but on Az Zazhnuniyah off Qatar (24° 30'N) newly hatched chicks were seen on 29 May 1981 (R.J.Connor *pers.comm.*) In Oman it is never numerous; small numbers, usually immatures, may be seen amid large assemblies of Crested and

Sandwich Terns in any month. It was usually absent from December to March. The maximum count during two years in southern Oman was of 34 adults on 6 May and 40-50 during August and September which suggests some passage. In northern Oman Walker (1981a) noted a passage in March-April and September with a maximum count in November (c. 100) which "reflected stormy weather". Birds apparently on passage in Masirah however, assembled in 'roosts' of about 500 with "fewer mid-winter" (Griffiths & Rogers 1975).

Sterna sandvicensis **Sandwich Tern**

A scarce tern in the Arabian Gulf, small numbers seen in all months with lone adults in April, June and July (*per.obs.*). There are no colonies in the region and it probably completes with *S.bengalensis* since they rarely co-exist anywhere. In Oman where *bengalensis* is generally scarce, Sandwich is often the most numerous tern. Walker (1981a) noted a north-westerly coasting movement in northern Oman from January which reached a peak in April. Large numbers of non-breeding birds spend the northern summer on Oman coasts; counts over two years showed that it is most numerous in October-November and April-May.

Sterna dougallii **Roseate Tern**

This species breds on Masirah and the Daimaniyat Islands in northern Oman (Gallagher & Rogers 1980) being present from March to October. Walker (1981a) saw small numbers on northern Oman beaches from March to September and I saw up to 10 in June 1983. It is rare however, in southern Oman and in two years only one was noted: an immature near Salalah, 24-26 June 1984.

Sterna hirundo **Common Tern**

Scarce and irregular in the Arabian Gulf (Bundy & Warr 1980). A common migrant in the Arabian Sea along Oman coasts. Small numbers remain on Oman coasts during the northern summer but it was generally absent between October and April. A protracted passage was monitored during the seawatching sessions at Mirbat (TABLE II) and movements were often seen taking place there when birds were absent on Dhofar beaches nearby. However, the highest counts of beached birds coincided with passage times offshore: in April and September up to 500 were seen assembled. The heaviest north-east passage occurred in May when over 200 an hour passed Mirbat, this movement continuing, in declining numbers, until August. Some evidence of a south-westerly return was seen in September when over 50 an hour were recorded in three watches. Scrutiny of loafing birds on Dhofar beaches between April and September revealed a high percentage of birds considered to be three-year old sub-adults. The age of these migrants might account for the protracted and late northerly passage: sexually immature terns are well known to visit northern colonies before breeding. Their scarcity in the Arabian Gulf suggests an overland passage into central Asia.

Sterna repressa **White-cheeked Tern**

A common summer visitor to the Arabian Gulf, Gulf of Oman south to Masirah from April through October (Bundy & Warr 1980, Gallagher & Rogers 1980). It breeds on offshore islands but loafing flocks are common on mainland coasts during this period and adults bring recently fledged juveniles to mainland shores in eastern Saudi from late June. From April to August 1983 large assemblies were seen in northern Oman on mainland coasts, mainly immatures. In southern Oman however, it is surprisingly scarce only very small numbers being located from April-June and in September. The maximum count, about 100 on 13 April 1984, was exceptional even though tern flocks were closely watched. One immature apparently over-wintered at Taqa 1983-1984; present during November-January. This scarcity in Dhofar suggests that the Gulf and Masirah populations pass towards winter quarters well offshore. The wintering region appears to be largely unknown; Cramp and Simmons (1985) suggest, from current evidence, that it winters at sea.

Sterna anaethetus **Bridled Tern**

A common summer visitor to Masirah and islands in the Gulf of Oman and Arabian Gulf, present from March to November (Bundy & Warr 1980, Gallagher & Woodcock 1980). In southern Oman it is present from April in coastal waters, usually in small numbers but once 200 off Raysut in early May (R.Hedley). Bailey (1966) noted larger numbers close to the coast during the upwelling period, especially near Kuria Muria where it has recently been found breeding

(Gallagher1985). In September and October 1983-1984 large north-easterly coasting movements were seen at Mirbat (TABLE II). This movement sometimes exceeds 700 birds an hour, possibly involving birds from Red Sea colonies, but is little understood at present.

Sterna fuscata **Sooty Tern**

A rare summer visitor to islets in Musandam peninsula (Oman) from late May to October, breeding in June (E.N.T.Morris per F.E.Warr). Not suspected off Dhofar but evidently a vagrant there; three birds were photographed near Salalah, 2 May 1980 (S.M.Brogan *per* F.E.Warr *pers.comm.*).

Sterna albifrons **Little Tern**

In eastern Saudi Arabia it is a summer visitor with most arriving in March and departing in October and November. It breeds on islets in pools and lagoons away from the littoral but locally near coasts. Colonies on lagoons near Al Uyun, about 40kms. from the sea, have consisted of 40 pairs. The young fledge in these colonies from late May. It frequents coastal areas especially where there is an outflow of freshwater, or sewage, from an oasis or cultivation and has not certainly been seen co- existing with *S.saundersi*. The autumn exodus of *albifrons* is obscured by past confusion with the coastal *saundersi* but large assemblies of 'little' terns in coastal areas seem likely to have been this species. In Iran a similar situation exists with *albifrons* taking up a niche inland and *saundersi* remaining wholly coastal (Scott *et al* 1975). Adults in winter and immatures, however, are probably not safely identified in the field. In the Gulf region breeding adult *albifrons* were identified by (a) more extensive white on forehead extending slightly over eye (b) grey of upperwing and mantle contrasting with white rump and tail (c) bright orange legs and feet. Saunders' Tern in fresh adult plumage is more uniform in appearance; the rump and tail being concolorous with upperwing and mantle; the forehead patch is smaller with little or no extension of white over the eye; the legs are usually dark flesh, brownish or even maroon-looking depending upon the light. The sharply contrasting black primaries of Saunders' is probably not a reliable field character. When visiting Saudi colonies of Saunders' I thought there were some differences in calls but this requires further study.

Sterna saundersi **Saunders' Little Tern**

A summer visitor to the Arabian Gulf east to Gulf of Oman and south to Masirah; common in Iran (Scott *et al* 1975) uncommon northern Oman (Gallagher & Woodcock 1980) with only a scattered coastal presence in Saudi Arabia (*pers.obs.*) Colonies are usually small and scattered and some sites are probably overlooked. Eggs have been recorded from April to June in eastern Saudi and Bahrain (writer, R.J.Connor). Both small chicks and recently fledged young have been seen in eastern Saudi in late June. It is present in Gulf localities from late February and almost all have gone in November. Large post-breeding assemblies, sometimes exceeding 5000, were noted on Abu Ali Island (Saudi Arabia) in October (writer G.K.Brown). These large coastal flocks were difficult to identify and may have comprised Little Terns. The high counts suggest an influx of migrants, presumably from Iran. In southern Oman migrants were generally scarce with only odd individuals on beaches from April-June and September to early December; invariably immature birds. Small groups of this species or *S.albifrons* were seen passing Mirbat during seawatches, always going north-east along the coast (TABLE II).

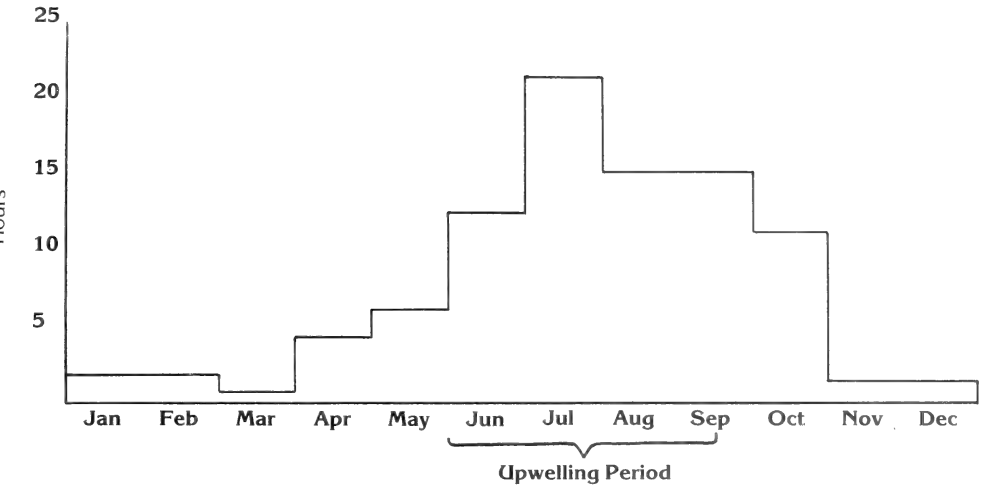
Anous tenuirostris **Lesser Noddy**

Irregular non-breeding visitor to Oman waters (Gallagher & Woodcock 1980). Probably only a vagrant to mainland coasts and not seen by Bailey (1966). One was seen close to shore at Mirbat, 5 August 1983. (C.M.Greaves, R.Hedley).

Anous stolidus **Common Noddy**

A scarce visitor to the northern Arabian Sea with two small breeding colonies in Oman, on Daiymaniyat in the north and Qibliyah on Kuria Muria (Gallagher & Rogers 1980, Gallagher 1985). Not seen in the upwelling region by Bailey (1966) and evidently scarce off Dhofar. At Mirbat, the seawatching sessions 1983-1985 recorded two, 2 September 1983; two, 7 June and four, 28 June 1985.

TABLE 1 AVERAGE HOURS SPENT SEAWATCHING, MIRBAT 1983-1985



. (Observations by G.B.S.Tibbett, R.Hedley)

ACKNOWLEDGEMENTS

I would like to thank Mrs F.E.Warr and M.C.Jennings for continuing to provide Arabian data and for help with several references. The seawatching and other observations in southern Oman were shared with Steve Tibbett and Roger Hedley. ST provided the data on TABLE II for period 19 July to 29 August 1985 and shared in many seawatching and other excursions in Oman. Thanks are due to both for their cooperation and company. Grateful acknowledgement also to John Bryan on Masirah for the opportunity to see his slides of gulls and skuas and to John Palfery in eastern Saudi Arabia for recent information from the Arabian Gulf.

SUMMARY

Observations on seabirds in south-east Arabia are summarised. Seawatching results are given for selected species and some identification criteria added where considered appropriate. Pelagic tubenoses are commonest during the upwelling period from late May to September off Dhofar in southern Oman. Large north-easterly movements were seen from the shore, especially involving Jouanin's Petrel, Pale-footed Shearwater, Wilson's Storm Petrel, Common and Bridled Terns. Some tern species breeding in northern Oman are rare in the south and the status is reviewed. Some tern species have, on present evidence, different breeding periods in the Arabian Gulf and the Arabian Sea. The status of gulls is given with, for species in the *argentatus/fuscus* complex, a review for eastern Arabia using a revised taxonomy. Two species, Cory's Shearwater and Kittiwake were recorded for the first time in Arabia.

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Addendum to *Sandgrouse 7 :* Blackstarts in Southern Oman

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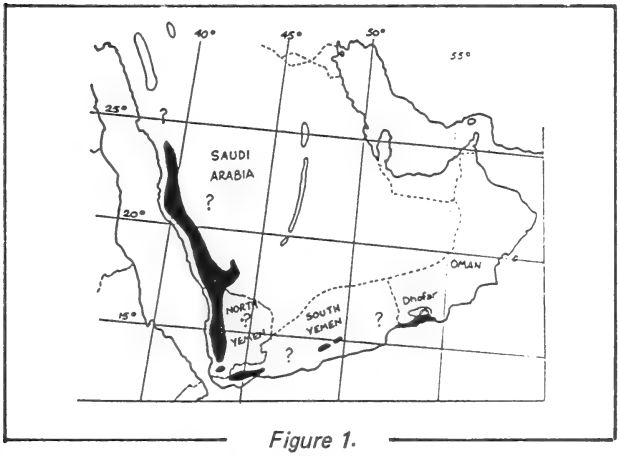


Figure 1.

Approximate breeding range of Blackstart *Cercomela melanura* in Arabia.

C. m. erlangeri

C. m. melanura

Area of known overlap

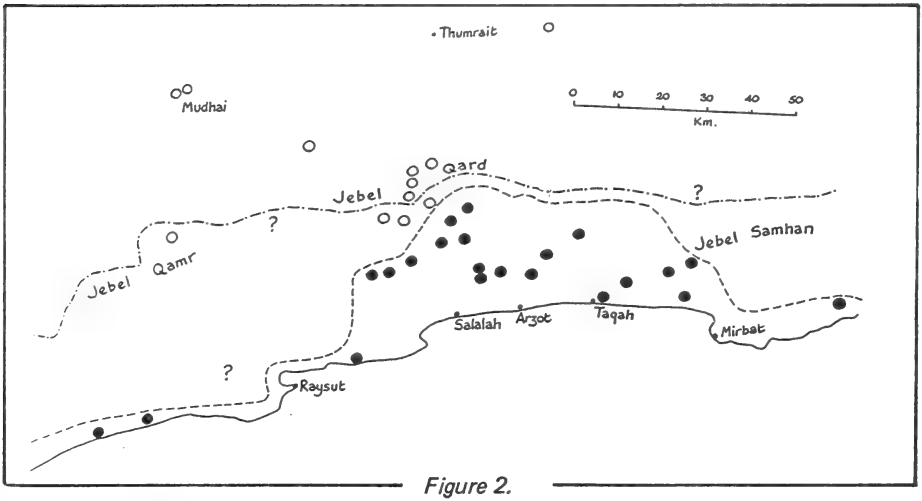


Figure 2.

Located pair(s) of Blackstarts *Cercomela melanura* in Dhofar in relation to monsoon vegetation.

900m (approx.) contour

Approx. limit of monsoon-affected areas

Presence of pair(s): *C. m. erlangeri*

Presence of pair(s): *C. m. melanura (light morph)*

BLACKSTARTS IN SOUTHERN OMAN

by
Graham Bundy

INTRODUCTION

Two races of Blackstart *Cercomela melanura* occur in Arabia, the pale ash-grey and white nominate form in arid Palaearctic desert regions and a dark, smoky-grey form *C.m.erlangeri*, in areas of higher humidity in the south and west (*Figure 1*). In southern Oman (Dhofar) both forms occur in a 300km. long range of hills between the South Yemen frontier and about 55°E (*Figure 2*) but are ecologically and thus reproductively isolated. The peculiarities of the situation in Dhofar are the result of a localised summer monsoon, unique in Arabia, the moisture brought by the monsoon being primarily responsible for the vegetation, seasonally green, which characterises the hills near the coast. In western Arabia, where rainfall is less localised on higher ground between South Yemen and the Hejaz (around 23°N) dark Blackstarts are said to intergrade towards the northern end of the Hejaz range with the nominate form (Meinertzhagen 1954) but this is not clear in British Museum specimens and requires further study. In North Yemen it breeds mostly between 500 and 1500 metres on stony, bushy hillsides (Cornwallis & Porter 1982) on west-facing slopes but extends to east-draining wadis on the arid side of the mountains (Phillips 1982); further study is required there to ascertain whether the highland plateau forms an ecological divide between two morphologically distinct forms. In Dhofar the limit of the monsoon-affected areas is fairly abrupt and can be mapped with a fair degree of accuracy (*Figure 2*). The ecology of the region has been dealt with in some detail by Sale (1980) while the avifaunal affinities have been outlined by Gallagher and Woodcock (1980). The limits of the distribution shown by dark Blackstarts in this region also illustrates the probable limit of the small Afro-tropical 'faunal-island' created by the monsoon conditions from June through September annually, in an otherwise Eremian arid zone of the Palaearctic. Observations were made from September 1983 to July 1985 principally in the central sector of the Dhofar hills and the Jebel Qara; coverage of the higher, eastern areas, the Jebel Samhan, was minimal because of access dificulties.

MORPHOLOGY AND VOICE

The dark form *C.m.erlangeri* is almost uniformly smoky- grey, generally darker above than below, with a whitish vent and under-tail coverts. The closed wing shows a coppery 'panel' with rusty-brown edgings to the remiges. The pale ashy-grey and white nominate form is almost white below and, in fresh plumage, exhibits a whitish wing 'panel' where *erlangeri* is brown. In pale birds the black tail contrasts more sharply with the rest of the plumage but it is not known if this has any significance in display postures. Pale adults were in body and tail moult in July and August looking, at that time, in a poorer and more dishevelled condition. From early June the pale wing 'panel' takes on brownish tones, presumably due to wear. This obvious moult is not apparent in dark *erlangeri* during this period but observations are hindered by the monsoon conditions. Adults have been seen, however, in October and November with abraded rectrices and birds become difficult to find suggesting that most are in moult then. Juveniles closely resemble adults but pale *melanura*, often food-soliciting several weeks after leaving nest-holes, retain some darker grey edgings to mantle feathers. This disparity in appearance between two closely allied forms is another example of Gloger's Rule where races tend to be darker in wetter or more humid environments than in drier regions.

With the possible exception of an arrested post-nuptial moult and protracted breeding season in *C.m.erlangeri* little difference in biology could be detected in the two forms. The songs were considered to be marginally different but this could be merely local variation. The song is a

BUNDY, G. Blackstarts in Southern Oman. *Sandgrouse* 7: 43-46

short, mellow, throaty utterance, vaguely trilling in quality but difficult to commit to paper. Dark *erlangeri* birds were noted as singing with a slightly more trilling quality than the desert birds, with emphasis on first and last notes: **"ch-lulu-we"**. In the pale form, which was heard more often and tended to breed in smaller territories, song sounded consistently like **"che- we-we"** with three or four notes equally emphasised. There was inevitably some variation but the general patterns of songs was quite consistent and may be an additional isolating factor.

ECOLOGY

Sale (1980) divided the mountain regions of Dhofar into five vegetation zones from the wooded, south facing slopes across plateaux with varying amounts of scrub to open, rainless desert. Blackstarts breed on, and seldom stray far from (a) bushy, south- facing areas affected by the summer monsoon and (b) arid, northward-draining wadis on the fringe of the desert where rainfall averages less than 100mm. annually. *C.m.erlangeri* is a characteristic bird of the former and *C.m.melanura* is found exclusively in the latter. The summer monsoon affects the coastal regions, especially the south- facing escarpment and some ravines which intersect the range. These slopes in particular are well-wooded but there are cliffs, rocky ravines and scree-slopes with a good scattering of trees and scrub. Dark Blackstarts inhabit these areas from the foot of the escarpment to the highest crags. The plateaux of the Jebel Qara to the north of the Salalah coastal plain where most observations were concentrated, are affected by the monsoon mists. There are extensive grasslands after the monsoon with some scrub and scattered trees; on these plateaux which form a barrier between the two races and thus an ecological divide, Blackstarts are rare. Out of range of the annual monsoon-mists these table lands are arid, open undulating stony deserts with almost no vegetation. It is in the sometimes spectacular ravines which carve into the arid parts of the jebel, as well as in the wadis which drain northinto the desert plains, that *C.m.melanura* is locally resident. It is absent from open desert as it requires wadi courses, preferably with cliffs on at least one side, or boulder-strewn slopes nearby, and is seldom found far from a scattering of *Acacia* trees. Locally it is found around low cliffs flanking small villages where it freely uses artefacts and forages among livestock. Isolated pairs are found in open desert where rocky outcrops and some scrub exist but these are rare in Dhofar north of the jebel areas. Blackstarts were rarely seen away from their respective breeding places, the two forms were never seen together and no intermediate examples are known from this region.

Breeding pairs of *erlangeri* were fairly evenly distributed over suitably rocky and wooded slopes. Only in one small area - a narrow ravine at Rawri Khawr - were two pairs detected in close proximity. Pale birds in desert wadis however, probably because of the localised nature of suitable ground, were found in small 'clusters'. Observations in two areas of Wadi Haluf between March and June 1985 showed that one sector of 1.5km., had six pairs while another, further south and extending for about 1km., had four pairs. Around Mudhai village, some 40kms. north of the jebel, three pairs were present along about 500 metres of low cliff bordering a small settlement. Dark *erlangeri* seemed to have larger territories and only pale desert-dwelling *melanura* regularly showed territorial competition. Where Mourning Wheatears *Oenanthe lugens* were present in arid wadis, they were seen to chase off pale Blackstarts and inter-specific competition may be an important factor in the dispersal and density of breeding *melanura*. In some suitable-looking areas, *e.g.* the upper reaches of Wadi Ayun where two or more pairs of Mourning Wheatears were present in less than 1km. of dry wadi-bed, Blackstarts were absent. Mourning Wheatears are not confined to the desert wadis; it is one of the very few principally Eremian species to extend across the stony, lightly vegetated monsoon-affected plateaux. The Mourning Wheatear proved to be rare in *erlangeri* habitats and no competition with that form was recorded.

BREEDING SEASONS

No significant differences could be detected between the behaviour of the two populations of

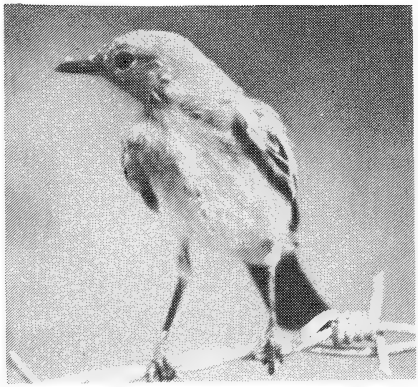


Plate 1 *Blackstart pale morph Cercomela melanura melanura Southern Oman, June 1985.*

Photograph G.Bundy

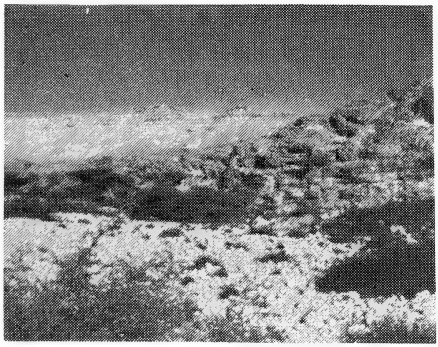
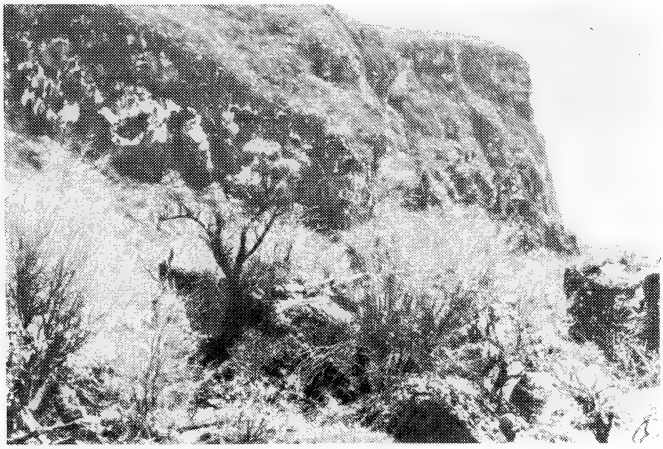


Plate 2 *Breeding habitat Cercomela melanura melanura : arid wadi, Southern Oman.*

Photograph G.Bundy

Plate 3 *Breeding habitat Cercomela melanura erlangi : monsoon- affected rocky slopes, Southern Oman.*

Photograph G.Bundy



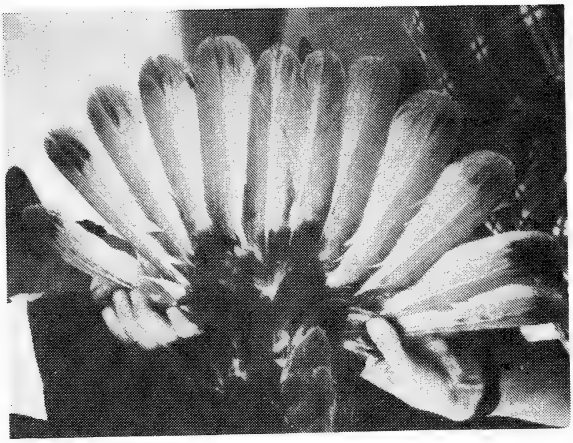


Plate 4

Unbanded tail of dark phased adult Long-legged Buzzard Buteo rufinus. Eilat, spring 1984.

Photograph W.S.Clark

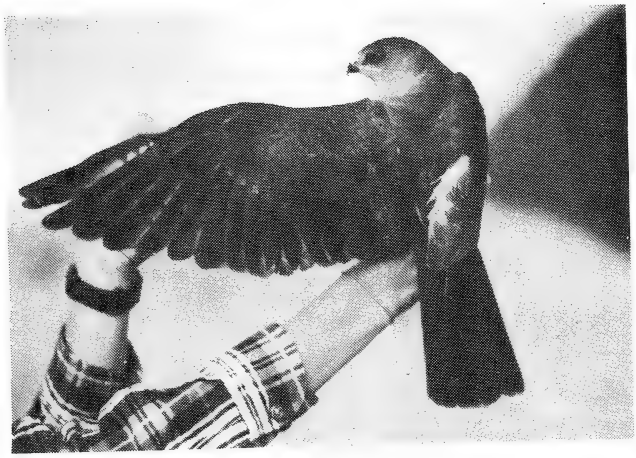


Plate 5

Adult male Levant Sparrowhawk Accipiter brevipes. Eilat, spring 1984 (note pointed wing).

Photograph W.S.Clark

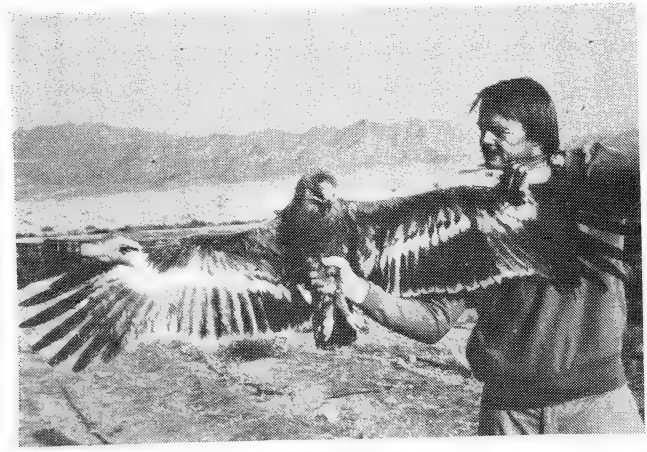


Plate 6

Bill Clark holding immature Steppe Eagle Aquila nipalensis Eilat, spring 1984.

Photograph C.Schultz

Plate 7

Black Bush Chat Cercotrichas podobe caught at Eilat, June 1985

Photograph H.Shirihai

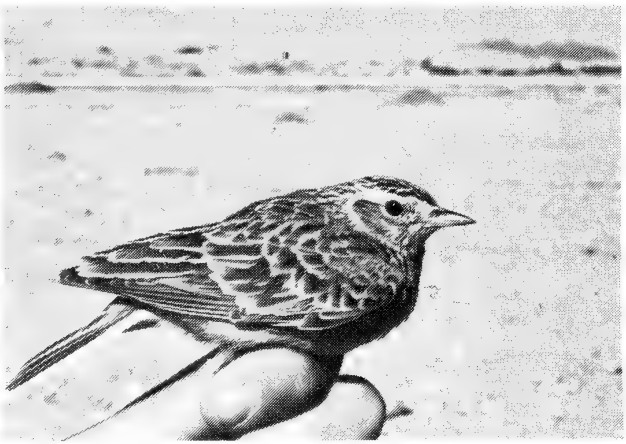


Plate 8

Small Skylark Alauda gulgula Eilat, December 1985.

Photograph H.Shirihai

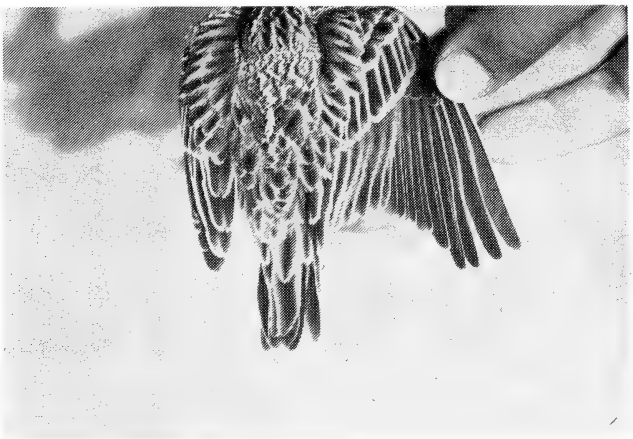


Plate 9

Small Skylark Alauda gulgula showing wing and tail projections. Eilat, October 1984.

Photograph H.Shirihai

Plate 10 *Small Skylark Alauda gulgula crouching on the ground, Eilat, October 1984.*

Photograph H.Meyer

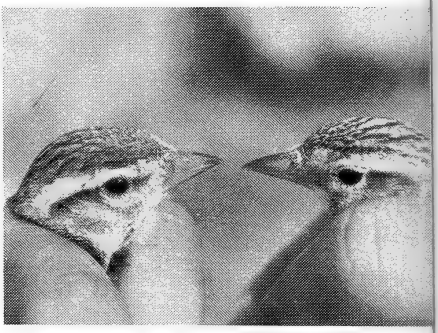
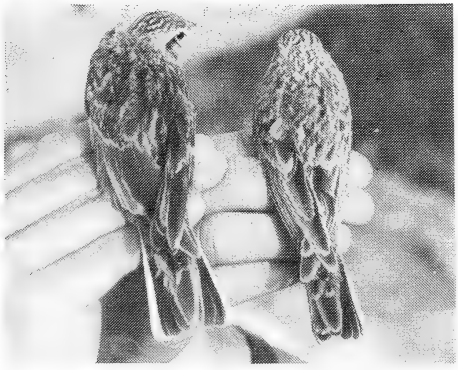


Plate 11 *The heads of two races of the Short-toed Lark: left Calandrella brachydachtyla dukhunensis; right C.b.hermonensis Negev Desert, Israel, November 1983.*

Photograph H.Shirihai

Plate 12 *Rear view of the same two larks C.b.dukhunensis left and C.b.hermonensis right. Negev Desert, Israel, November 1983.*

Photograph H.Shirihai



Blackstarts. There is suggestive evidence that the breeding season of *erlangeri* might be more protracted than that of *melanura* and this may be correlated to the monsoon period (mid-June to mid- September) when dramatic changes take place in its immediate environment. Both forms begin song and pair-formation in early February. Laying, in some pairs at least, must start in mid- February since both forms have been seen feeding unfledged young from 1 March. Pale *melanura* have been noted feeding fledged young in late April at Mudhai and re-visiting nest holes in the same territory on 4 June but, as mentioned above, are in moult from mid-June and have not been suspected of breeding thereafter. Dark morphs however, were seen carrying food (small caterpillars and winged insects) presumably to hillside nests above Arzat on 28 June while Walker (1981) records evidence of breeding in the same region as late as 27 September. It is not known what effect, if any, the summer monsoon has on breeding *erlangeri* but a more protracted breeding season seems probable in a better vegetated and more diverse ecosystem. No quantative data exists on local abundance of invertebrate prey in this region but it seems reasonable to assume that the green monsoon-affected areas would be richer than the near rainless desert to the north. An indication of this might be the arrival over the hills, especially during the monsoon period, of insect swarms (unidentified) and feeding swifts from coastal breeding colonies, probably *Apus niansae*. The relative scarcity of dark *erlangeri* from late September through to November is possibly due to arrested moult (June to August in *C.m.melanura*) after a protracted breeding season but this is speculation and requires further study.

DISCUSSION

The existence of distinct and segregated populations of Blackstarts in southern Oman illustrates the zoo-geographical divisions in south-western Arabia. Afro-tropical species in Dhofar are almost entirely, like dark Blackstarts, confined to the monsoon-affected areas. Another dark form, the browner *C.m.lypura* occurs in north-east Africa.

With the exception of the two forms of Blackstart, the only species widespread in both green and arid regions of Dhofar is the Black-capped Bulbul *Pycnonotus xanthopygos*. The Palestine and Shining Sunbirds *Nectarina osea* and *N.habessinica* extend into some arid wadis where vegetation is suitable for their needs but they became rare north of the jebels. Since 1982 the eastern form of the Palm Dove *Streptopelia senegalensis cambayensis* has spread westwards along the Arabian Gulf to Dammam (50°E) (J.Palfery *pers. comm.*) while in Oman it has, since 1983, begun breeding as far south as Thumrait (18°N.54°E) taking up niches in man-made 'developing' areas. The Thumrait birds are now breeding only 40kms. north of the jebel edge where its Ethiopian relative, nominate *senegalensis* extends from the coastal plain, through the monsoon-affected parts of the jebel to the desert fringe. A parallel situation with Blackstart may soon exist if the southward spread continues except that eastern *cambayensis*, separable in the field (e.g. Cramp & Simmons 1985), and its African con-specific form, may attempt to share the arid areas of overlap while there is no evidence that the two Blackstarts have ever been in competition.

Although south-western Arabia is sometimes included in the Ethiopian or Afro-tropical faunal region: it includes enough Palaearctic elements to exclude it but enough Afro-tropical species to exclude it from the Palaearctic (Diamond 1985). Ethiopian intrusions appear to be localised to favoured areas of higher rainfall and vegetation throughout the south-west (M.C.Jennings *pers. comm.*) and Dhofar provides another example of this. Throughout the Dhofar region about 61 species breed (excluding the cosmopolitan Osprey *Pandion haliaetus* and six seabird species breeding on coastal cliffs and offshore islands) of which some 23 (37%) are generally considered Ethiopian elements. Within the monsoon-affected areas about 35 species breed and the Afro- tropical proportion increases to around 63%. The region in south- western Arabia where Afro-tropical elements predominate seem to be only fragmentary, ecologically isolated and forming faunal 'islands' in an otherwise arid region.

ACKNOWLEDGEMENTS

Thanks are due to M.C.Jennings for making available recent data from the Arabian Atlas scheme which assisted in preparing the all-Arabian distribution map and to Mike Everett for help in preparing the map.

SUMMARY

Two forms of Blackstart breed in the same range of hills in southern Oman but remain ecologically and thus reproductively isolated. A similar situation in western Arabia, should the two forms overlap there, would suggest that speciation might be well advanced. The present distribution of the two easily recognisable forms in Dhofar is mapped, the morphology, ecology and local breeding seasons are described. There is suggestive evidence that the dark form breeding in monsoon-affected areas has a more protracted breeding season with a correspondingly later moult than the pale desert-dwelling form. The possible faunistic significance is discussed and a near-parallel case, emerging with the expanding range of eastern Palm Doves, is given. *Plate* 1 reproduces the nominate form of the Blackstart and *Plates* 2 and 3 illustrate typical habitats of the two forms of Blackstart inhabiting southern Oman

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THE SMALL SKYLARK, A SPECIES NEW TO ISRAEL AND THE MIDDLE EAST

by

Hadoram Shirihai

INTRODUCTION

During the early morning hours of 28 September 1984 in the northern fields of the Kibbutz Elot near Eilat, Israel, whilst releasing birds from mist nets I caught sight of two unusually small larks flying away and calling with an unfamiliar monosyllabic call. I did not locate the larks again that day but did see one on the following day and thereafter I repeatedly saw them up to 13 October. I checked through what little literature was available to me and began to wonder whether the birds might be Small Skylark (also known as Eastern, Lesser or Oriental Skylark) *Alauda gulgula* but I was unable to substantiate this. However, on the 14 October 1984 one of the birds landed near to a net to feed and I was able to coax it into the net. With the bird in the hand, I felt sure that the only possible identification was indeed Small Skylark. The bird was small (wing 91.0mm. tail 55.0mm) and it was clearly not a Skylark *Alauda arvensis*.

With the permission of the Nature Reserves Authority the bird was caged for one day so that it could be studied, photographed and shown to other ornithologists. The bird took food and water and was released 24 hours later after its identification as a Small Skylark had been confirmed .

To my surprise, during the last few days of October, more Small Skylarks appeared in a particular spot in the fields. Nets were set in an attempt to catch the birds and by 11 November seven had been caught. All the birds present then appeared to have been ringed but on 22 November an unringed one was seen . I concluded, therefore, that up to that time nine birds had occurred at Eilat.

These particular birds were present in the northern fields of the Kibbutz until 15 December 1984 after which date they had all disappeared but on 22 December I discovered a group of eight Small Skylarks in a melon field some distance away and I was able to see that only one of these was ringed. This group was associated with Skylarks and Crested Larks *Galerida cristata*. Attempts were made to catch these birds and on 16 January 1985, one was caught. Strong winds prevented further trapping at this site but from January to mid-April some of these birds moved to the northern fields where the first birds had been caught and two new birds were eventually trapped and ringed, bringing the total number ringed to ten.

In the autumn of 1985 the Small Skylark re-appeared at Eilat on 1 October, two days later than in 1984. The maximum number of birds seen by the end of December was ten. One of the birds was seen to be ringed and presumably was one of the birds from 1984.

Whilst in the fields I observed the birds continuously, comparing their behaviour with the Skylark and the other larks that were present. All the birds caught were examined, measured and photographed and the accumulated data was compared with the literature.

IDENTIFICATION IN THE HAND

The Small Skylark is a small to medium-sized lark with a short tail and wings, the tarsus and bill being relatively long.

Soft Parts

The bill is small but compared to that of the Skylark it looks long, thick and pointed (in profile

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bill length is half that of the head). The upper mandible is brown to dark grey. The lower mandible is horn grey, and only the tip has the same colour as the upper mandible. The iris is brown and the eye ring whitish. The tarsus and the toes are pale flesh coloured. The soles of the feet are paler and the claws are pale horn.

Head

There is a whitish supercilium starting at the base of the bill, narrow at first, broad and prominent behind the eye then tapering to a point 10mm. behind the eye. Lores and chin are whitish/pale brown. The ear coverts are pale brown to rusty, slightly streaked with darker brown and encircled by a blackish stripe starting under the eye. The feathers of the crown are blackish/dark brown with buff fringes producing a streaked effect. When raised these crown feathers create a small crest. The throat is buffish-white; the lower cheek is spotted dark brown but there is no clearly defined moustachial stripe. The nape is greyer than the crown.

Underparts

These are light sandy coloured, the breast and even more so the flanks, are narrowly and markedly streaked dark brown. This pattern shows much individual variation. Some specimens have narrow and delicate streaks while others have relatively broader ones. The belly is paler and has some sandy colour in it. The vent and undertail coverts are pale sandy coloured.

Upperparts

The dominant colour of mantle, back and scapulars is blackish to dark brown, with feather edges grey/sandy. The rump and uppertail coverts are more rusty, and only the centres of the feathers are dark brown.

Upperwing

The greater coverts are dark brown, broadly edged and tipped sandy-brown (the inner ones are paler, and the outer ones more rusty). The median coverts are similiar in colour to greater coverts, but a shade rustier. The lesser coverts are dark brown with edges rather greyer than the median and greater coverts. The primary coverts are dark brown, with the outer webs rusty-coloured and the tips sandy. The alula is dark brown and only the outer web has a rusty fringe. The tip is sandy. The first primary is thinner and shorter than the primary coverts and its inner web is a varying shade of grey whilst its outer web is sandy white. The primaries and secondaries are dark brown, all having rusty outer webs (0.5-2.0mm. wide) except the second primary which has a pale sandy outer web. The tertials are dark brown and the outer edges are rusty to pale sandy. The secondaries and primaries 7-10 have a notched tip. Primaries 6 to 10 (sometimes 4th and 5th) have rather contrasting sandy tips 1-2mm. wide forming a trailing edge which is less noticeable on the secondaries.

The underwing - the coverts are whitish to sandy. The axillaries are rusty to dark brown and the remiges are grey.

The tail - the rectrices are dark brown. The first and second outer have light edges and the outer webs are sandy coloured; the third has only a sandy tip. The fourth and fifth have sandy narrow edges to the outer and inner webs. The fringes of the two central tail feathers are wider and shaded sandy/rusty.

Measurements

TABLE 1 presents measurements taken from 10 Small Skylarks caught at Eilat in the autumn and winter of 1984/85 and compares these measurements with those of Small Skylarks (race *inconspicua*) and Skylarks.

TABLE 1 MEASUREMENTS OF SMALL SKYLARKS COMPARED TO SKYLARK

	Small Skylark *A.gulgula.* Ten specimens at Eilat 1984/85 (H. Shirihai)	Small Skylark *A.gulgula inconspicua* from Baker (1926) Dementiev and Gladkov (1970) and Ali & Ripley (1972)	Skylark *A.arvensis* from Svensson (1984) and Shirihai (1983-84: *pers. obs.)*
Wing	89.0 - 98.5	m. 89.0 - 101.0	m. 96.0 - 119.5
	(A = 93.5)	(A = 93.5)	(A = 111.0)
		f. 86.0 - 98.0	f. 98.0 - 112.0
		(A = 92.0)	(A = 108.0)
Tail	54.5 - 61.0	49.0 - 68.0	65.0 - 75.0
	(A = 56.7)		(A = 71.0)
Tail difference (outer to inner feathers)	2.0 - 6.5		7.0 - 11.0
	(A = 3.7)		(A = 9.5)
Tail tips to under tail coverts	21.0 - 26.0		
	(A = 24.8)		(A = 22.0)
Tail tip to upper tail coverts	16.0 - 23.0		
	(A = 19.7)		(A = 21.0)
Bill to skull	15.0 - 16.5	m. 15.0 - 17.0	14.0 - 16.0
	(A = 15.8)	f. 16.0 - 17.0	(A = 14.5)
Bill to feathers	9.8 - 11.5		
	(A = 10.4)		
Bill depth (at nostrils)	4.2 - 5.0		4.2 - 5.3
	(A = 4.6)		(A = 4.9)
Bill width (at nostrils)	4.2 - 5.2		4.3 - 6.0
	(A = 4.5)		(A = 5.1)
Tarsus	23.0 - 25.0	21.0 - 26.0	24.0 - 28.0
	(A = 24.2)	(A = 23.5)	(A = 25.5)
Tarsus thickness (at middle)	1.1 - 1.3 x 1.9 - 2.0		
	(A = 1.17 x 1.98)		(A = 2.2 x 1.5)
Footspan (without claws)	26.0 - 29.0		
	(A = 26.8)		(A = 29.0)
Footspan with claws	41.0 - 52.0		
	(A = 43.5)		(A = 48.0)
Hindclaw	11.0 - 21.0		12.5 - 17.5
	(A = 14.0)		(A = 16.2)
Middle claw	5.5 - 7.0		6.0 - 8.0
	(A = 5.9)		(A = 7.0)
Inner claw	3.0 - 5.0		4.5 - 6.0
	(A = 4.2)		(A = 5.5)
Outer claw	3.2 - 5.5		3.5 - 4.9
	(A = 4.1)		(A = 4.0)
Weight (grammes)	19.5 - 26.0	m. 24.0 - 30.0	(A = 40.0)
	(A = 22.6)	f. 24.0 - 29.0	

A = average (or mean)
All length measurements in millimetres

Wing Formulae

Average lengths from 10 specimens of the Small Skylark, Eilat 1984/85.

Primaries (numbering outermost inwards)		*A.arvensis* (H.Shirihai)
1 9.5 - 12.0 mm. shorter than longest primary covert		13.0 -18.0 mm.
2 1.5 mm. less than wing point		-2.5
3 longest (2nd and 5th occasionally)		
4 longest (2nd and 5th occasionally)	2 to 5 emarginated outer webs of primaries	
5 1.3 mm. less than wing point (range 0 - 5.0 mm.)		7.0 (5.0 - 9.5)
6 -8.3		-17.0
7 -15.4		-24.0
8 -19.1		-27.0
9 -21.5		-31.0
10 -23.7		-23.0
Inner secondaries 14.3 mm. less than wing point		-25.0
Tertials 3.2 mm. less than wing point		-16.0

Tail Pattern

The main difference in the tail pattern of the Small Skylark compared to the Skylark is in the colour of the outer rectrices: sandy brown to pale rusty on the Small Skylark and whitish on the Skylark.

Sexing

There is a difference in the lengths of the wing and tail between the sexes and a slight difference in the length of the bill and tarsus (Ali & Ripley 1972; Dementiev & Gladkov 1970).

	Male	Female
Wing (mm)	90.0 - 101.0	86.0 - 98.0
Tail (mm)	58.0 - 68.0	49.0 - 58.0
Bill (mm)	16.0 - 17.0	15.0 - 17.0
Tarsus (mm)	22.0 - 26.0	21.0 - 25.0

The measurements of the Small Skylarks caught at Eilat suggest that five were mala and five female.

Moult and Age

I could not find any well-documented information on ageing or the sequence of moult of the Small Skylark. I assume that ageing as well as the moult sequence in the autumn is similar to that of the Skylark as detailed by Svensson (1984), Ginn and Melville (1983) and Dementiev and Gladkov (1970). They note that both the adult and the juvenile have a full moult in the summer (July - September) and that after it, ageing is rather difficult. Zarudnyi (1916) points out that with the Small Skylark the adults moult in July - August while the juveniles start their moult as soon as they gain independence from the adults.

The specimens of the Small Skylark caught at Eilat in autumn 1984 had fresh remiges with hardly any wear. The fringes of the primaries were pale and the first was on average 0.6mm. shorter than the outer primary covert. In addition to that, the first primary of all birds trapped was pointed with a pale edge. These details are consistent with first year birds of Skylarks. All specimens seen between January and April 1985 appeared worn and faded, although the wear was less apparent in the remiges. The crest was longer and more protruding compared to that of the specimens in autumn plumage seen in October - November 1984.

SUMMARY OF IDENTIFICATION IN THE HAND

The Small Skylark is similar to the Skylark but its separation is not difficult in the hand. The main differences are in the length of the tail and wing and in their respective wing formulae. The wing tip of the Skylark is very much longer in relation to the tips of the inner secondaries and tertials than the Small Skylark. The measurements of the Small Skylark are markedly smaller than those of the Skylark with hardly any overlap. The sandy-brown/rusty colour of the outer edges of the remiges and the edges of the coverts is a striking feature of the Small Skylark. The colour of the outer edges of the retrices also differs, being sandy/rusty on the Small Skylark and white on the Skylark. There is a marked difference in their weights - the Small Skylark weighs on average 15gm. less than the Skylark.
Plates 7 to 9 depict some of the birds caught at Eilat.

IDENTIFICATION IN THE FIELD

The Small Skylark appears in the field as a typical lark, with dark rusty upperparts, streaked breast and pale underside. It has a relatively long and thick bill with a pointed tip. The tip is shortish and the legs relatively long. In colour it resembles the Skylark but in shape and flight, the Woodlark *Lullula arborea*. Sometimes from a distance it appears as a Short-toed Lark *Calandrella brachydactyla* or Lesser Short-toed Lark *Calandrella rufescens*. The following features are useful in its field identification:-

Silhouette and size : size is similar to Woodlark (c.160mm.) and smaller than Skylark (c.185mm.). The bill seems small, but compared with that of Skylark and Woodlark it is longer and thicker, its length being half the size of the head when in profile. From the side the head looks rather flat almost in line with the bill. There is a short crest that occasionally protrudes giving the head a pointed shape. The tail looks relatively short compared with the Skylark's and protrudes less beyond the wings. Compared with the Woodlark it is longer and protrudes more. The wings are rather short and the distance between the tip of the tertials and the wing tip is very short, averaging 3.2mm.(sometimes equal). In the Skylark this distance averages 16mm.

Head: There are dark spots on the forehead and top of the head. The cheek is a little rusty. The lores and supercilia are whitish and quite striking. The nape is grey to rusty-brown and also streaked. The throat is whitish and the moustachial stripe hardly exists as compared to Skylark. The Small Skylark differs from the Woodlark in having a less prominent crest and the supercilia do not meet at the back of the head. In the field the bill looks brownish-grey to its tip. The lower mandible is a pale greyish-yellow.

Upper parts: In the field the dark brown feathers on the back and scapulars are noticeable for their sandy fringes. The coverts are dark brown and have sandy/rusty edges. There is a contrast between the lesser coverts, which are pale grey and the median coverts and greater coverts, which are a browner/rusty colour. A significant difference compared with both the Skylark and the Woodlark is the rusty colour along the outer edges of the remiges giving the impression of a very rusty-coloured wing. The rump is pale rusty.

Tail: The tail looks short and is slightly forked. The sandy colour of the outer rectrices is sometimes difficult to see but in flight they look rather sandy compared with the Skylark which has white outer tail feathers. The Woodlark has a very short-looking tail, less forked with white edges to both outer and inner rectrices, which is quite different from the Small Skylark.

Underparts: The breast is sandy-yellow and has delicate narrow dark brown to medium brown streaking. The belly is sandy-white, with no streaking on the flanks. The legs are fleshy pink to yellow and quite long.

Identification in flight

In flight, the wing of the Small Skylark seem short and rounded and the tail looks rather short too. The stripe along the trailing edge of the wing is less noticeable compared with the Skylark's and its brown-sandy or rusty colour is clearly different from the white and brown

contrasting trailing edge of the Skylark.
The flight of the Small Skylark is very slow, and it tends to hover and flutter its wings while low over the field. The flight silhouette is rather like that of the Woodlark. Where flying high it is faster and reminds one of the flight of a Short-toed Lark or a Skylark.
Calls

The calls of the Small Skylark are probably its most diagnostic feature and are quite different from that of the Skylark and the Woodlark. They resemble a monosyllabic **'prrrt'** or **'baz'** and are uttered in a staccato fashion reminding one of the calls of Richards Pipit *Anthus novaeseelandiae.* Usually one to three calls are made at intervals of one to two seconds.

THE PRINCIPAL FEATURES OF IDENTIFICATION IN THE FIELD

The Small Skylark is not difficult to identify. Its call commands attention and is different from that of any other lark.The Small Skylark is close in colour to the Skylark and somewhat similar to the Woodlark. Size is one of the most important features that differentiates it from Skylark. The Small Skylark is small and squat and its tail and wing are clearly shorter than that of the Skylark. The tip of the tertials is only a little shorter (sometimes equals) the wing tip (much longer in that of the Skylark). When standing, the rusty shade of the wings and cheek are apparent, whilst the sandy edges of the tail as compared to the white of the Skylark, are noticeable. In flight the short tail and short rounded wings, are apparent, whilst there is an absence of any noticeable white trailing edge to the wing. The Small Skylark has a longer white supercilium, a more protruding crest and a longer tail (with white edges to the inner rectrices) than the Woodlark and it has rusty coloured remiges which the Woodlark lacks. The special pattern of the Woodlark's primary coverts is not found in the Small Skylark and flight and calls differ too. It differs from the Lesser Short-toed Lark and the Short-toed Lark by its thicker and more prominent streaking on the breast and its noticeably longer and narrower bill; it is also a little larger and squatter in comparison and its pattern of streaking is quite different. One may say that the colour and build of this lark, which is not dissimilar to various other larks, particularly Skylark, is not striking. Principally its call and different behaviour are features that would single it out, prompting the alert bird-watcher to look for all other characteristics that would confirm its identification.

BEHAVIOUR AND DAILY ROUTINE

The first group of Small Skylarks observed in October and November 1984 appeared to follow a definite daily routine in the small area in which they were concentrated. They spent their time in a patch of desert and in damp ploughed fields as well as green irrigated fields with fodder crops such as lucerne which was growing to a height of 20-40cm. They mostly preferred the drier areas with low and sparse growth which was nearer the ringing station. They ranged over a rather small area of 330 x 700 metres which is surrounded by dry desert. I checked wider afield and other types of land in the vicinity but found none there. During the early morning hours, they would arrive from their roost flying in high and making a lot of noise which could be heard from quite a distance. Upon nearing the fields they would suddenly lose height and land to feed.

Most of the day they would feed on seeds at various points in a small area and it seems that some of the birds increased their body weight after a while. In a continuous followup of two birds that were caught several times during 10 days, their weight increased by 4gm. (a 17% increase) averaging 2% per day. The behaviour of the Small Skylark was rather different from the Skylark's. The Small Skylark was less cautious in the field, it did not hide and it could sometimes be approached to a distance of four metres when feeding. If disturbed it flew a short distance and did not hide upon landing, often returning to its original position within a short time. In similar circumstances Skylarks would fly a greater distance and would tend to hide, freezing when alighting and crouching on the ground in an unobtrusive way. Whilst feeding in the fields the Small Skylark tended to stay in twos or threes whilst the Skylark tended to stay in a flock. Whether feeding or flying there seemed little interaction between the two species and each would fly in a

different manner and in a different direction and even whilst feeding no contact between the species was detected. During October and November, in the field adjacent to the station, there were days in which a great concentration of larks of seven different species was seen feeding together - Small Skylarks, Skylarks, Short-toed Larks, Lesser Short-toed Larks, Calandra Larks *Melanocrypha calandra*, Crested Larks and Woodlarks. The behaviour of the second group of Small Skylarks (December 1984 and January 1985) was slightly different to the first in the following respects: They were more worried and shy, hiding amongst the melon plants and tending to gather with the Skylarks and Crested Larks. Besides that they did not move away from the area and would feed and roost in the same place.

An interesting occurrence took place on 1 and 11 November 1984 during attempts to catch them in nets erected close to the ringing station. Two birds were caught and were waiting to be ringed in bags, hanging on the station wall. When I tried to coax more birds into the net, the birds in the bags, hearing the approach of their mates, emitted what seemed to be distress calls which caused the free birds to change course in mid-air and avoid the nets. After realising this I placed the caught birds in the car at a distance of 100 metres from the nets and then succcessfully coaxed the free birds into the nets without any trouble.

DISTRIBUTION AND HABITAT PREFERENCES

The Small Skylark is found in large parts of Central and South East Asia. It is very common in Soviet Central Asia, Afghanistan and the Indian Sub-continent and replaces the Skylark of the Central and Western Palaearctic. The two species meet during the autumn and winter in Central Asia. Much of its habitat is desert, semi-desert and arid areas but it does occur in wet and green areas typical of the Skylark's habitat. It is often associated with the slopes of the valley sides and at river mouths at altitudes varying between 1,500 and 3,500 feet. It is largely resident in many of the areas it inhabits and migration is often limited to a movement from high to low altitudes. Some northern populations have been found to migrate short distances from their breeding areas. Breeding usually occurs from the end of March to mid-May but some races breed over the months of May to August. Vaurie (1959) recognised eleven races the most westerly of which, *inconspicua* breeds as far west as Iran. This race is in fact migratory although its movements and winter quarters are not known. It is considered that the birds recorded at Eilat were of this race as the description matched that given by Baker (1926), Dementiev and Gladkov (1970) and Ali and Ripley (1972).

The bird has been sighted a few times in South East Iraq although it appears not to have been previously recorded in the Western Palaearctic (Sharrock 1978). Its appearance at Eilat brings it some 3,000 km. west of its most westerly known breeding areas.

The sudden appearance of the Small Skylark in Eilat as a possible migrant and a wintering visitor poses a number of questions with no easy answers. I do not consider that the species has previously been overlooked during recent years. I personally have watched intensively at Eilat since 1980 and am sure that this bird with its distinctive call and appearance would have been observed if it were a regular migrant or wintering visitor. Whether the movements are as a result of a population explosion or the need to seek new feeding areas can only remain as speculation until further knowledge is gained.

ACKNOWLEDGEMENTS

I would like to thank all those people who helped me in the field and in my studies, particularly Merav Galaret and Halcyon Wood, also Professor H. Mendelssohn and Nila Shariv of Tel Aviv University and Nina Sebba, Walter Roggeman, Niels Kjillen and Steve Morgan all of whom helped with the preparation of the article. The Nature Reserves Authority sponsored my work at Eilat and my colleagues at the Eilat N.R.A. : Yuval Peled, Eilon Ziv, Oded ben Shafrut, Reuban Hafner and Yechram Shlisinger helped in many ways.I am indebted to Don Parr for help in preparing this article for publication in *Sandgrouse*.

SUMMARY

From the end of September 1984 until April 1985 16 birds identified as Small Skylarks were seen at Eilat, Israel, apparently the first records for Israel and the Western Palaearctic. Ten of these birds were caught and ringed. Notes on their identification in the field and in the hand together with wing formulae and measurements are presented and behavioural differences between them and the other lark species are described, as also is their daily behaviour whilst in the area. Their distribution and appearance in Eilat is discussed and a brief reappearance in the autumn of 1985 mentioned.

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THE SMALL SKYLARK, A NEW SPECIES FOR SAUDI ARABIA

by

G.K.BROWN and J.PALFERY

INTRODUCTION

From October 1984 until March 1985 up to five Small Skylarks *Alauda gulgula* overwintered at Dhahran on the Gulf coast of Saudi Arabia. This is the first Saudi Arabian record of this species. There are two other Middle East records: two birds wintered on the nearby island of Bahrain from 12 November 1978 to 12 January 1979 (F.E.Warr *pers.comm.**) and up to sixteen were recorded at Eilat in Israel from September 1984 to April 1985 (Shirihai 1986). There were also two sightings of possible *gulgula* in northern Oman in November 1977 (Gallagher & Woodcock 1980, Walker 1981).

The Dhahran birds were first noted by J.H.Morgan and JP at dusk on 17 October. We disturbed them as they were going to roost in some sprayfields and were puzzled by their strange calls and behaviour but were unable to identify them. The following afternoon GKB discovered them separately and identified them as Small Skylarks. The birds remained in the same small area throughout the next five months and were also observed by T. and J. Heindel and C. and W. Peterson. They were last seen on 14 March when three, probably four, birds were present and some song was heard.

The Small Skylark replaces the Skylark *A.arvensis* throughout south Asia. Its range extends from south central Asia across the Indian sub-continent to south-east Asia and there are several races, only a few of which are migratory (Ali & Ripley 1983, Harrison 1982, King *et al.* 1975). The nearest breeding area to Arabia is south-east Iran where the species is mainly resident (Scott 1973).

HABITAT

In its breeding range the Small Skylark is a bird of grassy areas and cultivation (Ali & Ripley 1983). In Dhahran the birds spent their entire stay on a series of grassy meadows which were daily irrigated with effluent water from powerful sprinklers. During the first month they showed a preference for a meadow where there were patches of ranker grass and other vegetation up to about twenty centimetres high. They avoided completely another meadow which had a considerable growth of tamarix saplings and bushes. In December the favoured meadow was mown and thereafter the larks began to range more widely among the various meadows, and by the end of their stay they were often found in grassy patches in and around a large reed bed. During the period when the Small Skylarks were present in the sprayfields, Short- toed Larks *Calandrella brachydactyla,* Crested Larks *Galerida cristata* and Skylarks were also present, and direct comparisons were possible with the last two species.

DESCRIPTION

Size and Shape: A small, compact lark, rather heavy bodied and with a short narrow tail. In general it was similar in shape to Wood Lark *Lullula arborea* or to a small Crested Lark, though about 30% smaller than that species and lacking its conspicuous crest. Compared to *arvensis,* both in flight and on the ground, *gulgula* appeared smaller and dumpier, characteristics which

* *This record was not published. Ed.*

BROWN, G.K. & PALFERY, J. 1986. The Small Skylark, a New Species for Saudi Arabia. *Sandgrouse* 7: 55-59

were emphasized by its short tail. *Arvensis* always seemed a taller, more attenuated bird. *Gulgula* has a small crest, similar in size to that of Wood Lark but it was not always very obvious, especially as *gulgula* flattens the crown feathers when uneasy. The medium size bill was equal in length to the loral distance, perhaps longer, and looked identical in shape to that of *arvensis.* In flight the wings appeared broad at the base - broader than in *arvensis* and thus less uniform in width. On the folded wing the primary extension was slight, roughly equal to 1/8 of the exposed tertials, and only two primary tips showed. The most striking structural feature, however, was the short tail. Whereas on *arvensis* the tail length looked equal to the width of the wing at its base, on *gulgula* it was only about 2/3 the wing breadth. The tail also appeared narrow and lacking in bulk.

Plumage: Similar to *arvensis* but more warmly coloured, both above and below. Basically brown above with darker striations which sometimes produced a patchy effect on the mantle, and buffish below with streaking on the breast.

Head: Fine, dark streaking on the crown giving a slight capped appearance at times. in some birds there was a paler centre and the streaks were concentrated in two lateral bands. The nape was paler with finer streaking, a feature which accentuated the capped appearance. The creamy buff supercilia were broad and long; they almost met on the forehead and extended well back onto the nape, thus approaching those of *L.arborea* in length. Behind the eye they were bordered below by a dark line which extended along the top of the ear, broadening towards the rear. The ear was a virtually uniform brown-buff. The lores were buff and similar to the ear. There was a pale, buff/whitish eye-ring. Chin and throat were whitish and usually unmarked, although on some birds slight malar stripes with narrow, whitish sub-moustachial stripes were visible when seen head-on. Sides of neck finely streaked with the streaks almost forming wavy striations. There was a dark, blackish, arrow-shaped patch just above the shoulder where the streaks coalesced. It was not always visible but was especially obvious when a bird adopted an alert posture with head and neck up-stretched.

Upperparts: Mantle and back feathers dark brown with buff edgings. On some birds the buff edgings were either absent or so thin that the feathers formed dark patches on the mantle, roughly triangular in shape with their apices to the rear. The rump was paler than the mantle and back, and there were broader buff edgings to the feathers. The scapulars were also fringed buff.

Tail: Medium brown with buff-white outer edges which were not always easy to see. Undertail feathers dark, except for the outer edges, and contrasting with the pale undertail coverts and vent.

Wings: Brown with buff edgings to the feathers; these edges were whiter on the tertials and sandier on the secondaries and primaries. The lesser coverts were the palest area of the wing, and the median coverts the darkest. On some birds the latter appeared as a dark band on the closed wing, contrasting with the pale lesser and palish greater coverts; on others there was less contrast between the median and greater coverts. In flight a surprisingly broad, buff trailing edge was sometimes visible, usually as the birds landed. This feature was variable and not always seen. Underwing feathers were buffish with darker axillaries and paler secondary tips.

Underparts: Whitish but duller and buffer than on *arvensis.* Buff wash to breast and flanks. Belly paler. Vent whitish. Breast streaked. The streaks were heaviest around the top of the breast where at times they formed a necklace. Above the belly they cut off fairly sharply. There were some streaks on the flanks but they were few, slight and indistinct.

Bare Parts: Iris black. Upper mandible dark horn; lower mandible medium to pinkish horn. Legs pinkish to orangey brown.

Voice: Four calls were noted. Two were common flight calls. The first was a soft **'pyup'** or **'twip'**, similar to the call of Ortolan Bunting *Emberiza hortulana*. This is a call which we have also heard from birds in north-west India. The second was a harsh, buzzing **'pweebjj'** or **'pzeebz'**, the final part of which had a very distinctive twanging quality. It is difficult to

phoneticize and we also noted it as as a nasal, buzzing **'shwerrrk'**. P.D.Round (*pers.comm.*) describes a similar call, which he notes as **'chizz'**, from birds in Thailand. In Dhahran we found both calls diagnostic and the buzzing call especially useful.

The other two calls were less frequently heard. One was a dry *calandrella* - like **'trrp'** which was uttered in flight along with the two more usual flight calls. The fourth call was only heard once: a very soft, rather fruity **'chirrup'**, similar to that of *arvensis* but much quieter and softer. It was uttered by a bird on being flushed.

Song: On 25 October a bird was seen singing in song flight. The song flight lasted about three minutes and was similar to that of Crested Lark: the bird moved slowly forward, drifting from side to side and sometimes circling, in a floppy flight with frequent wing closures. On 14 March song was heard again. A bird sang in an undulating flight at a height of six to ten metres and made a parachute descent at the end of it. The song itself was a sustained warbling not unlike that of *arvensis* except that it included buzzing notes reminiscent of *gulgula*'s distinctive call note. On 11 November a bird twice uttered subsong while perched on the ground. This was a short, quiet, buzzing warble.

BEHAVIOUR

Generally the birds were very shy, skulking and nervous although they did become more approachable for a while once they had settled in the sprayfields; by the spring, however, they were once again very wary. They tended to keep to patches of longer grass or other vegetation where they could hide. When approached, they craned their heads nervously and flattened the crown feathers but did not usually fly until the observer was within about ten metres of them. When finally flushed, they would climb to about ten metres and fly fifty to a hundred metres before dropping to the ground again. They usually landed in or close to cover. On 17 October birds were observed going into patches of longer grass to roost. They landed near the edges of these patches, crouched down and then, with head lowered, scurried like mice into cover and out of sight.

They tended to feed in long vegetation and could slip through the stems of long grass with great rapidity and without revealing their movements. In the open they often ran or walked in a crouched position and in broken ground made use of clods of earth and small tussocks for concealment, sometimes creeping between them, sometimes making a rapid run.

Their flight was typically lark-like: rather floppy and bouncing with frequent wing closures. Sometimes birds would almost hang in the air on spread and quivering wings; sometimes they flew with dangling legs. Before alighting they occasionally hovered briefly like *arvensis* but usually plunged straight to the ground, parachuting down with spread wings and raised tails like Meadow Pipits *Anthus pratensis*.

On being disturbed, they tended to fly higher than the wintering *arvensis*. Whereas the latter did not usually rise to a height greater than five metres, *gulgula* rose to ten metres or more. Even after flying high *arvensis* normally flew low over the grass before finally alighting whereas *gulgula* parachuted straight down. Throughout the period the birds were usually found in pairs and aerial chases often occurred with birds looping, twisting and diving at heights of up to fifteen metres.

The first wintering Skylarks were noted on 7 November and from the middle of that month until the beginning of February there was a flock of sixty or more on the sprayfields. It was noticeable that the *gulgula* tended to avoid the *arvensis*. After the arrival of the latter, they were less often found in what had been their preferred meadow and began to range further afield. The Skylarks may not have been the only reason for this move, however, for about the same time there were some alterations to the habitat and some patches of longer vegetation were mown. Chases between the two species were seen. On 6 December, for example, a Skylark flew at a *gulgula* which was feeding nearby. An aerial chase ensued over some fifty metres during which the Skylark persistently tried to harry the *gulgula* and the latter to outclimb it. During the chase the *gulgula* was joined by another.

Various other interspecific interactions were noted: one bird was chased off by an Isabelline Wheatear *Oenanthe isabellina*, another by a Red-throated Pipit *Anthus cervinus*, and squabbles occurred with White Wagtails *Motacilla alba* though neither species was dominant.

IDENTIFICATION

In the Middle East there are three species of Lark with which *gulgula* could be confused: the Skylark, the Short-toed Lark and the Wood Lark. The distinctions from the Skylark *Alauda arvensis* which we noted at Dhahran can be summarized as follows:

1. *Gulgula* is smaller and dumpier.
2. It has a short, rather narrow tail.
3. It lacks a white trailing edge to the wing. At times a buff trailing edge can be seen, especially as the birds are alighting, but this feature seems variable and is not always visible.
4. Its tail is of a subdued colour with the outer edges buff- white and the centre medium brown. It thus lacks the striking, almost black and white appearance of *arvensis*. In fact it is less striking even than that of *G.cristata*.
5. *Gulgula*'s dark streaked crown sometimes gives it a capped appearance - a feature which was absent from the wintering *arvensis*.
6. The streaks on either side of the neck coalesce to from two small, dark patches. Although not always visible in *gulgula*, these neck patches appear to be absent in *arvensis*.
7. *Gulgula* has longer, more conspicuous supercilia although because of the variability of the supercilia on *arvensis* this is not a consistent distinction.
8. The mantle is darker and more uniform with fewer and less conspicuous edgings to feathers in *gulgula*.
9. On *arvensis* the underparts are cleaner and whiter, a feature which is most obvious in flight.
10. *Gulgula* is very secretive.
11. It tends to fly higher.
12. When alighting it usually drops straight to the ground in a parachute descent.
13. Its two commonest flight calls, the distinctive, buzzing **'pzeebz'** and the soft **'pyup'**, are quite unlike anything uttered by *arvensis*. The latter does have a **'zwee zweep'** alarm call but this lacks the twanging quality of the *gulgula* call.

The small size of *gulgula* together with the dark patches on the sides of the neck might lead to confusion with Short-toed Lark *Calandrella brachydactyla* for an observer unfamiliar with that species. The distinctions are as follows:

1. In *gulgula* the dark patches are on the sides of the neck, not on the breast.
2. It is generally a darker, more heavily streaked bird.
3. The breast is strongly and extensively streaked. On immature *brachydactyla* this streaking is more obscure and is restricted to a band across the upper breast.
4. The tail lacks the contrasting colouring of that of *brachydactyla* with its white sides and dark centre.
5. *Gulgula* has a longer, less stubby bill.
6. It has a small crest which is lacking in *brachydactyla* although the latter does sometimes raise the feathers of the nape.
7. The two flight calls of *gulgula* are quite different from any call of *brachydactyla*.

Confusion with the Woodlark *Lullula arborea* may arise due to the similarities in size and structure, and head pattern. Given satisfactory views, however, the two species can be distinguished on plumage details. Moreover, the call of *L.arborea* is quite distinct.

CONCLUDING REMARKS

Considering the small number of observers in the Middle East, the fact that there have been at least three recent records of Small Skylark suggests that this is a species which has probably been overlooked in the past and which could well occur more frequently than records indicate. Any observer finding a strange looking or sounding small lark should thus consider the possibility of the Small Skylark *Alauda gulgula*.

ACKNOWLEDGEMENTS

We are grateful to Mrs. F.E.Warr for supplying us with details of the Bahrain record, to D.Parr for details of the Eilat record and to P.D.Round for comments on the call of *A.gulgula* in Thailand.

SUMMARY

The overwintering in 1984/85 of five Small Skylarks in eastern Saudi Arabia is documented. A description of the birds is given, together with notes on their behaviour. Distinctions between the Small Skylark and the Skylark, the Short-toed Lark and the Wood Lark are discussed.

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A RECORD OF THE BLACK BUSH CHAT IN SOUTHERN ISRAEL

by

J.C.Eames

On 12 April 1981 M.Cocker, J.Mycock and myself saw a bird in an area of Acacia *Acacia tortilis* scrub adjacent to the Kibbutz field of Yolvata 40km. north of Eilat, Israel, that was unfamiliar to us. It delivered a brief song, best described as a liquid chatter, before diving into thick cover, and was not seen again. The bird had been watched for no longer than two minutes.

The following brief description was noted at the time:

Body size and bulk was similar to Blackbird *Turdus merula*. The tail was graduated and equal in length to the body. The plumage was entirely black, except for white crescent- shaped tips to the underside of the tail feathers, forming a pattern recalling that of a Yellow-billed Cuckoo *Cocivzus americanus.* Orange inner webs to the inner primaries or outer secondaries, formed a wing panel. The bill was black and approximately half the lengh of the head, as measured from the base of the upper mandible to the hind crown. The upper mandible was slightly decurved and the legs were black and the eye was dark.

After later reference to literature and to skins the bird was identified as a Black Bush Chat *Cercotrichas podobe*.

DISTRIBUTION

The Black Bush Chat is an Ethiopian species inhabiting the scrub belt in a broad band running 10-20 degrees north of the Equator from Senegal in the west, east to the Red Sea, breeding as far north as Port Sudan (Archer & Godman 1961). The species also occurs in Yemen and Saudi Arabia, where Yanbu al bahr on the Red Sea marks the most northerly point of its breeding range, where it is an uncommon breeding resident (Jennings 1981).

In 1973 it was recorded for the first time in central Saudi Arabia and is now established as a locally common breeding resident (Jennings 1980). Jennings (1980) also suggests that habitat changes as a result of increased irrigation and cultivation in this area in the last 20 years may be responsible for this expansion of the species' breeding range. It is perhaps possible that this range extension and the occurrence of this individual are in some way connected.

Although the species is considered a lowland resident throughout its range (Cave & Macdonald 1955, Jennings 1980), it has been suggested that the nominate race occurring in Africa, may be a partial migrant, breeding towards 20 degrees north in April and May, and wintering as far south as 10 degrees (Archer & Godman 1961) since they obtained specimens from Ethiopia and Somalia during December, January and February only. However, this may reflect a less dense distribution in the southern part of its range.

RACIAL IDENTIFICATION

Two races of Black Bush Chat have been described. The nominate race occurring in Africa always shows an orange underwing, formed by orange inner webs to the inner primaries. This feature has been cited by Archer and Godman (1961) as a reliable means of separating it from the Arabian race *C.p.melanoptera,* which is said to show a wholly black underwing. However, an examination of 40 skins of *melanoptera* revealed 16 showing some orange on the underwing, the colour, however, being less intense than that of *C.p.podobe*.

Thus whilst the absence of orange indicates *melanoptera*, a bird with an orange underwing could be of either race, though more likely the nominate race, if richly coloured.

EAMES,J.C. 1986. A record of the Black Bush Chat in Southern Israel. *Sandgrouse* 7: 60-61

SUMMARY

A Black Bush Chat *Cercotrichas podobe* was observed near Eilat, Israel, on 12 April 1981. It has not proved possible to determine the race involved. However the race occurring in the Arabian Peninsula has recently undergone range expansion northwards. This is the first record for Israel.

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Since the above note was written it has been drawn to my attention that four records of this species have occurred in or near Eilat, Israel between 1981 and 1985. (H.SHIRIHAI, 1986 Black Scrub Robin *Cercotrichas podobe.* A new species to Israel and the western Palaearctic. *Dutch Birding in press.)* One of these birds is illustated in *plate* 7 (centre pages) Ed.

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THE FIRST EXAMPLE OF THE RUFOUS SHORT-TOED LARK *CALANDRELLA BRACHYDACTYLA DUKHUNENSIS* FOR THE WESTERN PALAEARCTIC, FROM THE NEGEV DESERT, ISRAEL

by

P.R. Colston and H. Shirihai

During the autumn of 1983, HS of the Nature Reserves Authority in Israel examined and ringed over 300 Short-toed Larks *Calandrella brachydactyla* in the western Negev desert at Kziot, Nizana area. This species is a very common and abundant migrant in spring and autumn through Sinai where it is represented by three races, listed here in their order of abundance: 1 *hermonensis* 2 *longipennis* 3 *brachydactyla*.

On the morning of 3 November 1983 a very unusual *Calandrella* lark was caught together with several Short-toed Larks. In the hand the bird was found by HS to be appreciably larger and darker, with a wing of 104 mm, and it had noticeably black legs, whereas all other Short-toed Larks examined at that time had very pale legs, as well as smaller and thinner bills. The bird's identity was puzzling and at that time it was thought to be some unknown species of *Calandrella*. A full account of the bird's plumage, measurements and wing formula was taken together with many colour photographs. It was also photographed in the hand alongside more normal *brachydactyla* for comparison. See *plates* 11 and 12 centre pages. The bird was subsequently taken to the Zoological Gardens of Tel Aviv University, where it was kept in captivity until its identity could be ascertained. The bird lived in captivity for seven months, but it died on 8 June 1984. The specimen was found to be a male, on dissection and was made into a study skin, now kept at the Zoological Museum at Tel Aviv University (specimen number 9905). Meanwhile full details and photographs of the bird were sent to PRC at the British Museum of Natural History (BMNH) Tring who subsequently indicated that it belonged to one of the eastern races of the Short-toed Lark, most probably *dukhunensis* on account of its very long wing, larger proportions and weight of 30 gms., combined with its very dark brown upper parts and more buffy appearance below. According to Vaurie (1959) *dukhunensis* is a heavily pigmented race, which is browner and more buffy below than *longipennis*, while its wing averages larger than in any other race.

In January 1986 HS brought the specimen to Tring where we were both able to make a direct comparison with the very comprehensive series of *brachydactyla* skins present in the BMNH collections and confirm that the bird was a typical example of *dukhunensis* in all respects. Measurements taken by PRC of the bird as a skin are as follows: wing 100 mm; tail 60 mm; bill from feathers 11.5 mm, from skull 14 mm, depth at base, from nostril 7 mm; tarsus 23.5 mm; hind claw 11.0 mm.

Plates 11 and 12 (centre pages) depict the head and rear views of two races of the Short-toed Lark *C.b.dukhunensis* and *C.b.hermonensis*.

DISTRIBUTION

Vaurie (1959), gives the range of *dukhunensis* as Tibet, and Lop Nor to Ala Shan, migrating to India south to about 16°N, northern Burma and eastern China. According to Ali and Ripley (1972), this race probably breeds in Ladakh. It is a common and abundant winter visitor (September to April) from all along the base of the Himalayas, south through the Gangetic Plain and the Peninsula to Kerala. It is less common in Assam and Bangladesh. It is absent in Pakistan and the adjoining arid semi-desert, but virtually replaces the eastern form *C. b. longipennis* in central, eastern and southern India.

COLSTON,P.R. & SHIRIHAI, H. 1986. The first example of the Rufous Short-toed Lark for the Western Palaearctic; from the Negev Desert, Israel. *Sandgrouse* 7: 62-63

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THE SAHARO-SINDIAN ARID ZONE BIRDS

by

Colin J.O.Harrison

INTRODUCTION

It is perhaps advisable to begin by pointing out to those who may complain about the absence of a supporting mass of peripheral references, that this is not an authoritative study of the subject but is intended as a brief, provocative introduction to it.

When the major zoogeographical regions of the world were recognised, primarily on the basis of differing avifaunas, the desert regions of Arabia and North Africa were seen as convenient boundaries. Zoologists studying the richer faunas of the forests and grasslands of Eurasia and Africa recognised the Palaearctic and Afrotropical (previously Ethiopian) regions, and saw in these arid regions a convenient zone, on the northern border of which one fauna petered out into desert sands with another fauna appearing on the southern border. As a result of this, the boundary of Palaearctic and Afrotropical regions is usually represented by a line drawn latitudinally through the middle of these deserts, effectively bisecting the zone and preventing the recognition of it as an entity.

The existence of bird species confined to such arid areas as their normal habitat received relatively little attention. However, other biologists such as botanists and entomologists who habitually studied very large and complex arrays of species occurring in all types of habitats had no difficulty in recognising that they were dealing with a distinct area with its own flora and fauna. They recognised it as the Saharo-Sindian arid zone or region.

It extends from the western side of North Africa to north- western India, and includes Arabia and the southernmost parts of Iran and Pakistan. It is generally of low relief, but in some parts of the Middle East, and particularly in the southern parts of the Arabian peninsula, it has areas of higher ground which sometimes constitute islands supporting relict species closely related to those of faunas elsewhere and not strictly part of the arid-adapted avifauna. Twelve species are listed (*List C*) that appear to be derived from such isolation.

At the eastern end of the zone, in Pakistan and India, some river valleys appear to have provided similar island-type refuges; and species such as the Sind Jungle Sparrow *Passer pyrrhonotus* along the Indus River and the White-naped Tit *Parus nuchalis* with a population extending inland from Kutch and another small population in southern India, are comparable with isolates such as the Iraq Babbler *Turdoides altirostris* and the Grey Hypocolius *Hypocolius ampelinus* in the Iraq delta bordering the arid zone.

The zone is also crossed longitudinally by a series of rivers and gulfs: the Nile Valley, the Red Sea, the Arabian Gulf and Sea, and the Indus Valley. These introduce narrow zones of less arid habitats that allow incursions of species from the surrounding faunal regions - Palaearctic, Afrotropical and Oriental - particularly in the eastern half of the Saharo-Sindian zone, and as a result the situation appears more confused, and the avifaunal limits less obvious.

Another possible cause of confusion in identifying this arid zone is the existence within the Palaearctic region of a cooler Caspio-Mongolian arid zone, bisected by the mountain ranges of the Tien Shan and Altai. Although distinct from the Saharo- Sindian zone it shares with it five species: the Barbary Falcon *Falco pelegrinoides*, the Houbara *Clamydotis undulata*, the Desert Warbler *Sylvia nana*, the Desert Wheatear *Oenanthe deserti* and the Desert Sparrow *Passer simplex*; but with the possible exception of the last they are separate populations recognised on plumage characters as separate subspecies. This cool arid zone is separated from the Saharo-Sindian by a dry montane zone extending from Afghanistan to Turkey and having its own endemic avifauna in addition to more widespread montane species.

HARRISON, C.J.O. 1986. The Saharo-Sindian Arid Zone Birds. *Sandgrouse* 7: 64-70

This Caspio-Mongolian desert zone lies at the upper, north-eastern, end of Vaurie's "Eremian" region. The latter name infers aridity and has in recent times been used by Udvardy (1974), following Lattin (1957), as a synonym of 'arid' and 'desert' and as applicable to any dry area in the world. However, when Vaurie used the word in his study of Mongolian birds (1964) he began his faunal list with a pelican and three species of duck; and from his work on Tibetan birds (1972), and from personal discussions when he was about to embark upon on a detailed study of the avifauna of his Eremian region at the time of his unexpected death, it seems clear that he envisaged this region as comprising the Mediterranean and its immediate surroundings, and the Paratethys Basin.

The Paratethys Sea was present in the Miocene as an arm of the sea extending from the north-east Mediterranean across the region now occupied by the Black, Caspian and Aral Seas. Voous (1960), in his faunal types which are habitat groupings rather than zoogeographical zones, refers to this as the Sarmatic type, limiting it to water birds. Since this name is used by geologists for a limited period of deposition in this region during the Miocene it is not wholly appropriate. In the late Tertiary and Pleistocene the area was partly uplifted and increasingly drier, and became a series of inland sea basins surrounded by steppes and with arid areas spreading at its upper end. The present increasing extension of the eastern desert area linking it with Mongolia appears to be of relatively recent origin.

Although it may represent a palaeogeographical unit this Eremian (or Parathethys Basin) region at present comprises at least four zoogeographical divisions - the Mediterranean, inland seas, steppes and deserts. It was obviously an important region of avian speciation in the past; but it was far enough to the north to have been extensively affected by the Pleistocene climatic fluctuations which have influenced species distribution and made interpretation more difficult. These Pleistocene climatic changes may have facilitated the limited exchange of species between the two desert areas. In general, however, the Eremian region as envisaged by Vaurie appears to lie on the northern side of the Saharo-Sindian zone, and not to be a part of it.

THE SAHARO-SINDIAN AVIFAUNA

In the accompanying lists I have brought together forty-two bird species which appear to constitute a Saharo-Sindian avifauna, and an additional fourteen which are marginal in distribution but should probably be included. Of those in the main list there are twelve with obvious Palaearctic affinities, nine of Afrotropical origin, and five Oriental. This supports the suggestion that the region under discussion is not just the southern border of the Palaearctic zone, but a distinct entity which, as might be expected for an area based on aridity, has recruited its fauna from surrounding regions, and has some species that give no immediate indication of earlier origin or affinities.

Using broad generalisations three types of overall distribution can be identified among the arid-zone species. Some are largely confined to the northern part of the zone, others to the southern part, and some spreading over the central regions. These have been indicated on the main list. Such distributions may help to identify the regions of origin of endemic species. It also suggests that this arid zone has been reasonably stable in its overall form. When the Sahara Desert is discussed reference is often made to the fact that the bordering savannah regions have been more extensive in the historic and prehistoric past indicating a wetter climate. Had this spread of savannah been so extensive as to fragment the desert areas, and then isolate the fragments for significantly long periods, one would have expected the species to be less obviously latitudinally zoned and more fragmented in their distribution.

There is little evidence of patterns of speciation in isolation in the arid zone species, comparable to that apparent elsewhere. In the Palaearctic region subspecies and species were apparently created during the prolonged fragmentation of areas of forest and scrub. In the Afrotropical region similar patterns of subspeciation and speciation arose during the repeated changes in the relative distribution of savannah and forest, alternately producing 'islands' of one habitat within wider stretches of the other. Theoretically the same changes could have occurred in arid regions. The apparent lack of evidence of such speciation might be interpreted as an

indication that this desert zone was of relatively recent origin, or that there have been little past fragmentation of it, or that fragmentation had occurred but with a high incidence of extinction of isolate populations.

The presence of highly adapted endemic species, and some palaeontological evidence of past aridity make the first unlikely; and the consistency of distribution of present species makes the last improbable.

The second probability seems the more likely. It suggests an arid area, probably pure desert at its centre, which may have altered in overall extent from time to time, and appears to have allowed northward invasions past its western end. However, there is limited evidence which suggests that at least one temporary subdivision of arid habitat must have occurred in the past, far enough back and for long enough to produce two species. There are at least two species-pairs within this avifauna which appear likely to have been derived from single forms within this region.

One pair consists of the fairly similar Spotted Sandgrouse *Pterocles senegallus* and the Crowned Sandgrouse *P. coronatus*, with the latter preferring rockier habitats. Another is the Desert Lark *Ammomanes deserti* and the Bar- tailed Desert Lark *A. cincturus*, with the former preferring rockier localities. In each case both now have an extensively sympatric general distribution. A minimal explanation would require a division of an original arid habitat to isolate two populations of each ancestral form, producing species pairs, and with one division more rocky than the other; so that when the populations re-encounter each other when arid conditions become more widespread again they can overlap in range with the minor differences in habitat preference enabling them to co-exist without conflict. The White-crowned Black Wheatear *Oenanthe leucopyga* appears to form a species pair with the Hooded Wheatear *O. monacha*. I have treated the former as a Saharo-Sindian species (*List A*) but listed the latter as a montane isolate (*List C*). They are sympatric in some parts of their ranges, and if the Hooded Wheatear should also be considered a Saharo-Sindian bird then these form another pair of species with small differences in habitat preference.

Other scanty evidence of speciation and subspeciation may relate to still-existing barriers such as the Red Sea. The *Turdoides* babblers of the zone appear to have arisen from a secondary spread of a mainly Indo/Burmese subgeneric group of long-tailed species sometimes referred to as 'Chatterers', probably later than that giving Afrotropical Africa its *Turdoides* species complex. The spread may have involved only a single form. In subsequent isolation this gave rise to the Fulvous Babbler *T. fulvus* in North Africa, the Arabian Babbler *T. squamiceps* in Arabia, and the Iraq Babbler *T. altirostris* in the Iraq delta. Later still the Common Babbler *T. caudatus* extended its range from north-west India, through Pakistan and southern Iran, to overlap in distribution with the last species.

The original spread across these arid regions appears to have given rise in north-east Afrotropical Africa to two similar and extensively sympatric species with only slight differences in habitat. It is possible that these arose from a double invasion, with the Saharan Fulvous Babbler giving rise to the similar but smaller Rufous-bellied Babbler *T. rubiginosus*, and the Arabian Babbler to the more heavily streaked Scaly-throated Babbler *T. aylmeri*. Assuming this interpretation to be correct, it is of interest as a spread from Arabia and North Africa into the fairly arid north-east corner of Africa. Movements within this region are usually thought of in terms of extensions of range and invasions into Arabia from Africa rather than in the reverse direction.

The arid-zone representatives of various Palaearctic raptorial birds, in addition to being generally paler and sometimes sandier in colour, may also be smaller in size. One example is the Barbary Falcon *Falco pelegrinoides*, smaller and browner than the closely-related Peregrine *F. peregrinus* to which it is sometimes assigned as a subspecies. Another is the desert Eagle Owl, usually regarded as a subspecies *Bubo b. desertorum* of the northern Eagle Owl, but smaller, more slender in build and lighter in colour. Hume's Tawny Owl *Strix butleri* is paler in plumage and iris colour than the typical Tawny Owl *S. aluco* but is only slightly smaller in size. The desert form of the Great Grey Shrike *Lanius excubitor* is also smaller and paler.

The Brown-necked Raven *Corvus ruficollis* is smaller and duller in colour than the northern Raven *C. corax*. Another small form is the desert subspecies of the Ostrich *Struthio camelus*

syriacus. Although apparently now extinct and only known from Arabia and the Middle East in the recent past, its past range probably extended through the Saharan region as well.

FINAL COMMENTS

Although there may be disagreement over the precise list of species that should or should not be included in the various categories, the existence of an avifauna centred on this Saharo-Sindian arid region cannot be denied. In terms of the large faunal regions into which the world has been subdivided it does not fit neatly into any particular category. It could be argued that it should be treated either as the southern edge of the Palaearctic or the northern edge of the Afrotropical, or that it should be split and areas in which species derived from these two faunas predominate should assigned to them. However, in order to study and comprehend it properly it seems necessary to regard it as an entity, occupying a narrow zone, linking but discrete, between Palaearctic and Afrotropical, with its eastern end abutting the Oriental region.

Avifaunistically Arabia appears to be part of the eastern half of the Saharo-Sindian Arid Zone, containing montane islands supporting a number of endemic species isolated by the arid conditions at lower altitudes. It is invaded and enriched via the intrusive corridors of the Red Sea and Arabian Gulf by elements of the Palaearctic, Afrotropical and Oriental faunas. However, in some instances these may depend on small and sometimes temporary modifications in habitats, and their status as part of the Arabian avifauna often appears to be slightly precarious and possibly transitory.

SUMMARY

The Saharo-Sindian Arid Zone, although usually treated as a boundary or transitional area between the Palaearctic and Afrotropical regions, is a recognisable entity with its own fauna and flora. It extends from the western side of North Africa to north-west India, and includes Arabia, southern Iran and southern Pakistan. Areas of high ground, particularly in Arabia, constitute islands supporting species which are not a true part of the arid-adapted fauna. The zone is crossed by rivers and gulfs that allow incursions of species from other avifaunas. The Saharo-Sindian avifauna appears to embrace at least 42 species, and an additional 14 marginal species should probably be included. Although most evidence suggests a longstanding arid area without periodic fragmentation, the presence of two species-pairs suggests at least one possible division of the zone in the past.

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LIST A **SAHARO-SINDIAN ARID ZONE SPECIES**

Key. Related species may occur in another faunistic region from which the present species may have been derived - Palaearctic, Afrotropical, or Oriental = P, A or O.
Some are desert forms of species also occurring elsewhere = DF.
Some species form a pair with a similar species elsewhere, or with a group of species = SP or SG.
Saharo-Sindian distribution may be predominantly northern, southern or extend across the centre = N, S or M.

Ostrich	*Struthio camelus*	A	DF	M
Long-legged Buzzard	*Buteo rufinus*			
Sooty Falcon	*Falco concolur*			
Barbary Falcon	*Falco pelegrinoides*	P	SP	N
Sand Partridge	*Ammoperdix heyi*	P	SP	S
Houbara	*Chlamydotis undulata*	P		N
Cream-coloured Courser	*Cursorius cursor*	P		N
Lichtenstein's Sandgrouse	*Pterocles lichtensteini*			
Crowned Sandgrouse	*Pterocles coronatus*			M
Spotted Sandgrouse	*Pterocles senegallus*			M
Chestnut-bellied Sandgrouse	*Pterocles exustus*			
Eagle Owl	*Bubo bubo*	P	DF	M
Hume's Tawny Owl	*Strix butleri*	P	SP	
Syke's Nightjar	*Caprimulgus mahrattensis*	O		
Egyptian Nightjar	*Caprimulgus aegyptius*	A		
Thick-billed Lark	*Rhamphocoris clotbey*			N
Black-crowned Finch Lark	*Eremopterix nigriceps*	A,O	SG	S
Dunn's Lark	*Eremalauda dunni*	A		S
Bar-tailed Desert Lark	*Ammomanes cincturus*	O		M
Desert Lark	*Ammomanes deserti*			M
Hoopoe Lark	*Alaemon alaudipes*	A		M
Temminck's Horned Lark	*Eremophila bilopha*	P	SP	N
Pale Crag Martin	*Hirundo obsoleta*	P	SG	
Rufous Bushchat	*Cercotrichas galactotes*	A		M
Blackstart	*Cercomela melanura*			S
Stoliczka's Whinchat	*Saxicola macrorhyncha*	O	SG	
Desert Wheatear	*Oenanthe deserti*			N
Red-rumped Wheatear	*Oenanthe moesta*			N
Mourning Wheatear	*Oenanthe lugens*			
Hume's Wheatear	*Oenanthe alboniger*			N
White-crowned Black Wheatear	*Oenanthe leucopyga*			M
Scrub Warbler	*Scotocerca inquieta*			
Desert Warbler	*Sylvia nana*	P		
Arabian Babbler	*Turdoides squamiceps*	O	SG	
Fulvous Babbler	*Turdoides fulvus*	O	SG	
Great Grey Shrike	*Lanius excubitor*	P	DF	
Brown-necked Raven	*Corvus ruficollis*	P	SP	
Fan-tailed Raven	*Corvus rhipidurus* (or List C)			
Desert Sparrow	*Passer simplex*			
Golden Sparrow	*Passer luteus*	A		S
Trumpeter Finch	*Bucanetes githaginea*	P	SP	
House Bunting	*Emberiza striolata*		SG	

List B **ARID-ADAPTED SPECIES OF THE ZONE's BORDERS**

Tufted Guineafowl	*Numida meleagris*	A
Arabian Bustard	*Ardeotis arabs*	A
Thekla Lark	*Galerida theklae*	P
Dupont's Lark	*Chersophilus duponti*	P
Singing Bushlark	*Mirafra cantilans*	A
Rusty Bushlark	*Mirafra rufa*	A
Kordofan Bushlark	*Mirafra kordofanica*	A
Tristam's Warbler	*Sylvia deserticola*	P
Rufous-fronted Prinia	*Prinia buchanani*	O
Black Bush chat	*Cercotrichas podobe*	A
Sennar Penduline Tit	*Anthoscopus punctifrons*	A
Pygmy Sunbird	*Anthreptes platura*	A
Chestnut-bellied Starling	*Spreo pulcher*	A
Dead Sea Sparrow	*Passer moabiticus*	P

The subspecies *zarudnyi* of the Rufous- tailed Desert Lark *Ammomanes phoenicurus* which has other subspecies in peninsular India, and the subspecies *adamsii* and Krishnakumarsinhji of the Indian Sand Lark *Calandrella raytal* might also be included in the above list.

List C **MONTANE ISOLATES**

Philby's Partridge	*Alectoris philbyi*
Arabian Partridge	*Alectoris melanocephala*
Arabian Woodpecker	*Dendrocopos dorae*
Arabian Dunnock	*Prunella fagani*
Hooded Wheatear	*Oenanthe monacha*
Yemen Thrush	*Turdus menachensis*
Arabian Tit Warbler	*Parisoma buryi*
Arabian Warbler	*Sylvia leucomelaena*
Tristram's Starling	*Onychognathus tristrami*
Arabian Waxbill	*Estrilda rufibarba*
Yemen Serin	*Serinus menachensis*
Yemen Linnet	*Acanthis yemenensis*

It is possible that the Arabian Babbler might fit more appropriately into this group and the Hooded Wheatear might belong to *List A*.

COMPOSITION AND ORIGINS OF THE SOUTH-WEST ARABIAN AVIFAUNA: A PRELIMINARY ANALYSIS

by

Derek T. Lees-Smith

INTRODUCTION

In his review of Brown, Urban and Newman *The Birds of Africa* Volume 1, Vittery (1983) implied that South-west Arabia was to be considered avifaunally as being part of the Ethiopian faunal region (=Afrotropical faunal region, Crosskey & White 1977, Benson *et al.* 1979) following traditional practice since Sclater (1858) and Wallace (1876), accepted by Ripley in his discussion of Arabian biogeography (1954). However, in the same year that Ripley's discussion appeared, Meinertzhagen (1954: 33-34) queried traditional habit and stated that this area was best regarded as Palaearctic not Ethiopian, citing a few examples in support of his opinion. He did not provide any detailed analysis using such data as was available in his day; later, Udvardy (1975: 19) included south-west Arabia in the Arabian Desert biogeographic province of his Palaearctic Realm but did not mention the province at all in his discussion of his Palaearctic Realm (*op.cit.* pp 22-24) - and it should be noted that his scheme includes both floristic and faunistic elements. Despite additional data from ornithological observations made over the past thirty years, no analysis of the composition of the South- west Arabian avifauna and its probable origins has ever been published. This paper presents the results of a detailed analysis carried out to determine the best avifaunal placement of South-west Arabia.

SCOPE AND METHODS

For this analysis, South-west Arabia is defined as that portion of the Arabian Peninsula south of 20°N and west of 48°E which includes South-west Saudi Arabia, North Yemen and the western part of South Yemen. This area so defined includes the major montane area in the Peninsula except the Hejaz Mountains which is Jennings' Area 4 (1981) north of 20°N and outside the study area. This montane area includes several different biomes ranging from sand desert upwards through luxuriantly vegetated wadis on the Red Sea slope with Afrotropical bird species, to juniper forests - what remains of them - at nigh altitudes. As these mountains go up to over 3,000 metres, these biomes get compressed altitudinally within a few kilometres of distance. Full descriptions of the area in whole and in part are given by Meinertzhagen (1954: 3-5), Jennings (1981: 6-12), Cornwallis and Porter (1982: 2-6), Phillips (1982: 37). Within this area, a total of 118 bird species breed or are presumed to breed, excluding marine, coastal, introduced and recently self- introduced species, based upon data from the authors quoted above. The *Appendix* concluding this paper lists in full these 118 bird species. This number of breeding species can only be regarded as provisional as no 'gridded' map survey has ever been carried out nor any analysis of evidence for past avifaunas been published. For brevity, only the scientific names are used for these species with the English names only given in the *appendix* list. Where unlisted species are mentioned, the English names are given as well as the scientific. These 118 species are elements of eight different faunal types which are mainly based where relevant upon Voous (1960: 6) and are discussed in the following section. The species of each faunal type are discussed and commented upon. The final discussion deals with the results of the detailed analyses.

LEES-SMITH, D.T. 1986. Composition and origins of the South-West Arabian Avifauna: A preliminary analysis. *Sandgrouse* 7: 71-92

FAUNAL TYPES REPRESENTED IN SOUTH-WEST ARABIA

The 118 species may be divided into eight groups on basis of their faunal affinitives. A difficulty is occasioned by the fact that these faunal types or groups are mainly based upon Voous' (1963) concept previously illustrated in practice with his definitions and assigned species in his *European Atlas* (1960). In consequence, the faunal types so defined are only those with species in Europe. Voous did not expand his scope to cover the rest of Eurasia and North Africa. One of his faunal types, the Ethiopian (= Afrotropical this study) is a composite made up of many different African faunal types south of the Sahara - the Afrotropical avifaunal has apparently never been analysed in detail employing the Voousian faunal type concept.
Chapin's divisions (1923) are ecogeographical and his Sudanese and North-east African Provinces, are roughly equivalent to Udvardy's (1975: 26-27) Eastern Sahel, Somalian and Ethiopian Highland Biogeographic Provinces. Most of the Afrotropical species included in the study are from these parts of Africa which are geographically nearest to South-west Arabia.

TABLE 1 DISTRIBUTION OF 118 SOUTH-WEST ARABIAN BREEDING BIRD SPECIES BY FAUNAL TYPE.

Faunal type category		number	percent of total
1	Cosmopolitan	1	0.8
2	Holarctic *sensu stricto*	3	2.5
3	Old World	5	4.2
4	Eurasian	14	12.0
5	Eurasian-Afrotropical	7	5.7
*6	Saharo-Sindian	25	21.2
7	Afrotropical-Eurasian	12	10.2
8	Afrotropical	51	43.4
Total		118	100.0%

* for definition, see Ranck 1968: 54.

1 The Cosmopolitan Element (1)

Gallinula chloropus

This one species, of a phylogenetically 'old' group, which ranges widely over most of the world, requires water in its habitat for breeding and feeding, so therefore its presence locally in South- west Arabia is without biogeographical significance.

2 The Holarctic *sensu stricto* Elements (3)

Aquila chrysaetos *Lanius excubitor* *Pica pica*

Open ground with some bush, tree or woodland cover, arid to moist, lowland to montane, is the common ecological requirement for all three species which extend from Eurasia into North America. *Pica* is without any close relatives within the Corvidae in the Afrotropical faunal area where both *Aquila* and *Lanius* are well represented. Whilst *Lanius excubitor* is a wide-ranging species in the Saharo-Sindian area through the *meridionalis* subspecies group with *buryi* as the South-west Arabian representative, and *Aquila chrysaetos* is known to be present in the mountains bordering the Red Sea on the Arabian side from Israel southwards to the Yemen with

a population also present in Oman, *Pica* is an isolated Pleistocene relict in the montane areas of the Asir and the Tihama along with other Pleistocene relicts which are assigned to Faunal Type 4 in this study. *Pica p. asirensis* has in isolation lost almost all the gloss from body and wings, the white band on the rump and lower back and acquired bill and feet which are proportionally larger than in northern populations; these are all the kind of characters which can be evolved by very small populations which are cut off from any gene flow from other populations. The covered nest shared by *Pica* and the south Ethiopian Stresemann's Bush-Crow *Zavattariornis stresemanni* is an ecological adaption to strong winds and very hot sunshine, not an indication of relationships or close affinity between these two species.

3 The Old World Elements (5)

Tachybaptus ruficollis
Milvus migrans
Falco tinnunculus
Mirafra cantillans
Anthus novaeseelandiae

The common link between the species of this heterogenous assemblage is that all are, as themselves or as members of superspecies (definition, Amadon 1966; use in biogeographical analyses, Mayr & Short 1970), wide-ranging species of open country in the Old World tropics, subtropics and warm to cool temperate zones, though the Kestrel is represented in the New World by a closely-related species. All five species are in both Africa and Eurasia, five of them tolerant of dry conditions; *Tachybaptus* is adaptable to quite small pools. Whilst the kestrels (subgenus *Cerchneis* Boie 1826 in genus *Falco* Linnaeus 1758) and *Mirafra* are basically Afrotropical with the majority of the species in Africa, the South-west Arabian populations of the Black Kite and the Richards Pipit - both wide- ranging Old World species - show morphological characters suggesting closer affinity with the respective Afrotropical populations than with the northern, Eurasian population group in each species. Perhaps these two species should be assigned to the Afrotropical category for the purposes of this study; this would necessitate emendation of the category percentages of the total in Table to 4.2% for the Old World and 44.1% for the Afrotropical.

4 The Eurasian Elements (14)

Gyps fulvus
Buteo rufinus
Alectoris melanocephala
Alectoris philbyi
Strix butleri
*Picoides dorae***
Hirundo rupestris
Pycnonotus xanthopygos
Prunella fagani
*Sylvia buryi**
Sylvia leucomelaena
Passer domesticus
Rhynchostruthus socotranus
Acanthis yemenensis

** Voous (1977) classifies this species as Parisoma buryi but admits that the systematic position is uncertain. Ed.*
*** Dendrocopus dorae per Voous (1977). Ed.*

These 14 species are ecologically a mixed group from the forest woodpecker to an owl confined to arid land ravines with the other species occupying habitats of varying degrees of aridity, bush and tree cover. The bulbul and the sparrow have adapted themselves to man's gardens and buildings. The woodpecker is the only 'real' forest bird in this category. Of the 14 species, no less than nine are relicts of various types and the remainder are wide-ranging in Eurasia and Africa if their nearest relatives are counted.

Gyps fulvus (Voous - Palaearctic): its presence in South-west Arabia, which is at the southernmost limit of its range, is possibly due to descent from an ancestral population which was in the area at the end of the Pleistocene when most of Arabia was probably moister than at the present time and carried savannah grassland populations of large grazing and browsing mammals off which *Gyps* scavenged. So the present-time population in South-west Arabia of the Griffon would be a relict composed of an unknown number of breeding pairs, as the species is absent from Afrotropical Africa. Stresemann and Amadon (1979: 307 and footnote) suggest that *G. fulvus* together with the Himalayan Griffon *G. himalayensis* and the Cape Vulture *G. coprotheres* may form a superspecies. Snow (1978a) treated this whole group of griffons including Rüppell's *G. rueppellii* (Africa) and Indian *G. indicus* as a species-group.

Buteo rufinus (Voous - Palaeoxeric): though this bird is the only *Buteo* which is actually present in the desert biomes in the Old World, it also occupies open country other than deserts in Eurasia; perhaps the species is better assigned to the present category rather than to Voous' Palaeoxeric Faunal type. Not only is the species absent from any part of the Afrotropical avifaunal area, it is also not closely related to any of the Afrotropical buzzards. The Upland Buzzard *B. hemilasius* of central Eurasia appears to be its nearest Old World relative - Voous (1960: 55) united the two forms as one species but Stresemann and Amadon (1979: 373-374) preferred to retain them as two species. As *rufinus* occurs quite extensively in Arabia (Jennings 1981: map 13), this is very suggestive of continuous persistence in Arabia since the end of the last Pleistocene glaciation in Eurasia, gradually adapting over time to desiccation of Arabia from grasslands to deserts.

Alectoris melanocephala, a member of the *A. graeca* superspecies, is the older of the two *Alectoris* relicts in Arabia with *A. philbyi* of the *A. chukar* superspecies being the younger. Differing rates of evolutionary change make it difficult, if not impossible, to say which of the four main 'classical' Pleistocene glaciations in western Eurasia (Zeuner 1959) produced range extensions southwards resulting in subsequently stranded populations which eventually evolved into these two distinct birds as they are now. Watson (1962) provides a comprehensive discussion of the whole matter with the suggestion that *melanocephala* be informally separated into a separate subgenus within *Alectoris* leaving *philbyi* and other *Alectoris* species in subgenus *Alectoris*. I feel that such a course of action would be inadvisable as it would obscure relationships among the rock partridge species.

Strix butleri is a member of the *S. aluco* superspecies which replaces the forest-dwelling Tawny Owl *S. aluco* in arid, barren habitats. All other species of the temperate zone *aluco - uralensis* species in *Strix* in Eurasia and North America are forest birds. It seems very likely that *butleri* could be derived from a small *aluco* - type population which became stranded after a Pleistocene glacial retreat followed by progressive desiccation of the area concerned causing gradual disappearance of woodland - or galleries - with the birds managing successfully a re-adaption to an arid treeless environment. Possibly the Riss - Würm interglacial could have been the period in which evolution of *butleri* occurred from *aluco*-like stock; however, this is speculation. Small 'founder' populations with limited gene 'pools' can evolve quite rapidly in isolation into distinct forms from ancestral stocks.

Picoides dorae is a 'desert - coloured' woodpecker of juniper forest (-*Juniperus phoenicea, J. excelsa*, according to I. S. Collenette , *pers. comm.*) which is suggested by Short (1982: 256) to be nearest to the Fulvous-breasted/Brown-fronted Woodpecker *Picoides macei - auriceps* species-group and the Yellow-crowned Woodpecker *P. mahrattensis* of the Himalayan and Oriental faunal areas, implying that the area between south Arabia and forests in Nuristan, Baluchistan and north-west India, now treeless except along watercourses, was once covered with some kind of woodland during a Pleistocene glacial period which was sufficient for woodpeckers to extend to South-west Arabia. At present, no woodpecker is known from Muscat and Oman; the nearest juniper-dwelling woodpecker in Africa is the Golden-backed *Dendropicos abyssinicus* of the Ethiopian highlands - and *Dendropicos* is a purely Afrotropical woodpecker genus. The nearest *Picoides* species - the only one in the Afrotropical avifaunal area - is the Brown-backed *P. obsoletus* of the savannah and bush belt from Senegal to Ethiopia

and Uganda. To the north of Arabia, the nearest *Picoides* woodpecker is the Syrian *P. syriacus* of the *P. major* species-group in Sinai and Israel.

Prunella fagani, regarded as conspecific with both Brown and Radde's Accentors *P. fulvescens* and *P. ocularis* or with *ocularis* alone, by Ripley (1952: 35; 1964: 9), is perhaps best regarded as a full species forming a superspecies with *ocularis* and the Black-throated *atrogularis* - see Marien (1951) for distinctions between these and *fulvescens* - in a species-group of 'capped' accentors of Eurasian subarctic and montane scrublands with or without forest or woodland nearby. *P. fagani* is morphologically so near *P.ocularis* that it can be reasonably regarded as a relic from the Würm era when conditions between the Yemen and the Turkish - Iranian highlands were much less arid, permitting growth of scrublands which favoured southward range expansion of accentors of *ocularis* type stock. At present, no accentor is known from the area between the Turkish - Iranian highlands and the Yemen - not even a desert-adapted population of the mesic shrubland-dwelling Hedge Accentor *P. modularis* comparable to Kozlov's Accentor *P. koslowi* of Mongolia.

Sylvia buryi is unquestionably a *Sylvia* species (Vaurie 1957, confirmed by observers' field accounts) and probably an 'insularized' (- in this case, complete loss of any distinct colour pattern or markings) member of the *Sylvia* species-group which includes the *leucomelaena - hortensis* superspecies; this requires confirmation by a complete revision of *Sylvia* incorporating data from comparative field studies. Why Ogilvie-Grant, who described the species, thought it a *Parisoma* - an Afrotropical sylvid genus - and Meinertzhagen (1954: 256) a *Cercomela* - a turdid genus - must remain a mystery as *S. buryi* is totally unlike any species in either genus.

Sylvia leucomelaena, forming a superspecies with the more northern Orphean Warbler *S. hortensis* (Hall & Moreau 1970: 159), just reaches the Afrotropical area in the arid coastlands of Sudan, Eritrea and Somalia, and seems to be a relic from a time at the end of the Würm period when conditions were much more mesic than at present and thus is an example of a bird of originally mesic habitats managing to adapt itself to much hotter and more arid conditions.

Rhynchostruthus socotranus is the only endemic passerine species of the South-west Arabian / Aden Gulf / Socotra area which has evolved so much from its presumed cardueline relatives in Eurasia that it ranks as a full monospecific genus in itself. The species is composed of three quite distinct populations which Hall and Moreau (1970: 267) suggest have reached the stage of becoming 'incipient' species. Both Meinertzhagen (1954: 92) and Hall and Moreau (*op. cit.*) suggest a possible relationship, however distant, with the large Eurasian grosbeaks as *Rhynchostruthus* has **no** resemblance to any Afrotropical cardueline finch, not even the Oriole Finch *Linurgus olivaceus*. However, the overall body size and general colour pattern suggest that Meinertzhagen's alternative theory - that of evolution from a *Carduelis* stock, such as that which produced the Goldfinch *C. carduelis* - is much more probable.

Acanthis yemenensis forms a superspecies with the northern Linnet *A. cannabina* (of which it is very clearly an isolated representative in South-west Arabia) and according to Hall and Moreau (1970: 268) also with the Warsangli Linnet *A. johannis* of north Somalia which is a much more distinctive bird with some sexual dimorphism in adult plumage. Like *Prunella fagani, A. yemenensis* seems probably a Würm relic.

5 The Eurasian-Afrotropical Elements (7)

Apart from the *Accipiter* and the *Hieraaetus*, this category comprises five open-country species including three aerial feeders which range in both Eurasia and Africa and whose absence from South-west Arabia would be very surprising. As the greater part of the range of each species is in Eurasia, the seven species are here classed as 'Eurasian-Afrotropical' rather than 'Indian-African' as Voous (1960) would term them, as 'Indian' could imply restriction to, or origin in, the Indian subcontinent. The Crested Lark has an enormous range from western Europe to north China and the Lammergeyer is associated with the great mountain systems of south and central Eurasia. It seems best to treat all seven species as being Eurasian- Afrotropical

elements in relation to South-west Arabia, although it is possible that three of these - the swift, the lark and the swallow - could have evolved as species in Africa whence they colonized Eurasia. The *Accipter* and the *Hieraaetus* are birds of wooded and savannah country; *A. badius* probably originated in Eurasia where others of the same species-group are present with *badius* as the sole representative in Africa. This seems likewise with *H. fasciatus*, though *Hieraaetus* is also represented in the Afrotropical area by Ayres' Hawk-Eagle *H. dubius* which Snow (1978a: 96) feels to be in an Eurasian species-group containing the Booted Eagle *H. pennatus* and some Oriental species.

Gypaetus barbatus *Hieraaetus fasciatus* *Merops orientalis*
Accipiter badius *Apus melba* *Galerida cristata*
Hirundo daurica

Gypaetus barbatus (Voous - Palaeomontane) is a very distinctive and remarkable raptor, whose relationships within the Accipitridae are unknown but apparently not a member of the kite - sea eagle assemblage (Olson 1982), with a very specialized feeding technique and nesting on floors of small cliff-face caves, requires open country with a varied mammalian fauna attended by scavengers and adjacent to hills or mountains of the right geological formation to provide suitable nesting sites. These requirements were met through the whole Pleistocene era in south 'temperate' Eurasia and Africa. It is probable that the present-time population in Arabia and east Africa are relics from range expansions southwards along the 'Rift Valley' fault during Pleistocene glaciations in western Eurasia. The only competitors for bones with *Gypaetus* are hyaenas *Hyaena* and *Crocuta*.

Apus melba with the purely Afrotropical Mottled Swift *A. aequatorialis* form the species-pair of giant swifts, regarded by Brooke (1978: 283) as constituting a separate genus *Tachymarptis* (Roberts 1922), I think that the species-pair is best kept within *Apus* as a subgenus as Brooke himself did earlier (1970) in his review of the swifts. It seems possible that this group - the giant swifts - evolved in Eurasia with a first colonization of Africa evolving in *aequatorialis*, followed by a second colonization which is *melba* which also probably colonized Madagascar about the same time. It seems significant that the presumed first arrival in Africa is a low-altitude species - as is *melba* in Eurasia but the high-altitude bird in Africa. The present known range in South-west Arabia seems to fit in with the hypothesis of an Eurasian origin of the group - see Jennings' (1981) map 51.

Merops orientalis is Eurasian-Afrotropical with three distinct populations - African, Arabian and Oriental with the first two in arid regions and the third in all kinds of vegetational situations in India. Fry (1969: 591) suggests that *Merops* originated in the Oriental area whence it dispersed through time into Africa and northwards in western Eurasia. He also felt earlier in the same study (*op.* cit. : 579) that the nearest relative of *M. orientalis* was Böhm's Bee-eater *M. boehmi* but later (1978a: 309) reversed his opinion, deciding that it was difficult to derive a forest "form from an xeric stock of *orientalis*".

Galerida cristata (Voous - Palaearctic) and the Thekla Lark *G. theklae* sometimes treated as conspecific with the Malabar Crested Lark *G. malabarica* are a species pair, allopatric in India and north-east Africa but sympatric in North Africa and Iberia with *cristata* as one of the three widest-ranging lark species in the world. The genus is probably of Afrotropical origin, with a purely Afrotropical superspecies of three allospecies (Hall & Moreau 1970: 18) and the stock ancestral to both *cristata* and *malabarica* 'breaking out' of Africa during some Pleistocene interglacial into Eurasia, then splitting with evolution into the *cristata - malabarica* species-pair.

Hirundo daurica forms a superspecies with the Oriental Striated Swallow *H. striolata* in the species-group of 'retort nest' swallows (subgenus *Cecropis* Boie 1826 in genus *Hirundo* Linnaeus 1758) which includes four other wholly Afrotropical species. The Afrotropical populations of *daurica* are northern savannah and eastern montane birds, with the resident South-west Arabian population either identical with these montane birds or transitional in character between them and the northern populations in the Middle East. A comparative study of the whole *Cecropis* group is needed before speculation upon the biohistory of *daurica* could begin, but the possibility of derivation from Africa followed by a subsequent return at a period

such as the climax of the Würm glaciation cannot be discounted.

6 The Saharo-Sindian Elements (25)

It is beyond the scope of this paper to discuss the various terms used by writers of faunistic papers to describe the flora and fauna of the hot and 'cool' deserts of northern Africa, the Middle East, Turkestan, Mongolia and Pakistan; sufficient to say that Voous' term "Palaeoxeric" covers both hot and "cool" desert elements but 'Saharo-Sindian' is restricted to those of the southern hot deserts from the westernmost Sahara eastwards through Arabia and Baluchistan to the Thar Desert of Rajasthan in north-western India.

Falco concolor
Falco pelegrinoides
Ammoperdix heyi
Pterocles lichtensteinii
Pterocles coronatus
Pterocles senegallus
Pterocles exustus
Columba livia
Athene noctua
Apus pallidus
Ammomanes deserti
Ammomanes cincturus
*Calandrella dunni**
Alaemon alaudipes
Eremopterix nigriceps
Oenanthe lugens
Emberiza striolata
Oenanthe monacha
Oenanthe leucopyga
Prinia gracilis
Scotocerca inquieta
Turdoides squamiceps
Corvus ruficollis
Corvus rhipidurus
Bucanetes githagineus

* *Eremalauda dunni per Voous (1977). Ed.*

All 25 species are more or less resident within some part of the Saharo- Sindian area which is one of the largest arid areas in the world, extending from the Atlantic eastwards to the Thar Desert of north-west India, floristically and faunally occupied by life forms adapted to hot aridity with erratic or no precipitation. With five exceptions, none of these 25 species extends further east than the western Tian Shan foothills in Turkestan, the Thar Desert in India, and in Africa no further south than the Sahel belt and the arid areas of the Horn of Africa and northern Kenya. All species occupy arid, open habitats from stony desert to cliffs, ravines and sparse scrublands. The bunting has adapted itself to man's buildings in North Africa - but not in Arabia. A remarkable absentee from the avifauna of South-west Arabia is Temminck's Horned Lark *Eremophila bilopha* ; according to Jennings (1981: map 68; *pers. comm.*) this distinctive desert lark is definitely absent in southern Saudi Arabia and therefore, by inference, in the whole study area.

Falco concolor forms a superspecies with the Mediterranean Eleonora's Falcon *F. eleonorae* and like it is an autumnal breeder, of the Red Sea area, southern half of the Arabian Gulf coastal areas and the coasts of south Arabia, according to latest data from Jennings (*pers. comm.*) Brown and Amadon (1968,2: 764) group this species-pair with the hobbies subgenus *Hypotriorchis* Boie 1826 in genus *Falco* Linnaeus 1758. No inland cliff nest sites are known from South-west Arabia; one such is recorded from beyond the study area in North-eastern Saudi Arabia (Jennings 1985: 23) in addition to the inland sites known in the Sahara.

Falco pelegrinoides is the desert representative of the Peregrine Falcon *F. peregrinus* with which it forms a superspecies. Perhaps a comparative ethological study of the Eurasian population of *peregrinus* and of *pelegrinoides* might suggest which Pleistocene event may have resulted in the splitting of populations leading to the evolution of *pelegrinoides* to the stage of 'full' species.

Ammoperdix heyi of hot deserts forms a superspecies with the 'cool' desert See-see Partridge *A. griseogularis* of Iran and west Turkestan. North Arabian and Egyptian populations *heyi* and *nicolli* are composed of smaller and paler birds than the more southerly South Arabian and Sudanian *intermedia* and *cholmleyi* with 'African' males lacking the white frontal band on the head which is present in 'Asiatic' males. These characters suggest that at least two Pleistocene events caused contraction of deserts isolating populations of the ancestral stock of *heyi* which subsequently joined up again. Comparative field studies are needed to ascertain the validity of

these speculations.

Pterocles: this essentially Saharo-Sindian/Afrotropical group reaches northwards to the Mediterranean area, north-eastwards to Mongolia and eastwards to Tibet and Peninsular India, and is in need of a comparative ecological and ethological study according to Snow and Clancey (1978: 198). The four species in South-west Arabia represent different species-groups within *Pterocles* - Maclean (1984: 77-78) recognizes seven species-groups of the sandgrouse species, including the very doubtful *Syrrhaptes* based upon just one character but traditionally accepted by authors without query.

P. lichtensteinii is a member of a species-group which includes the Afrotropical/Peninsular Indian *indicus - quadricinctus* superspecies which is absent from Arabia, where it is geographically replaced by *lichtensteinii* which is the most desert-adapted member of the species-group (Snow & Clancey, *op. cit.*)

P. coronatus and *P. senegallus* appear to be differently-sized members of the same species-group which geographically overlap but in South-west Arabia they are geographically separate with *coronatus* east of the montane region and *senegallus* west of it on the Red Sea slope.

P. exustus appears to be quite distinct, probably its nearest relative within the genus is the Namaqua Sandgrouse *P. namaqua* of southern Africa, and has a southern Saharo-Sindian range extending to South-west Arabia and Kenya with isolated populations in Egypt and Peninsular India. This split range suggests a former wider, more continuous range under more mesic conditions than those now prevailing in the Sahara and Arabia.

Columba livia is the one Saharo-Sindian species which has managed to expand its range into more mesic regions through utilization of rocky and cliff country, including sea-cliffs, in the Mediterranean area, coastal western Europe, montane Turkestan and the Himalayan area. As *C. livia* is the only cliff-dwelling *Columba* species in South-west Arabia, Goodwin (1970: 51 & *Fig.* D2; 1978: 204-205) considers that the absence of Afrotropical members of the *livia* species-group in Arabia can be explained by the inability of the Afrotropical species to co-exist with *livia* in similar ecological circumstances.

Athene noctua (Voous - Turkestanian-Mediterranean) apparently forms a superspecies with the Spotted Owlet *A. brama* of India (Colston 1978: 263) and it is possible that *Athene* originated in an arid area as both members of the superspecies favour rocky and stony areas well supplied with holes and crevices. The north Indian Forest Spotted Owlet *A. blewitti* may be an earlier dispersal from *Athene* stock which adapted to mesic, forested conditions. The possibility that *Athene* evolved from some forest-dwelling ancestral stock cannot be excluded from consideration as *A. noctua* has successfully established itself in Europe, and from the west, in north China. Perhaps this is the reason for Voous' assignment of this species (1960: 159) to his Turkestanian-Mediterranean faunal type category rather than to his Palaeoxeric (= Saharo-Sindian) category where the species seems more naturally placed. Although the populations on the African side of the Red Sea and the Aden Gulf are continuous (apparently) northwards to Egypt from Somalia and north Ethiopia, these may be relics from the Würm period.

Apus pallidus is the only Saharo-Sindian member of the mainly Afrotropical *Apus* and is considered by Brooke (1978: 285) to form a superspecies with the Nyanza Swift *A. niansae* of north-eastern Africa. Whilst *A. pallidus* ranges over almost all North Africa extending northwards to European coastlands of the Mediterranean and eastwards to Baluchistan, it is only suspected of breeding in South-west Arabia - not yet proven. Although *A. pallidus* is so similar in size and appearance to the Swift *A. apus,* Brooke (1970) considers that the *pallidus* superspecies to be of an Afrotropical species-group within *Apus* and *A. apus* of an Eurasian species-group.

Ammomanes deserti and *A. cincturus* are each the Saharo-Sindian member of a superspecies - the first with Gray's Sand Lark *A. grayi* of Namibia in southern Africa and the second with the Rufous-tailed Desert Lark *A. phoenicurus* of India. That *Ammomanes* is absent in Africa between *grayi* in Namibia and the Sahara suggests that *Ammomanes* evolved in Africa during the Pleistocene with subsequent expansion into Eurasia and a later, westward dispersal of *cincturus*-like stock into Africa which resulted in geographical overlap with *deserti*.

Calandrella dunni is a *Calandrella* lark which forms a superspecies with the east African Obbia Lark *C. obbiensis* and Masked Lark *C. personata* as Hall and Moreau (1970: 15) have shown; it

can be added that juvenile and immature *dunni* show faint 'spangles' on feather tips which is a character lacking in *Eremopterix* but present in *Calandrella rufescens, C. starki* and others. The very long tertials, a character shared with *E. nigriceps,* is a morphological adaption to habitat, not a character usable for taxonomic purposes. In Arabia *dunni* is a desert bird whereas in Africa it is a bird of grassy savannahs on the southern edge of the Sahara (Mackworth-Praed & Grant 1955: 28).

Alaemon alaudipes is a pure desert bird, and is the only long-billed, long-legged lark in South-west Arabia. The species reaches southwards in Africa to the north Somalian coastlands where it meets the Lesser Hoopoe Lark *A. hamertoni* with which it forms a superspecies. Speculation upon *Alaemon's* affinities must await a comprehensive review of the Alaudidae, though Meinertzhagen (1951: 100-101) merged *Alaemon* with several other genera in *Certhilauda. A. alaudipes* is a very distinctive lark with a flight wing-pattern more reminiscent of some shorebird than a passerine.

Eremopterix nigriceps is the Saharo-Sindian representative of a grey-backed group of Afrotropical/Indian finch-larks which geographically replace each other. Though Hall and Moreau (1970; 20) mention that *nigriceps* is associated with Acacia steppe in Africa, this is not confirmed for Arabia by either Meinertzhagen (1954: 133) or Jennings (1981: 44). Whether the finch-larks *Eremopterix* are of African or Eurasian origin is a question which must await a review of the genus, but it seems possible that the former is the more probable.

Oenanthe lugens, considered by Hall and Moreau (1970: 105) to form a superspecies with *O. picata* of Iran, south Turkestan and Baluchistan, is not only a species with a highly disjunct distribution (three population groups with the Arabian *lugentoides* sharing characters with both the northern *lugens* and the north-east Afrotropical *lugubris*) but additionally is one of the six *Oenanthe* species displaying polymorphism according to Mayr and Stresemann (1950). No two workers involved with *Oenanthe* agree with each other over the relationships among the 18 species of the genus admitted by Mayr and Stresemann (*op. cit.*) and any postulated relationships should be regarded as provisional pending a complete review of the whole genus which incorporates data on ethology, vocalizations and interspecific ecological relationships. However, it is probable that: (a) *Oenanthe* originated in Africa whence it spread to Eurasia; (b) *O. lugen's* present-time biogeography suggests a relic species from a time when Saharan conditions were much more mesic than at present, such as the climax of some Pleistocene glaciation in western Eurasia.

Oenanthe monacha and *O. leucopyga:* on the basis of the male colour-pattern, these two black-and-white chats, which do not display polymorphism (Mayr & Stresemann 1950) appear to be closely related to each other but have reached full species level as they overlap in the southern Levant and, according to Jennings (1981), in three separate areas in Arabia, including the study area. *O. leucopyga* is Saharan with Arabia as its eastern limit, whilst *O. monacha* is Middle Eastern with Arabia as its western limit. This is very suggestive of origin from a single species whose population became split into two groups during a Pleistocene glaciation which made most of North Africa and the Middle East ecologically unsuitable for a desert ancestral species.

Prinia gracilis is the very marginal Saharo-Sindian species of the Afrotropical-Oriental *Prinia* sensu lato which is in need of a complete revision; the present species occupies vegetated habitats often near water in otherwise arid regions. Hall and Moreau (1970: 175) consider *gracilis* to be near the Afrotropical-Indian *P. subflava - inornata* superspecies; perhaps *gracilis* originated in India, expanding westwards along coasts and watercourses, and eastwards in India to overlap with the Tawny Prinia *P. inornata.*

Scotocerca inquieta appears to be the Saharo-Sindian offshoot from the priniine warbler assemblage and perhaps could be derived from some form possibly ancestral to the hill-warblers of subgenus *Suya* Hodgson 1836 in *Prinia* Horsfield 1821 in India. Differences of behaviour etc. are explicable by the ecological association of *Scotocerca* with arid, sparsely bushed country in contrast to the mesic, well-vegetated habitats occupied by *Prinia* species.

Turdoides squamiceps is the only timaliid in Arabia and is a member of a babbler superspecies of scrub and bushlands of arid regions from the Sahara and north-east Africa to India and Burma - see Hall and Moreau (1970: 145); possibly the Scaly Chatterer *T. aylmeri* of north-east

Africa may be its nearest relative within the superspecies. It is worth noting that this basically dry-country genus is one of the three timaliid genera shared by Africa and Eurasia (Hall & Moreau 1970: 138-143) the other two genera are represented by rainforest and Afromontane forest species which are absent from Arabia - even from the relatively mesic slope facing the Red Sea below 1,800 metres altitude.

Corvus ruficollis and *C. rhipidurus* are each the Saharo-Sindian representative of a superspecies - the first of the Holarctic - Afrotropical *C. corax* group, and the second of the purely Afrotropical *C. albicollis* group. I am in agreement with Hall and Moreau (1970: 378-379) on this assessment. Both species extend into the arid areas of the Horn of Africa and northern Kenya where the *C. ruficollis* population - *edithae* - appears to be a relic.

Bucanetes githagineus is the hot desert species forming a superspecies with the 'cool' desert Mongolian Trumpeter Finch *B. mongolicus* of Iran and eastwards. Possibly the Eurasian desert finches *Bucanetes, Rhodospiza,* the arid montane *Rhodopechys,* and the alpine *Leucosticte* together with *Carpospiza* are more closely related to each other and to the rose-finches *Carpodacus* than to any other cardueline finches. With two exceptions, all lay blue eggs with some sparse spotting.

Emberiza striolata is the somewhat marginally Saharo-Sindian member of the basically Afrotropical 'spot-egged' rock bunting subgenus *Fringillaria,* and may be a partially 'desertized' derivative from the same stock which evolved the wide-ranging *E. tahapisi* of somewhat less arid habitats in Africa. I am not at all sure the relationship between *'Fringillaria'* and the Eurasian rock- and meadow-buntings of subgenus *'Cia' (cia, godlewskii, cioides* and *jankowskii*) is as close as implied by Hall and Moreau (1970: 265); *'Cia'* lays 'scribbled' eggs as do all other *Emberiza* species except the *malanocephala - bruniceps* species-pair.

7 The Afrotropical-Eurasian Elements (12)

Bubulcus ibis	*Cursorius cursor*	*Anthus similis*
Neophron percnopterus	*Streptopelia senegalensis*	*Saxicola torquata*
Aquila rapax	*Apus affinis*	*Cisticola juncidis*
Falco biarmicus	*Upupa epops*	*Lonchura cantans*

The fact that out of twelve species in this category, only four are passerines suggests that this is an 'old' faunal type which has dispersed over time from Africa to Eurasia and this seems confirmed by the further fact that all these species are birds of open country and unrestricted to forest. Although Voous (1960) assigned seven of these species which reach Europe to various categories, one should take into consideration both probable biogeographical history at species and genus levels and the present-time biogeography.

Bubulcus ibis has been generically united, in recent taxonomic reviews, with either *Ardeola* (Bock 1956) or *Egretta* (Payne & Risley 1976), but I retain it as a monospecific genus upon the advice of H.F. Elliott and the late C.W. Benson who both emphasized that the Cattle Egret is a 'good' monospecific genus, their view being based upon familiarity with the species through long residence in Africa. Though Voous (1960: 18) assigned this species to his Indian-African faunal type category rather than to his Ethiopian, it appears to be best assigned to the Afrotropical/Eurasian as, whichever was the heron stock from which *Bubulcus* was derived, it has become adapted to dry land association with large browsing and grazing herbivorous mammals which suggests Africa to have been the area of *Bubulcus'* evolution. Perhaps pre-adaption to association with domestic cattle for foraging purposes has over time faciliated the spread of the species from Africa to Eurasia and thence to Australia and recently to the New World.

Neophron percnopterus: the present-time range of this small, opportunistic scrap-and-refuse feeding vulture suggests that this species of Afrotropical evolution if not origin, has expanded its range northward to the Mediterranean area and eastwards to Turkestan and India from Africa; Snow (1978a: 68) suggested that the nearest relative of the Egyptian Vulture within the Old World vulture group could be the Lammergeyer *Gypaetus* on the basis of structure and breeding behaviour.

Aquila rapax is represented in South-west Arabia by a *rapax* - type population as in north-west Africa, whereas the Eurasian populations are of the *nipalensis* - type. In both continents, *A. rapax* is the low-country, unspecialized feeder whereas all other *Aquila* species in both continents are ecological and dietary specialists in varying degrees. Perhaps this lack of specialization in *rapax* faciliated range expansion originally from Africa into Eurasia.

Falco biarmicus is a member of the *F. gyrfalco* species-group in which *biarmicus* is the basically Afrotropical species forming a superspecies with the central Eurasian Saker *F. cherrug* and the Indian Jugger *F. jugger* (Dowsett 1978: 111). Possibly this group of the 'great falcons' (subgenus *Hierofalco* Cuvier 1817 in genus *Falco* Linnaeus 1758) could be of African origin which in course of time and over space dispersed as far as the arctic regions and western North America and evolved into the several species (all open country birds taking much ground prey) of the present time.

Cursorius cursor being the most desert-adapted species of the Afrotropical *Cursorius*, could with some justification be regarded as the Saharo-Sindian member of the group having reached the African coast of the Mediterranean and eastwards to south-west Turkestan. Apart from the Indian Courser *C. coromandelicus* of India, *cursor* is the only *Cursorius* species outside the Afrotropical faunal area where the group appears to have evolved. Snow (1978b: 189) links *cursor* with Burchell's Courser *C. rufus* of southern Africa - another desert- adapted species - in a superspecies.

Streptopelia senegalensis is a very distinct species (so distinct that it has been made the type of a separate genus *Stigmatopelia*) which is the widest-ranging of any Afrotropical *Streptopelia* species. Goodwin (1970: Fig. D3; 1978: 214) feels that perhaps *senegalensis* is nearer to the Oriental Spotted Dove *S. chinensis* than to any other Afrotropical or Eurasian *Streptopelia* species. He also considered that *senegalensis* was originally a bird of arid habitats of scrub bush adjacent to permanent water which would explain adaption to man-made habitats and possibly eventual range expansion north-eastwards and eastwards to Turkestan and India.

Apus affinis is a gregarious - nesting Afrotropical swift whose ready adaptability to man-made structures has possibly enabled the species to expand its range northwards to Mediterranean Africa and eastwards as far as the Philippine Archipelago and Malaysia in prehistorical time. According to Brooke (1978: 287), *affinis* together with the African White- rumped Swift and the Horus Swift, *A. caffer* and *A. horus*, both Afrotropical species, form a species-group.

Upupa epops: according to Fry (1978b: 319), P.J.K. Burton's anatomical researches showed that the Hoopoe, a universally accepted monospecific family, has affinities with the purely Afrotropical wood- hoopoes Phoeniculidae. *Upupa epops* is an open country, hole-nesting, ground-foraging species with an enormous range over much of the Old World including Madagascar but not reaching islands and Australia or into absolute deserts. Though Voous (1960) assigned the Hoopoe to his Old World faunal type category, I prefer, in view of the species' African range and affinities, to regard it as an Afrotropical-Eurasian element for the time being - this does not mean that the species actually originated in Africa - it could have originated in Eurasia from an ancestral form from which both it and the wood-hoopoes evolved.

Anthus similis, considered by Hall and Moreau (1970: 40) to form a superspecies with the Holarctic alpine, tundra and coastal Water/Rock Pipit *A. spinoletta*, is an Afrotropical open country pipit which extends to South-west Arabia and beyond to Iran and the Indian sub-continent.

Saxicola torquata, as currently understood, is a very wide-ranging species in Africa, Eurasia, Madagascar and some Indian Ocean islands which is probably of Afrotropical origin which subsequently spread to Eurasia, though Voous (1960: 218) assigns it to his Palaearctic faunal type category - but with a reservation! At present the genus *Saxicola* is Eurasian and Malaysian with several species, only *torquata* being in Africa. However, *S. torquata* as understood by Ripley (1964b: 106-111) needs a thorough revision which may show that *torquata* itself may constitute a superspecies; Hall and Moreau (1970: 103) regard *torquata* sensu Ripley to be a member of a superspecies including the Reunion Island *borbonensis*, the Canary Islands Chat *dacotiae*, the White-tailed Bush Chat of northern India *S. leucura*; possibly the large and isolated central Mongolian Hodgson's Bush Chat *S. insignis* should be included within this superspecies. The

South-west Arabian population *felix* is nearer in character to Afrotropical than to northern populations, but the geographically nearest African population to *felix* is the very distinct Ethiopian montane *albofasciata*, so distinct that Hall and Moreau (1970: 103) suggest that it may be an incipient species.

Cisticola juncidis is a member of a grassland species-group within *Cisticola* containing *juncidis* and three Afrotropical and Madagascar species (Lynes 1930; Hall & Moreau 1970: 164). The Zitting Cisticola is, apart from the Golden-headed Cisticola *C. exilis* (India - Philippines and Australia), the sole Afrotropical species of an otherwise purely Afrotropical group to have successfully colonized south and west Eurasia as far as Europe, Japan, Malaysia reaching northern Australia. In South-west Arabia, *juncidis* is the only *Cisticola* species; the Desert *Cisticola C. aridula* of the same species-group is present on the African Red Sea coastlands but, as far as known, absent from Arabia.

Lonchura cantans is here treated as the Afrotropical member, reaching into South-west Arabia, of a superspecies including it and the White-throated Munia (or Silverbill) of the Indian subcontinent *L. malabarica* following Harrison (1964) rather than Hall and Moreau (1970: 353) who regarded these two silverbills as conspecific, and forming with the Grey-headed Silverbill *L. griseicapilla* (of east Africa) a group of three arid country species within the mainly Oriental and Australian *Lonchura* which occupy mesic habitats.

8 The Afrotropical Elements (51)

Scopus umbretta	*Centropus superciliosus*	*Phylloscopus umbrovirens*
Ciconia abdimii	**Otus senegalensis*	*Muscicapa gambagae*
Aegypius tracheliotus* **	*Bubo africanus*	**Terpsiphone viridis*
Terathopius ecaudatus	**Caprimulgus nubicus*	**Anthreptes metallicus*
Melierax gabar	*Caprimulgus inornatus*	**Nectarinia osea*
**Melierax metabates*	*Cysiurus parvus*	**Nectarinia habessinica*
**Aquila verreauxi*	**Halcyon leucocephala*	**Zosterops abyssinica*
Coturnix delagorguei	*Merops albicollis*	**Tchagra senegala*
**Numida meleagris*	*Coracia abssinicus*	E. **Onychognathus tristramii*
Otis arabs	*Tockus nasutus*	*Cinnyricinclus leucogaster*
**Burhinus capensis*	*Calandrella cinerea*	*Passer euchlorus*
Streptopelia roseogrisea	**Hirundo fuligula*	*Petronia dentata*
Streptopelia semitorquata	*Cercotrrichas podobe*	*Ploceus galbula*
Streptopelia lugens	**Cercomela melanura*	E. *Estrilda rufibarba*
**Oena capensis*	*Oenanthe bottae*	E. *Serinus rothschildi*
**Treron waalia*	*Monticola rufocinereus*	E. *Serinus menachensis*
Chrysococcyx klaas	E. *Turdus menachensis*	**Emberiza tahapisi*

*** Torgos tracheliotus per Voous (1977). Ed.*

Moreau (1966: 113), discussing the relationships between the Afrotropical and Oriental avifaunas, remarked: "..... about forty species of birds otherwise known only in Africa breed also in the south-west corner of Arabia ....." but neither listed these species by name nor provided a concise definition of *his* conception of "south-west corner of Arabia". If we take the 51 species listed above, and omit the five endemics (marked E) and the twenty which reach northwards and eastwards to northern Africa (*), the Levant and eastwards in Arabia itself, we have 26 species which fit Moreau's description. We have 26 Afrotropical elements only known in Arabia from the study area. Apart from the wetland *Scopus umbretta* and the two montane species - *Streptopelia lugens* and *Phylloscopus umbrovirens*, the remaining Afrotropical species are mostly species of the arid and semi-arid parts of the Sahel belt and the Horn of Africa which are included in Chapin's (1923) Sudanese and Northeast African provinces or Udvardy's (1975) Eastern Sahel, Somalian and Ethiopian Highland biogeographical provinces. It is obvious that all, including the two montane forest species, and the forms ancestral to the five endemics, have

reached South-west Arabia across a narrow Red Sea not so long ago in recent - very recent - geological time. The five endemics are discussed further on. In South-west Arabia, all these species are restricted to Jennings' (1981) Areas 1b, 2, 3, and 4 in western Saudi Arabia below 1,800 metres altitude and therefore to the same areas in the two Yemens by inference, with most in Jennings' Area 2 - the Tihama, and the arid lowland coastal strip north to about 20 N. Locally, the Afrotropical species can actually constitute the majority of all bird species in these areas. Biogeographically speaking, this little sample of the Afrotropical avifauna is unbalanced in its composition compared to the whole 'continental' avifauna from which it is derived - this lack of balance of faunal composition is a very characteristic feature of 'insular' faunas occupying very small areas. Ten species represent eight characteristic Afrotropical genera; the other genera are present in Eurasia and further as well. As all but the five endemics are discussed in Hall and Moreau 1970, Snow 1978, further mention of these species is unnecessary.

Turdus menachensis is a member of the east and south African *T. olivaceus* superspecies which is mainly montane except in South Africa. This superspecies together with the *T. liboyanus* superspecies are regarded by Hall and Moreau (1970: 132) as sections of the Eurasian - west Pacific *T. merula* - *T. torquatus* - *T. poliocephalus* complex of species and this seems confirmed by S. C. Madge's comment (pers.comm.) that *menachensis* and *merula* appeared to him to be similar in behaviour.
Onychognathus tristramii is a member of the *O. morio* superspecies (Hall & Moreau 1970: 362), also my own examination seems to confirm this. *O. tristramii* seems nearer to the generally wide- ranging Red-winged Starling *O. morio* than to the Eritrean - Somalian Somali Chestnut-winged Starling *O. blythi* of the same superspecies. *O. tristramii* is the sole South-west Arabian endemic of Afrotropical affinities to have a range extending northwards in the mountains bordering the Arabian Red Sea littoral as far north as Palestine; this suggests that this species could be a relic from a warmer period of a few thousand years ago.
Estrilda rufibarba is treated by Hall and Moreau (1970: 342) as a member of the *E. astrild* waxbill species-group, but were uncertain as to which African waxbill within this species-group was possibly the nearest relative of *rufibarba*. Only a comparative ethological study of the Waxbill *astrild*, Black-rumped Waxbill *troglodytes*, Crimson-rumped Waxbill *rhodopyga* and the Arabian Waxbill *rufibarba* will furnish sufficient data to enable the question to be settled with any certainty.
Serinus rothschildi: in his review of 25 Afrotropical *Serinus* species, Rand (1968) made *rothschildi* conspecific with the east and southern African *atrogularis* which he included with seven other *Serinus* species in his Group III diagnosed as yellow-green to grey-brown birds with stubby '*Serinus*' type bills and yellow rumps with a white rump in one species; *atrogularis* being one of the grey-brown species, but with a yellow rump. *S. rothschildi* has a greenish rump and a heavier bill. Hall and Moreau (1970: 273-274) disagreed with Rand's treatment, pointing out that *rothschildi*'s characters are also present in the members of their *sulphuratus* species-group. It would seem advisable to omit *rothschildi* from any *Serinus* species-group till further data, such as ethological, is available.
Serinus menachensis was included by Rand in his Group IV of brown- grey birds (without yellow or green) with three African species - *gularis, menelli* and *tristriatus*, which is the *S. gularis* species-group of Hall and Moreau (1970: 275). To me, the nearest relative of *menachensis* appears to be either the east-central African *S. reichardi* or the juniper - dwelling *S. tristriatus* of the Ethiopian montane regions.

DISCUSSION

A study of the physiographical map of Arabia together with the data presented in previous sections of this paper demonstrates the insular and depauperate character of the South-west Arabia avifauna - as so analysed in this paper, only 118 species which include five endemics of Afrotropical affinity, seven of northern affinity, and two relicts of northern affinities with a complete absence of any relicts of clear Afrotropical affinities, compared with the adjacent parts

of Africa and the Middle East much further north. Later in this discussion , a hypothesis is offered in explanation of this state of biogeographical affairs.

Endemic and relict species: the table below shows the 14 endemic and relict species by taxonomic category and biogeographical affinity. For the purpose of this table, the endemics which extend north, east and south for varying distances are included marked with asterisks.

TABLE II TAXONOMIC CATEGORY AND BIOGEOGRAPHICAL AFFINITIES OF 14 ARABIAN ENDEMIC AND RELICT BIRDS

Species	Endemic	Relict	Affinity
**Alectoris melanocephala*	X		northern
**Alectoris philbyi*	X		northern
**Strix butleri*	X		northern
Picoides dorae	X		northern
Hirundo rupestris		X	Afrotropical
Prunella fagani	X		northern
Turdus menachensis	X		Afrotropical
Sylvia buryi	X		northern
Pica pica		X	northern
**Onychostruthus tristramii*	X		Afrotropical
Estrilda rufibarba	X		Afrotropical
Serinus rothschildi	X		Afrotropical
Serinus menachensis	X		Afrotropical
Acanthis yemenensis	X		northern

As might be expected, the proximity of South-west Arabia to Africa excludes the evolution of at least one endemic genus or any relict species (the case of the rock martins is special, see below) showing clear Afrotropical affinities.

Socotra Island, at a much greater distance from the arid Horn of Africa, has but one endemic genus which is of Afrotropical affinity - *Incana*, a very nondescript warbler considered by Moreau (1966: 355) to be near *Cisticola*. The swallows merit comment: this is the *only* superspecies in the South-west Arabian avifauna represented by two species, each of which occupies separate areas at different altitudinal levels - the northern relict *rupestris* in the mountains and the Afrotropical *fuligula* below it in the arid and desert areas. In contrast to the situation in Sri Lanka with relicts and double invasions discussed by Ripley (1949), there is in South-west Arabia no species-pair resulting from double colonization by the same stock from either Africa or the north with the first producing an endemic and the second conspecific with the 'mainland' species as is the case with the Socotra Bunting *Emberiza socotrana* and the African Rock Bunting *E. tahapisi insularis* on Socotra Island; the Japanese Yellow Bunting *Emberiza sulphurata* and the Masked Bunting *E. spodocephala personata* in Japan; the Taiwan Bulbul *Pycnonoctus taivanus* and the Chinese Bulbul *P. sinensis formosae* on Taiwan; the hill mynas *Gracula ptilogonys* and *G. religiosa indica* on Sri Lanka and a final example - the thornbills *Acanthiza ewingi* and *A. pusilla diemseni* on Tasmania, to give only these few examples. The first member of the species-pair is the descendant of the first invasion, the second member of the later, second invasion. There is **no** parallel case among the birds of South-west Arabia.

The 'Arabian Pier': In explanation of the presence of Indomalayan wet evergreen forest birds isolated at the present time in South India and Sri Lanka from their nearest relatives in Assam and further east, Ripley (1949) postulated a 'pier' of hill ridges across central India and southwards along the west coast being ecologically suitable in past time to permit these rainforest bird species to disperse westwards from Assam to south India and Sri Lanka by this

route. In similar manner, the ancestors of the present -time northern relict birds and endemics of northern affinities could have reached the Asir -Yemen area along the chain of hills and mountains bordering the Red Sea in western Arabia at times during peaks of Pleistocene glaciations when climatic conditions were favourable to these now bare hills, being covered with warm mesic temperate shrub and tree woodlands almost continuously from Palestine to Yemen. At peaks of Pleistocene glaciations in Eurasia, it is inferred that the Sahara and Arabia were even then not much better vegetated than grassland (Moreau 1963, 1966) and it is most significant that no Afrotropical **forest** birds and mammals are known to have reached Africa's Mediterranean littoral. All these known palaeontologically, historically and at the present time are species of grassland or open bush country - in some cases, wetlands. Furthermore, no relict or endemic birds of northern origin are known from the upper levels of the isolated montane blocks in Saharan Africa - which are of insufficient extent to provide the resources capable of sustaining small isolated populations, nor are these montane blocks connected to the north by chains of hills. Neither are any relict or endemic bird species of northern origin known from the mountains of northern Oman (Djebel Akhdar in Muscat), though a goat *Hemitragus jayakari* of Himalayan and Indian Peninsular affinity is known to be present in these mountains. No parallel case in birds is known. Only the Asir -Yemen montane block is physiographically connected to the north by a range of hills, and it is only this montane block which is the area of northern relicts and endemics in Arabia.

The Afrotropical problem in South-west Arabia: Jennings has pointed out (*pers. comm.*) that the Afrotropical species outnumber all others of other faunal types in the Tihama and the foothills on the Red Sea slope up to about 1,800 metres altitude, above which they decrease to a small proportion of the whole, with a secondary increase in number on the desert fringe of the eastern slope of the mountains, followed by gradual decrease in number eastwards. Data is insufficient to illustrate this fact with precise percentages for each main group of faunal elements of the whole. If we reduce the eight faunal type categories of TABLE I to just three, we have: Afrotropical 51 (43.4%), Saharo-Sindian 25 (21.2%) and 'Others' 42 (35.4%) for the whole area. Thus we have the 51 Afrotropical species dominant in number in a very small area, relatively speaking of the whole study area - unfortunately, no recent data is readily available from South Yemen to enable further analysis to be made, but it is not anticipated that such additional data, when forthcoming, would significantly alter the overall biogeographical picture. Limits between major faunal realms are not as sharp and exact as might be inferred from the literature, for there is always a certain amount of two - way penetration by elements of both areas in inverse ratio to distance. It should be noted that whereas other faunal realms are separated by water or grade into each other, the Afrotropical and the Holarctic are separated by a wide arid zone with its own rather distinct fauna - the Saharo-Sindian whose faunal elements are the hot arid elements of Voous' Palaeoxeric faunal type. Unlike China where Oriental and Palaearctic realms meet and merge over a large intermediate zone with Magpie *Pica pica* reaching south China and Paradise Flycatcher *Terpsiphone paradisi* reaching Manchuria, the Magpie does not reach Afrotropical Africa and no Afrotropical paradise flycatcher *Terpsiphone* reaches Europe. This biogeographical phenomenon is termed by Darlington (1957: 453-454, *Fig.* 53) "faunal transition" and he defines the term with explanation.

CONCLUSION

Whilst Meinertzhagen (1954) - birds only - and Udvardy (1975) - all plants and animals - would include South-west Arabia with the rest of the Arabian Peninsula in the Palaearctic, other workers on various animal groups would draw their lines of faunal demarcation between Afrotropical (-Ethiopian) and Palaearctic at various points across the Peninsula. Chapin's Line (Ripley 1954: *Fig.* 1) actually indicates the northern and the eastern limits of several purely

Figure 1

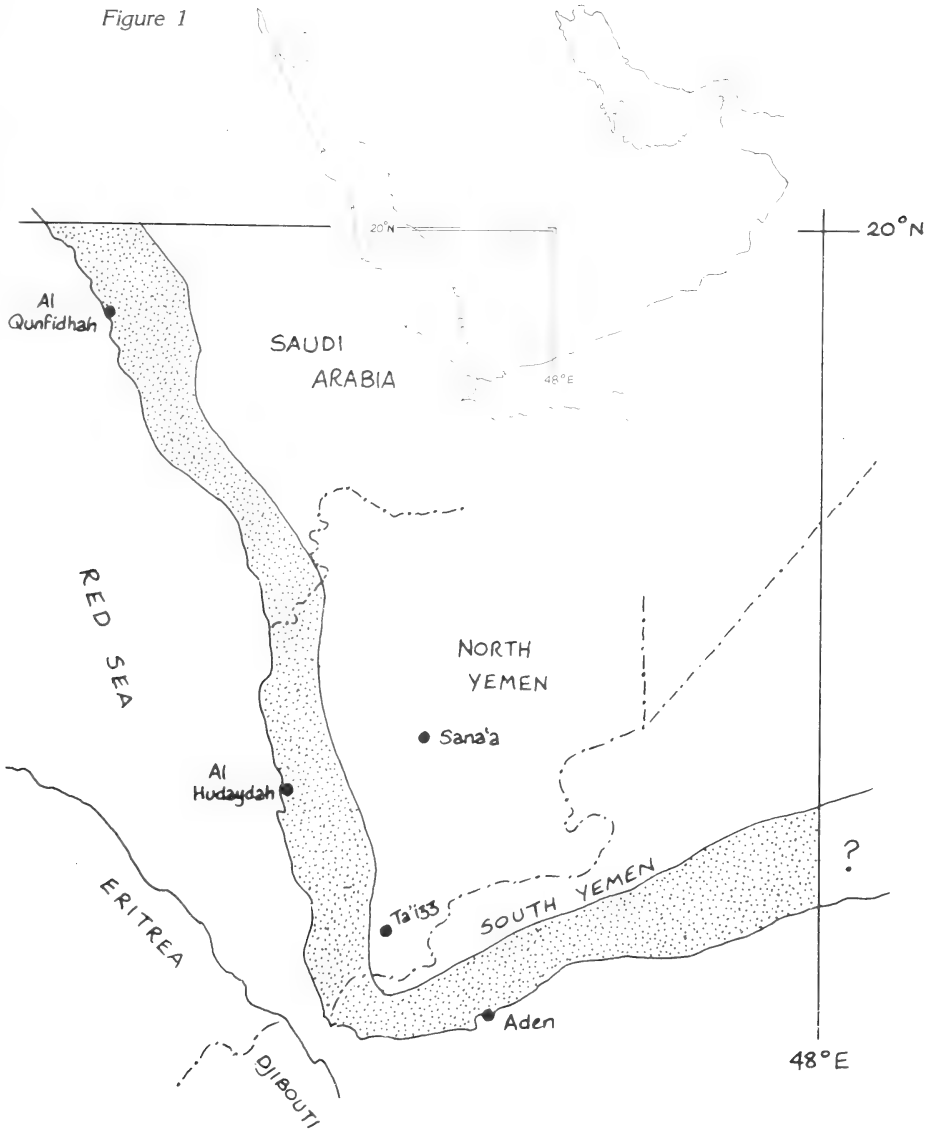

Figure 2 showing South-west Arabia within the limits of 20°N and 48°E.
The stippled area is the area occupied by the predominantly Afrotropical element in the South-west Arabian avifauna and this area is referable to the Afrotropical Region. The eastern limit is uncertain in the Hadramaut.

Figure 1 showing the Arabian Peninsula with double black line enclosing the South-west Arabian study area between 20° N and 48°E and the Red Sea and the Gulf of Aden.

Afrotropical elements in Arabia, whether these dominate the local avifauna or not. For the birds, it would seem better to draw this arbitrary line as being parallel to the Red Sea and the Gulf of Aden coasts to include the Tihama north to 20 N and in South Yemen, eastwards to an uncertain point in the Hadraumaut. (See *Figures* 1 & 2). Within this limit, truly Afrotropical bird species are the dominant element; beyond the limit north and eastwards, these rapidly diminish in number to Chapin's Line. The remainder of the bird species - 68 in all - are northern relicts, endemics of northern affinities, Saharo-Sindian and widespread in Eurasia, most south Eurasian including Indian. Agreement among biogeographers over the optimum assignment of the Arabian Peninsula or any part of it to one or other of the major biogeographical realms cannot be achieved as no faunal or floristic realm devised for any one biological group can match perfectly that for any other group.

SUMMARY

An analysis was carried out on the 118 breeding or presumed breeding, land and freshwater bird species of South-west Arabia and this revealed that 51 species, or 43.4% of the total, are purely Afrotropical with the majority restricted to a narrow strip of territory facing Africa on the Red Sea slopes, where these locally preominate in the local avifauna with some species extending further north and east. These 51 species include the five endemics of purely Afrotropical affinities. The remainder of the endemics (seven species) and the two relicts are of northern provenance without any close relatives in the Afrotropical avifauna. It is recommended that for the purposes of avian biogeography, this Red Sea and Gulf of Aden slope below 1,800 metres altitude south from 20 N. and eastwards to an uncertain point in the Hadraumaut be assigned avifaunally to the Afrotropical area and the remainder of the Arabian Peninsula to the Holarctic avifaunal area.

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APPENDIX

SYSTEMATIC LIST OF 118 SOUTH-WEST ARABIAN BREEDING BIRD SPECIES

The species sequence and English names generally follow that of Voous (1977) but English names of species unmentioned by Voous are those of Mackworth-Praed and Grant (1952, 1955) unless modified where desirable by Hall and Moreau (1970: 384-406). Members of superspecies are indicated with the second part of the three - part nomenclatural combination enclosed in parentheses as suggested in the first example of Recommendation 6B, ICZN Code (1985: 11); for definition of the superspecies concept, see Amadon (1966) and for its usage in biogeographical analyses, see Mayr and Short (1970: 2-3). Species which are not members of a superspecies are indicated by the usual binominal combination.

Tachybaptus (ruficollis) ruficollis Pallas 1764	Little Grebe
Bubulcus ibis Linnaeus 1758	Cattle Egret
Scopus umbretta Gmelin 1789	Hammerkop
Ciconia abdimii Lichtenstein 1823	Abdim's Stork
Milvus migrans Boddaert 1783	Black Kite
Gypaetus barbatus Linnaeus 1758	Lammergeyer
Neophron percnopterus Linnaeus 1758	Egyptian Vulture
Gyps (fulvus) fulvus Hablizl 1783	Griffon Vulture
Aegypius tracheliotus Forster 1791	Lappet-faced Vulture
Terathopius ecaudatus Daudin 1800	Bateleur
Melierax (canorus) metabates Heuglin 1861	Dark Chanting Goshawk
Melierax gabar Daudin 1800	Gabar Goshawk
Accipiter (badius) badius Gmelin 1788	Shikra
Buteo rufinus Cretzschmar 1827	Long-legged Buzzard
Aquila rapax Temminck 1828	Tawny Eagle (Africa)
	Steppe Eagle(Eurasia)
Aquila (chrysaetos) chrysaetos Linnaeus 1758	Golden Eagle
Aquila verreauxi Lesson 1830	Verreaux's Eagle
Hieraaetus fasciatus Vieillot 1822	Bonelli's Eagle (Eurasia)
	African Hawk Eagle (Africa)
Falco (tinnunculus) tinnunculus Linnaeus 1758	Kestrel
Falco (concolor) concolor Temminck 1829	Sooty Falcon
Falco (peregrinus) pelegrinoides Temminck 1829	Barbary Falcon
Falco (cherrug) biarmicus Schlegel 1843	Lanner
Alectoris (graeca) melanocephala Rüppell 1835	Arabian Red-legged Partridge
Alectoris (chukar) philbyi Lowe 1934	Philby's Rock Partridge
Ammoperdix (heyi) heyi Temminck 1825	Sand Partridge
Coturnix (coromandelica) delagorguei Delagorgue 1847	Harlequin Quail
Numidea meleagris Linnaeus 1758	Helmeted Guineafowl
Gallinula (chloropus) chloropus Linnaeus 1758	Moorhen
Otis (arabs) arabs Linnaeus 1758	Great Arabian Bustard
Burhinus capensis Lichtenstein 1823	Spotted Thick-knee
Cursorius cursor Latham 1787	Cream-coloured Courser
Pterocles lichtensteini Temminck 1825	Lichtenstein's Sandgrouse
Pterocles coronatus Lichtenstein 1823	Coronetted Sandgrouse
Pterocles senegallus Linnaeus 1771	Spotted Sandgrouse
Pterocles exustus Temminck 1825	Chestnut-bellied Sandgrouse
Columba livia Gmelin 1789	Rock Dove
Streptopelia (decaocto) roseogrisea Sundevall 1857	African Collared Dove
Streptopelia semitorquata Rüppell 1837	Red-eyed Dove
Streptopelia (lugens) lugens Rüppell 1837	Dusky Turtle Dove

Streptopelia senegalensis Linnaeus 1766	Palm Dove
Oena capensis Linnaeus 1766	Namaqua Dove
Treron (australis) waalia Meyer 1793	Yellow-bellied Green Pigeon
Chrysococcyx klaas Stephens 1815	Klaas' Cuckoo
Centropus superciliosus Hemprich & Ehrenberg 1833	White-browed Coucal
Otus (scops) senegalensis Swainson 1834	African Scops Owl
Bubo africanus Temminck 1821	Spotted Eagle Owl
Athene (noctua) noctua Scopoli 1769	Little Owl
Strix (aluco) butleri Hume 1878	Hume's Tawny Owl
Caprimulgus inornatus Heuglin 1869	Plain Nightjar
Caprimulgus nubicus Lichtenstein 1823	Nubian Nightjar
Apus (pallidus) pallidus Shelley 1870	Pallid Swift
Apus (melba) melba Linnaeus 1758	Alpine Swift
Apus affinis Gray 1830	Little Swift
Cypsiurus (parvus) parvus Lichtenstein 1823	African Palm Swift
Halcyon leucocephala Müller 1776	Grey-headed Kingfisher
Merops albicollis Vieillot 1817	White-throated Bee-eater
Merops orientalis Latham 1801	Little Green Bee-eater
Coracias (garrulus) abyssinicus Herman 1783	Abyssinian Roller
Upupa epops Linnaeus 1758	Hoopoe
Tockus nasutus Linnaeus 1766	Grey Hornbill
Picoides dorae Bates & Kinnear 1935	Arabian Woodpecker
Mirafra (javanica) cantillans Blyth 1844	Singing Bush Lark
Eremopterix (grisea) nigriceps Gould 1841	Black-crowned Finch Lark
Ammomanes (phoenicurus) cincturus Gould 1841	Bar-tailed Desert Lark
Ammomanes (deserti) deserti Lichtenstein 1823	Desert Lark
Alaemon (alaudipes) alaudipes Desfontaines 1789	Hoopoe Lark
Calandrella (personata) dunni Shelley 1904	Dunn's Lark
Calandrella (cinerea) cinerea Gmelin 1789	Red-capped Lark
Galerida cristata Linnaeus 1758	Crested Lark
Hirundo (rupestris) rupestris Scopoli 1769	Crag Martin
Hirundo (rupestris) fuligula Fischer & Reichenow 1884	African Rock Martin
Hirundo (daurica) daurica Linnaeus 1771	Red-rumped Swallow
Anthus novaeseelandiae Gmelin 1789	Richard's Pipit
Anthus (spinoletta) similis Jerdon 1840	Long-billed Pipit
Pycnonotus (barbatus) xanthopygos Ehrenberg 1833	Black-capped Bulbul
Prunella (atrogularis) fagani Ogilvie-Grant 1913	Arabian Accentor
Cercotrichas podobe Müller 1776	Black Bush Chat
Cercomela melanura Temminck 1824	Blackstart
Saxicola (torquata) torquata Linnaeus 1776	Stonechat
Oenanthe (pileata) bottae Bonaparte 1854	Red-breasted Wheatear
Oenanthe (lugens) lugens Lichtenstein 1823	Mourning Wheatear
Oenanthe monacha Temminck 1825	Hooded Wheatear
Oenanthe (leucura) leucopyga Brehm 1825	White-crowned Black Wheatear
Monticola (saxatilis) rufocinereus Rüppell 1837	Little Rock Thrush
Turdus (olivaceus) menachensis Ogilvie-Grant 1913	Yemen Thrush
Cisticola juncidis Rafinesque 1810	Fan-tailed Warbler
Prinia gracilis Lichtenstein 1823	Graceful Warbler
Scotocerca inquieta Cretzschmar 1826	Scrub Warbler
Sylvia (hortensis) leucomelaena Hemprich & Ehrenberg 1823	Arabian Warbler
Sylvia buryi Ogilvie-Grant 1913	Arabian Tit Warbler
Phylloscopus umbrovirens Rüppell 1840	Brown Woodland Warbler
Muscicapa (striata) gambagae Alexander 1901	Gambaga Dusky Flycatcher

Terpsiphone (paradisi) viridis Müller 1776	Grey-breasted Paradise Flycatcher
Turdoides (fulvus) squamiceps Cretzschmar 1817	Arabian Babbler
Anthreptes (platurus) metallicus Lichtenstein 1823	Nile Valley Sunbird
Nectarinia habessinica Ehrenberg 1828	Shining Sunbird
Nectarinia (asiatica) osea Bonaparte 1856	Palestine Sunbird
Zosterops abyssinica Guerin-Meneville 1843	White-breasted White- eye
Tchagra senegala Linnaeus 1766	Black-headed Bush Shrike
Lanius (excubitor) excubitor Linnaeus 1758	Great Grey Shrike
Pica pica Linnaeus 1758	Magpie
Corvus (corax) ruficollis Lesson 1831	Brown-necked Raven
Corvus (albicollis) rhipidurus Hartert 1918	Fan-tailed Raven
Onychognathus (morio) tristramii Sclater 1858	Tristram's Grackle
Cinnyricinclus (leucogaster) leucogaster Boddaert 1783	Amethyst Starling
Passer (domesticus) domesticus Linnaeus 1758	House Sparrow
Passer (luteus) euchlorus Bonaparte 1851	Arabian Golden Sparrow
Petronia (xanthicollis) dentata Sundevall 1850	Lesser Rock Sparrow
Ploceus (velatus) galbula Rüppell 1840	Rüppell's Weaver
Estrilda rufibarba Cabanis 1851	Arabian Waxbill
Lonchura (malabarica) cantans Gmelin 1789	African Silverbill
Serinus rothschildi Ogilvie-Grant 1902	Yellow-rumped Serin
Serinus menachensis Ogilvie-Grant 1913	Yemen Serin
Rhynchostruthus socotranus Sclater & Hartlaub 1881	Golden-winged Grosbeak
Acanthis (cannabina) yemenensis Ogilvie-Grant	Yemen Linnet
Bucanetes (githgineus) githagineus Lichtenstein 1823	Trumpeter Finch
Emberiza striolata Lichtenstein 1823	House Bunting
Emberiza tahapisi Smith 1836	African Rock Bunting

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NOTES TO CONTRIBUTORS

The Editorial Committee of *Sandgrouse* will consider for publication original papers in the English language which contribute to the body of knowledge of the birds of the Middle East, their distribution, breeding biology, identification, conservation etc. The Middle East for this purpose includes Turkey and Libya in the west to Afghanistan and the Palaearctic fringe of Pakistan in the east, the southern shores of the Black and Caspian Seas in the north to the Arabian peninsula and the Palaearctic limits in the Sudan and Ethiopia in the south.

Submissions will be considered on the understanding that the work has not been previously published or offered for publication to any other journal.

Submissions should be in duplicate and must be typewritten on one side of the paper only and with double spacing. The approximate position of figures and tables should be indicated in the margin. Authors should consult a recent copy of Sangrouse and follow the conventions in use for section headings, tables, captions, references, dates abbreviations etc. A full length paper should include a summary not exceeding 5 per cent of the total length.

The English vernacular name and the scientific name of birds mentioned should follow Voous,K.H.1977. *List of Recent Holarctic Bird Species* B.O.U., London.

Figures and diagrams should be drawn in black ink on white paper or board and should follow the proportions in previous *Sandgrouse* issues. Good quality colour or black and white photographs may be included, subject to cost.

Authors will normally receive galley proofs of their papers; these should be corrected and returned to the Editor without delay. Textual changes cannot be made at proof stage under any circumstances.

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All manuscripts should be addressed to the Editor, *Sandgrouse,* O.S.M.E., c/o The Lodge, Sandy, Beds., SG19 2DL.

CORRIGENDA

Sandgrouse 4, 1982

Observations on Migrant Birds at Azraq and North-east Jordan, up to April 1967 *by* D.I.M.Wallace pp.77 - 99 p.94 line 30: Delete *"Ficedula semitorquata"* and "Semi-collared Flycatcher" and substitute *"Ficedula hypoleuca* and "Pied Flycatcher".

Sandgrouse 6, 1984

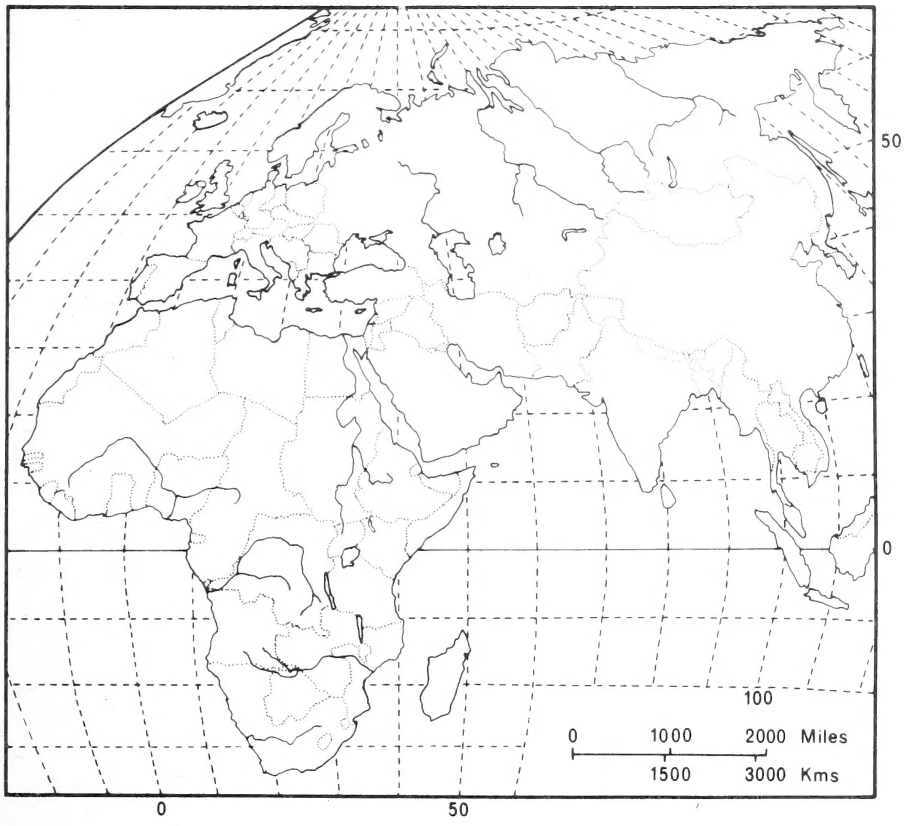
Birds seen on an Expedition to Djibouti *by* G. & H.Welch. pp. 1 - 23 p.19 lines 1 to 4: Delete entry under "Rüppell's Warbler". The authors now consider that their views of this single bird were not adequate enough to positively eliminate Ménetriés' Warbler *Sylvia mystacea*

Selected Observations from Lebanon, Syria and Jordan in Springs of 1963 and 1966 *by* D.I.Wallace pp.24 - 47 p.39 lines 10 and 12. Delete "*Milvus milvus*" and "*M.milvus*" and substitute "*Milvus migrans*" and "*M.migrans*"

Booted Eagles in Intermediate Plumage seen at Eilat, Israel *by* V.Holmgren. pp. 76 - 79.

p. 76 fourth line from bottom: Delete "*plate 11*" substitute "*plate 12*". p.78 penultimate line: Delete "*Plate 12*" and substitute "*Plate 11*".

Plates 11 and *12* centre pages. The captions have been wrongly ascribed; please transpose the captions.



An equal-area map of the Palaearctic, Oriental and Afrotropical zoogeographical regions. O.S.M.E.'s area lies in the centre of the map (see *Notes to Contributors*) which also embraces the breeding grounds and winter quarters of the vast majority of the migrants that pass through the area.

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