

THE ORNITHOLOGICAL
SOCIETY OF THE
MIDDLE EAST



SANDGROUSE
No 5

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

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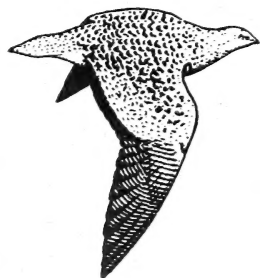
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2. To encourage an interest in and conservation of the birds of the Middle East.
3. To develop a mutually beneficial working relationship with all environmental and conservation bodies and natural history societies in and concerned with the Middle East.

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Michael Jennings and Alan Vittery

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FOREWORD

This volume of *Sandgrouse* reflects both the wide range of study possible in such a diverse geographical area as the Middle East and the inevitable concentrations by bird-watchers on the more spectacular phenomena, such as raptor migration.

With the exception of No. 1, each volume of *Sandgrouse* has contained a major paper on raptors. This has undoubtedly helped to create a better understanding of the migration patterns at the principal localities and the numbers of birds involved, and systematic counting could, over the years, provide valuable comparative data on which assessments of population trends and breeding success could be based. But there is the danger that the present uncoordinated approach could prove counter-productive. Already there are indications of inexplicable inconsistencies in the records being submitted from the same locality by different observers. Organised groups of observers can generally be far more effective, and less error-prone, than individuals. For the data to be of real value therefore, rather than merely 'of interest', a more rigorous and a standardised approach to raptor counting is required. OSME is however, in no position to vet observations submitted in papers and has taken the view that its role is to publish, in the belief that inconsistencies will be resolved by further research and evidence.

It would be a pity if the sheer spectacle of raptor migration were allowed to distort the overall research effort. It is therefore encouraging to see the 'spin-off' from the prolonged observations at the Bosphorus appearing in the form of a paper on the migration of passerines and near-passerines.

Some readers may be concerned, in these days of sophisticated field identification techniques, to see reference in the paper on Siwa and Qattara to the collection of specimens. Apart from the exceptional need to substantiate a species or race suspected to be new to science, OSME would not support the taking of specimens from the purpose of identification. However, it is prepared to consider publishing relevant data on specimens collected for *bona fide* scientific research as long as the laws and regulations of the country in question are fully respected.

Lindon Cornwallis
David Fisher
Chris Harbard
Michael Jennings
Alan Vittery

EDITORIAL

The Editorial Committee draws attention in the Foreword to certain problems that it faces in selecting papers for publication. Notwithstanding these questions we trust that prospective authors will continue to submit work freely for consideration and for the first time we include in this volume, inside the back cover, 'notes for contributors'. If we are to maintain the high standard already achieved in the first five volumes of *Sandgrouse* we do need a much higher rate of submission that is forthcoming at present.

In this volume we are glad to welcome Ian Wallace's further instalment of the 'Azraq papers' together with his supporting evidence for the first records of the occurrence of a race of *Oenanthe picata* in Jordan. Rob Bijlsma presents a masterly account of his team's impressive observations of raptors at Suez in the autumn of 1981 while Richard Porter's paper on passerine migration at the Bosphorus helps to fill an obvious gap in such studies. We are pleased to publish a contribution from India by Professor R. M. Naik and B. M. Parasharya on the puzzling colour phases of the Indian (Western) Reef Heron. The paper on the Siwa Oasis and the Qattara Depression by Steve Goodman and Peter Ames brings together important records from a little known area in Egypt which is threatened by a grandiose flooding project. Simon Albrecht presents evidence, gleaned in Turkey, of the possible hybridization between Tree and House Sparrow, an occurrence which is found only scarcely in the literature. Colin Harrison's note on the Saunder's Little Tern will help to resolve difficulties concerning the distribution and identification of that species in its Middle Eastern range and finally David Morgan's paper throws some light on the prey of the Eagle Owl in Turkey. We are indebted to all these authors.

As in previous issues scientific nomenclature follows the *List of Recent Holarctic Bird Species* by K. H. Vuoss, B.O.U., London, 1977. In general the English vernacular names also follow that work.

I have received help and advice from a number of people and in particular I would like to record my appreciation of such to Steen Christensen, Mike Everett, Tim Inskipp, Derek Lees-Smith, Richard Porter, all members of the Editorial Committee and my wife, Joyce.

Donald Parr

THE BREEDING BIRDS OF THE AZRAQ OASIS AND ITS DESERT SURROUND, JORDAN, IN THE MID-1960s

by

D. I. M. Wallace

INTRODUCTION

This is the second paper to examine in detail the ornithological data gathered at and around Azraq in April and May, 1963, 1965 and 1966. In its attempt to clarify particularly the full variety and habitat preferences of breeding birds, past records from 1922 and 1955, a few from other seasons up to September 1965 and some from the basalt and brown soil desert north-east of Azraq are included. Records from 1967 onwards are excluded, except in discussion.

Two earlier summaries of the mid-1960s breeding bird population, prepared largely by I. J. Ferguson-Lees, appeared in Hemsley and George (1966) and Morton Boyd (1967). These accounts listed 63 species, for which breeding had been proved or suspected. This paper lists 66 species, of which 28 were proved to breed successfully, 20 almost certainly bred, 12 may have bred and 6 tantalised.

NATURE OF OBSERVATIONS ON BREEDING AND BEHAVIOUR

Exploration of the Azraq oasis and its desert surround continued throughout all periods of observations. This behaviour prevented any standard, year-on-year survey of breeding birds. At the oasis, the (then) prolific vegetation of the outfalls was difficult to penetrate, let alone search effectively, and in the desert, even identically routed surveys of the same wadi could be thwarted by the vagaries of temperature and weather, most notably afternoon duststorms. Nevertheless, after the learning year of 1963, nearly all observations were disciplined against a standard register and later analysed by habitat.

TABLE I displays the overall balance of observations within the basic divide of oasis and steppe/desert habitats. It can be seen that the oasis attracted a level of observations quite out of proportion to its part within the whole explored area of c. 1,250 sq. km. Nevertheless five desert areas with substantial bird communities were surveyed in all three years and it is unlikely that any regular breeding species was missed.

HABITATS OF BREEDING BIRDS

Detailed accounts of the wetland, degraded steppe and desert habitats at and around Azraq can be found in Hemsley and George (1966) and Morton Boyd (1967). Unfortunately, their work came too late to be set as a discipline but TABLE II restructures their classification of vegetation to allow a cross-match of the observed breeding bird communities. As a display of the habitat profiles of breeding species, TABLE II is both incomplete and repetitious (with five species unassignable to habitat type due to insufficient registrations and seven species occurring broadly across desert habitats and two others) but it does demonstrate immediately the two dominant communities of breeding birds: those of the freshwater marshes at Azraq and of the wadi systems of the limestone hammada. No other habitats support such diverse communities though those of the seasonal wetlands and the basalt edge were distinct.

The habitats at, and particularly around, Azraq did not support a constant bird community. With hindsight, it has become clear that it was subject to alterations caused by short-term climatic and vegetational fluctuations. These were evident in nearly all habitats but appeared most obvious against the variable surface vegetation of the hammada and its intersperses. They undoubtedly stemmed from the preceding winter climate, locally judged to be 'normal' in 1962/63, 'wet' in 1964/65 and 'dry' in 1965/66. The alterations included opportunistic breeding by aquatic species, withdrawals or non-breeding behaviour in desert species and invasions by nomadic and migrant

species. In this respect, the observations of Clarke (1980) at Shaumari from 1975 to 1977 provide a fascinating extension of the mid-1960s work at and near that area. Against a potential of 15 breeding species (judged against habitat type), 12 were found in 1963, 1965 and 1966 but only 10 were present during the intensive survey of the next decade.

It remains to stress that essentially the Azraq community inhabits one huge drainage basin (see *Figure 1*. Morton Boyd 1967), with water running or widely standing from December to April and the continual redeposition of silt providing annual chances for plant regeneration and dispersal. Though much of its surround appears to be so, the basin is not in any full ecological sense a true desert. It should be particularly noted that the mid-1960s observations at the oasis were made in a period of relative ecological stability. Although water extraction from the northern spring (at Azraq Druz) began in 1932 and there was a peat fire in the western marshes in 1957, the oasis still appeared at first and last sight to be Meinertzhagen's "perfect paradise for birds". Its relatively water- and plant-less state in 1979 (Conder 1981) could not be imagined by the 1960s expedition members and the overall diversity of the mid-1960s breeding population, stemming from the conjoint occurrence in a relatively small area of oasis, of seasonal floods and two abutting desert surfaces, was marked. Indeed, compared to those of similar latitudes at Lake Huleh, Israel (Zahavi 1957) and around Habbaniya, Iraq (Chapman & McGeogh 1956), the Azraq community appears to have been unique in its complexity. The failure to sustain the full conservation measures envisaged in the management plan of 1966 is a bitter harvest, the more so given the findings of Clarke (1980) which have demonstrated the potential for recovery in the new reserve at Shaumari.

INCIDENCE OF BREEDING BIRDS IN THE MAIN HABITATS

In 1963, 1965 and 1966, the numbers of observed breeding birds were all logged or registered but the final analysis does not allow any overall quantification of the oasis and desert communities. In the case of the former, counts were made (and estimates revised) annually and these are given individually in the systematic list and summarised in TABLE III. The numbers of breeding birds within the numbers of all birds using the oasis in spring were noticeably low (and the presence of at least 14 species apparently fickle). Overall they were continuously swamped by those of migrant and unqualified birds, whose peak presence in the same month has been roughly measured by Wallace (1982) at up to 20 times greater than that of even the interpolated breeding population in TABLE III.

In the case of the steppe/desert communities, measured broad line counts were made in 52 widely scattered localities and the incidences of birds therein calculated against total count lengths. These quotients are given in TABLE IV. It should be noted that the habitat types reflect the actual character of the explored localities and do not fully match the basic classification given in TABLE II. The numbers of breeding birds within the number of all birds varied markedly and overall they were fewer in the 52 localities than migrants and unqualified birds, providing only 43% of all disciplined registrations. This comment should not be taken to imply that such a balance was typical of the entire steppe/desert surround at Azraq. The patchwork of habitats, with wadi systems, rocky hilltops, basalt flow and limestone hammada dominant, invites no such event even in periods of peak passage.

A PROFILE OF THE MID 1960s BREEDING SPECIES

Of the 66 species proved or suspected to be breeding, 33 were non-passerines and 33 were passerines. Of the former, 21 were aquatic and 12 non-aquatic species; of the latter, seven were aquatic and 26 non-aquatic species. Of the total of the 28 aquatic species, at least 21 were confined to the Shishan and Druz freshwater outfalls, with their presence therein sustained fundamentally by the underground aquifers. They formed no part of either the seasonal water or the steppe/desert communities. Of the total of 38 non-aquatic species, one – the Rock Dove – was totally dependent on the artificial habitat of ancient castles. Of the 37 others, eight exploited villages, marginal cultivation and disturbed land but these niches were important only for three – the Short-toed Lark,

the House Sparrow and the Goldfinch. In strict terms, the profile of the natural steppe/desert community can be reduced to seven non-passerines exploiting impermanent water and steppe niches and 11 non-passerines and 23 passerines exploiting mainly the limestone hammada, its wadi systems and the edge of the basalt shield. Within the basalt shield, the profile contracted dramatically to two non-passerines and four passerines or only six out of the 38 steppe/desert species.

Of the 66 breeding species, at least 19 and probably 26 were residents and at least 33 were migrants. These assignments depend however on somewhat piecemeal data (other than Clarke's work at Shaumari) and seven species continue to defy any conclusion. Residence or the lack of total withdrawal was most marked in the steppe/desert community, with 17 out of 38 species present throughout the year. It was much less so in the aquatic community, with only nine out of 28 species staying on to rub shoulders with the heavy winter immigration of other birds. Of the 33 migrants, at least 16 were clearly dogged by the erratic state of their habitats or the tiny size of their potential breeding groups.

KEY TO TREATMENT IN SYSTEMATIC LIST

Localities and habitats:

The best maps of the Azraq area are found in Hemsley and George (1966). They show particularly well the divide between the limestone and basalt surface, the drainage basin and the distribution of the major habitats. The best map of the Shishan out-fall – the most closely explored of all aquatic habitats – is in Conder (1981). The location of 29 other areas and places was shown by Wallace (1982). Good photographs of the hammada and a well vegetated wadi spread were published by Clarke (1980). *Figure 1* illustrates the essential topography of the area and locates the main areas of the 1960s observations.

Assessment of breeding bird numbers

As already indicated, no standard measure was applied and only approximations, as in TABLE III and IV, were made. In the case of the broad line counts in the desert, the width of the front covered by the two main observers rarely exceed 100 metres in wadis or 200 metres in the most open hammada. All comparable estimates, e.g. for larks, have been made strictly within the discipline of the register.

Dating

Details of days, months and year are generally suppressed except where such appear significant for an individual species or can be applied to the various stages of the breeding cycle.

Breeding status

In this paper, the bald categories of breeding status adopted by Ferguson-Lees – 'proved', 'almost certain', and 'no direct evidence' – have been revised and extended into five classes that echo those now used in British breeding bird surveys. These are:

- 1 breeding proved by the finding of nests, nests with eggs, chicks and fledged young
- 1/2 breeding virtually proved by the finding of apparent nests, sitting birds and persistent breeding behaviour
- 2 breeding indicated by territorial, sexual or nest building activity
- 2/3 probable breeding indicated by territorial and sexual activity but perhaps subject to failure or later departure
- 3 possible breeding indicated by pressure of paired birds, marked localisation and long duration of presence but with supporting records not containing any pronounced breeding activity and indicating later departure

With the benefit of hindsight, particular attention has now been paid to the temporal pattern of observations. All potentially breeding species with few or no May records have been particularly closely examined and relegated to class 3 or excluded.

In addition to the above classification, the capitals R and M are used to indicate respectively whether the breeding species was in the mid-1960s a resident in, or a migrant to, the area. No assignment is made in the case of problematic observations.

CLIMATE, PERIODS OF OBSERVATION AND MAIN OBSERVERS

These have already been detailed in Wallace (1982). It should be noted that the registered data on breeding birds were acquired in 38 days of the 1963, 1965 and 1966 visits, with the second half of April providing the bases of most comparisons between the years.

SYSTEMATIC LIST

- Tachybaptus ruficollis* **Little Grebe** (2) R
Oasis, Shishan, secluded pools, 3-4 pairs trilling loudly.
- Ixobrychus minutus* **Little Bittern** (2/3) M
Oasis, Shishan, rushy areas, up to 2 males (thumping in 1966) and 2 females.
- Ardea purpurea* **Purple Heron** (1) M
Oasis, Shishan, dense, tall reeds, numbers obscured within up to 40 migrants but nest building seen on 3 May 1965 and two nests found on 10 May 1966, with clutches of 4 and 5.
- Tadorna tadorna* **Shelduck** (2/3) ?
Qa El Azraq, edges of outfalls and saline lake, 4-5 pairs courting in 1963 and 1965. None in 1966. Seen by Hollom in April 1955.
- Anas platyrhynchos* **Mallard** (1) R
Oasis, Shishan, freshwater marshes, 9-15, perhaps 30 pairs. Duck flushed from small ducklings on 19 April.
- Anas querquedula* **Garganey** (2/3) M
Oasis, Shishan, freshwater marshes, apparently 4-10 pairs, some in courtship flight.
- Circus aeruginosus* **Marsh Harrier** (2) R
Oasis, Shishan and Druz, dense reedbed, 2 males and up to 5 females, forming 3-4 pairs, with regular entry points. Several seen by Hollom in April/May 1955. Two pairs in display seen by Conder in February 1979.
- Falco tinnunculus* **Kestrel** (1) R
Desert, Wadis Aseimir and Muheilan, relict mature *Pistacia atlantica* and (once) Qasr Amra, up to 4 pairs. 8 nests inspected between 24 April and 11 May contained a dead female, clutches of 1, 2, 3, 4 (twice) and broods of 2 (twice) and 4; of these, one clutch of four and all the broods were found in a remarkable colony of four nests set in two *Pistacia* only 80 metres apart on 11 May 1966. All tree nests were formerly those of *Corvus ruficollis*.

- Alectoris chukar* **Chukar** (1) R
Desert, lower edges of basalt Jebel Uweinid and basalt ridge above Wadi Aseikhim, respectively 5 adults (including a hen with 8 eggs taken by villagers) and 12 adults (including parties of up to 6 and a pair with 7 flying juveniles). Closely associated with relatively rich flora of basalt edge (see Hemsley and George 1966; Meinertzhagen 1924).
- Ammoperdix heyi* **Sand Partridge** (3) ?
Desert, basin of Wadi Rajil, a small partridge, 26 April 1965, silt dunes north of Qa El Azraq, two others, 10 September 1965. Undoubtedly *Ammoperdix*. *A. heyi* identified near Qasr El Kharanah on 24 October 1922 (Meinertzhagen 1924) and again at Shumari from July to September 1977 (Clarke 1980).
- Coturnix coturnix* **Quail** (2/3) M
Oasis, Shishan, bird flushed from dense shrub, whence came cheeping calls, 22 September 1965.
- Rallus aquaticus* **Water Rail** (2) R
Oasis, Shishan, dense, lower marsh vegetation, 9-12, perhaps 20 pairs, very active and often calling (including sharming).
- Porzana pusilla* **Baillon's Crake** (1) M
Oasis, Shishan, dense but relatively open surround to reed and tamarisk complexes, 5-10 pairs. Nest with clutch of 5 found 17 April 1963.
- Gallinula chloropus* **Moorhen** (2/3) R
Oasis, Shishan, freshwater marsh, up to 33 birds, throughout all periods of observation, often calling.
- Fulica atra* **Coot** (2/3) R
Oasis, Shishan, secluded pools, up to 4 birds (once an obvious pair), throughout even latest period of observation, calling.
- Chlamydotis undulata* **Houbara** (3) ? M
Surround to Qa El Azraq and desert, direct observation: fresh scapular, 17 April 1963, single bird, 6 May 1965; indirect observation and hearsay: "present in the breeding season", "nests," "one to three shot annually" (Shishan wildfowler), "November 1964". In late October 1922, Meinertzhagen saw "occasional birds" in the western desert, "considerable numbers" near a basalt area within it, "several" near the oasis and found it "well distributed" in the eastern desert. In 1955, Hollom saw one near Qasr Amra. In the mid 1960s, however, it was clearly very rare and the previous suggestion that it almost certainly bred was unwarranted. From 1976 to 1979, it reappeared in small numbers (up to 9) and mostly between May and October (Clarke 1982) but no behaviour indicative of breeding was observed (J. E. Clarke, *in litt*).
- Himantopus himantopus* **Black-winged Stilt** (1) M
Qa El Azraq, drying edges to and islands in saline water, 20-90, perhaps 50-100 pairs. 36 nests found (in incomplete search), with clutches of 1(x3), 2(x3), 3, 4(x2), 5(x2) on 1 and 2 May 1965. Breeding frustrated in 1966 due to low water level.
- Recurvirostra avosetta* **Avocet** (1) M
Qa El Azraq, habitat as last species, breeding on same islands in two places, 11-32 pairs. 17 nests, with clutches of 1(x5) and 2 on 17 April 1963 and 1(x2), 2(x2), 3(x2), 4(x3) and 5 on 1 and 2 May 1965. Breeding frustrated in 1966. Hollom saw about 100 on 23 April 1955 but noted that apparently all had gone 11 days later.

- Burhinus oedicnemus* **Stone Curlew** (1) M
Desert, grassy hammada, near Qasr Amra and junction of Wadis Aseimir and Butum, 1-2 pairs; near Shishan and in Wadi Rajil, single birds or nocturnal calls. Clutch of 2 on 20 April.
- Cursorius cursor* **Cream-coloured Courser** (1) M
Desert, silted, shrub-covered and grassy hammada, and silted cultivation, west of oasis, obvious, with 92 birds registered on 24 full days of desert observation; east of oasis, only one (west of Wadi Rajil). Clutches of 2 on 16 and 19 April 1963 and one brood of two on 20 April 1965. Although regarded as a classic desert bird, it was noticeably scarcer in the dry year of 1966 (only 24 seen, no evidence of breeding).
- Glareola pratincola* **Collared Pratincole** (2) M
Oasis, Shishan and Druz, drier areas of outfalls and adjacent edges of qa, 86-170 pairs, courting and behaving territorially.
- Charadrius dubius* **Little Ringed Plover** (2) M
Qa El Azraq, water-logged edges and *Typha* marsh, 1-2 pairs and odd birds; Qa Khanna, up to 3 birds, April 1965. Courting and/or holding territories.
- Charadrius alexandrinus* **Kentish Plover** (1) R
Qa El Azraq, drying edges of saline water and mudpan, up to 70, perhaps in all 200 pairs. Burku reservoir, at least two pairs, 30 April 1965. Desert qas: Qa Khanna, up to 3, perhaps up to 7 pairs, El Hamda, 1 pair. Clutch of 3, 7 May, eight broods of 1-3 chicks from 16 April to 7 May.
- Charadrius leschenaultii* **Greater Sand Plover** (1) M
Qa El Azraq, up to c.100 birds, including 1-2, perhaps 7 pairs, behaving territorially. Desert qas: Qa Khanna, up to 38 birds, including up to 4 pairs, with clutch of 3 on 28 April and seven broods of 1, 2 (thrice) and 3 (thrice) from 20 to 28 April; near Jebel Uweinid, 1 pair; El Hamda, 1 nervous pair and single male. The Azraq desert, over both its basalt and limestone surfaces, is dotted with large and small qas and the breeding population is probably much larger than the above numbers of pairs indicate. Southward range extension of c.600 km. from nearest Turkish population.
- Hoplopterus spinosus* **Spur-winged Plover** (1) M
Oasis, Druz, waterlogged and drying grass marsh, 5-9, perhaps 10 pairs. Clutches of 3, then 4 on 15, 17 April and 1 on 7 May.
- Chettusia leucura* **White-tailed Lapwing** (2/3) M
Oasis, Druz, habitat as last species, 1-2 pairs, behaving territorially but subject to constant harrying by *H. spinosus* and unlikely to have nested. None in 1966. Prospecting c. 600 km. east of western limit in Iraq.
- Gelochelidon nilotica* **Gull-billed Tern** (3)
Qa El Azraq, habitat as *H. himantopus* and *R. avosetta*, two areas, up to 5 and 7 birds, perhaps 1 pair, localised, occasionally sitting on newly exposed mud isles. Qa Khanna, up to 4 birds, also a single egg apparently of this species (but perhaps of *R. avosetta*). Hollom noted a few in 1955.
- Pterocles senegallus* **Spotted Sandgrouse** (2/3) M
Desert, silted, shrub-covered hammada west of Shishan, east of Druz and in Wadi Rajil, 12 birds, including 4 clearly bonded pairs. Brown soil desert, east of basalt, between H4 and Burku, eight on 30 April 1965. No records south of the oasis and not even suspected at Shaumari in the late 1970s (J. E. Clarke, *in litt*).

- Pterocles alchata* **Pintailed Sandgrouse** (1) M
Desert, silted, shrub-covered hammada and wide basins near basalt, Wadis Butum and Esh Shaumari. Brown soil desert east of basalt shield between H4 and Burku, 79 in several flocks, 30 April 1965. Wadi Rajil and Qa El Fara, at least 29 birds, including at least 13 pairs. Basalt shield, near H5, 50 in several flocks and parties, 30 April 1965. Three nests, all with clutches of three.
- Columbia livia* **Rock Dove** (1/2) ?
Desert castles, Qasrs Amra, el Hallabat, Hamman Es Sarkh and Aseikhim (not Druz or Kharanah), up to nine birds at each. Nest material seen in two holes. Seen by Hollom at Qasrs Amra and Kharanah in 1955. Entirely absent from desert in 1966.
- Athene noctua* **Little Owl** (1/2) R
Desert, basalt bluffs and (once) castle, 14 birds at 7 localities, entering nest holes and (once) evidently sitting. Three nests inspected in 1965. Meinertzhagen (1954) noted that the local race *lilith*, although typically pale, threw up darker morphs. Two of the 14 were such. Dispersal of juveniles away from basalt nest areas indicated by Shaumari records in late 1970's (Clarke 1980).
- Alcedo atthis* **Kingfisher** (3) ?
Oasis, Shishan, edge of *Tamarix* complex, one carrying fish and another agitatedly attached to island edge, 19 April 1965.
- Merops superciliosus* **Blue-cheeked Bee-eater** (2) M
Oasis, bare islands within reed and tamarisk complexes, edges of dry flat silt near such, 8-10, perhaps 20 pairs, localised, chasing and calling; digging observed on 3 May 1966. Hollom saw three on 4 May 1955.
- Eremalauda dunni* **Dunn's Lark** (1) ?
Desert, status uncertain due to likely confusion with *Ammomanes cincturus* and a pale race of *Ammomanes deserti* in 1963 and 1965. Definite identifications in Wadi Rajil, with two near track from Umari to Tell Qorma on 26 April 1965 and one c. 3km. south of Tell Qorma on 6 May 1966, and in Wadi Esh Shaumari, where an adult with young in a nest was found near the agricultural research station in early May 1965. Basalt shield, silt pan, 27 km. west of H4, a pair and at least three other birds, 30 April 1965. Identification confirmed by specimen taken at last locality and both moving and still photographs of nesting adult.
Habitat invariably silty pans of wadi bottoms with thick shady shrublets, with the one chosen to shelter the Shaumari nest being noticeably larger than other plants used by all other nesting larks. Other observations already published in Round and Walsh (1981) except for song of bird creeping about under shrubs: 'more like sub-song of a scratchy-voiced warbler that a real lark – a sort of 'screedle-screedle-scri-rit-tit-screedle-screedle. . .' ad infinitum. North-westward range extension of over 1000 km. from northern limit in Saudi Arabia but, in truth, presence long obscured by difficulty of identification.
- Ammomanes cincturus* **Bar-tailed Desert Lark** (1/2) ?M
Desert, at least 158 birds at 37 localities in 1965 and 1966, with 93 at 22 places on hammada, 56 at 10 on wadi spreads and nine at five on silt pans within or along edges of basalt shield. On hammada, undoubtedly the most ubiquitous lark (being present at 22 of 24 searched localities) and apparently the commonest (proving 35% of all lark sightings), certainly so in the south-eastern sector of the area. On wadi spreads, the third most ubiquitous and fourth commonest lark. Along measured foot counts, apparent population density c. 2 birds/km. on hammada and c. 1 bird/km. in wadi spreads, both figures reflecting the large territories of a long-legged, fast running species, showing as *Eremophila bilopha* more shyness than in other larks. Newly begun nest found on 20 April.

Only one previous certain record (Hollom 1959) but presence probably long obscured by difficulty of identification.

Preferred habitat sandy, flat grey – and brown – toned hammada, spreading into adjacent sandy or silted wadi spreads with scattered (but never dense) shrublets; within such, most tolerant of all larks of altitudinal variation. Distribution within habitat wide but in places noticeably uneven, with loose assemblies of two or three pairs. Fringe habitats gravel slopes adjoining basalt, flat basalt pebbles overlying hammada (once) and silt and gravel wadi within basalt shield (once). Distribution extended to grassy, rocky uplands near Tel Ureimiba and brown soil desert near Burku.

*Ammomanes deserti***Desert Lark**

(1) ? R

Desert, at least 172 birds at 18 localities in 1965 and 1966, occurring in two morphs discussed separately:

Dark, blackish annae.

162 at 14 places near or within basalt shield, with 12 outliers at four places on dark hammada north of Wadi Aseimir and in Wadi Mudeisisat. Within basalt shield, undoubtedly the most ubiquitous lark (occurring at 14 of 19 searched localities) and by far the commonest (79% of all lark sightings). Along measured foot counts, population density c. 6 birds/km. along edge of basalt shield and c. 3 birds/km. within it. Apparently absent from eastern section of basalt shield and brown soil desert between Burku and H4. Collecting food on 16, 26 and 28 April; three juveniles out of nest on 25 April and one on 2 May.

Preferred habitat summits, ridges and upper slopes of basalt shield, using 'cairns' and other prominences as look-out and song posts and feeding between boulders (particularly where blown silt accretes); 'edge effect' marked (as noted above). Fringe habitat isolated basalt mounds, lower basalt areas adjoining limestone hammada (particularly when north-facing rocks bear lichens). On ground, isolated from *A. cincturus* in these habitats though by as little as 20-30 metres; both species may use same airspace when basalt and hammada abut.

Pale, dun-coloured: race unknown.

Status uncertain due to likely confusion with *A. cincturus* and probably *E. dumni*. Definite identifications: north-east of Wadi Aseimir, where two on 16 April 1963, in Wadi Buttum, one on 16 April 1963, near Qa Rajil, two on 19 April 1963, at Faidhat Edh Dhahikiya, a pair on 26 April 1966, and in Wadi Mudeisisat, one on 9 May 1966. Hence at least eight birds at five places within hammada and wadi spreads and near chalk cliffs. In song on 9 May, pair collecting food on 26 April. Listing of a pale form as 'fairly common' at Shaumari in the late 1970s thus largely unprecedented and not free of possible confusion with *E. dumni* (J. E. Clarke, *in litt*).

*Alaemon alaudipes***Hoopoe Lark**

(1) R

Desert, 38 birds at nine localities in 1965 and 1966, with 34 at seven places on wadi spreads and overgrown qa edge and only four at two places on hammada; apparently commoner in 1963, when 22 birds seen at nine localities. Along measured foot counts, apparent population density c.2 birds/km. in wadispreads a low figure, reflecting large territories among taller shrublets. Clutch of three on 18 April, two young in nest on 24 April and a dead fledgling on 20 April.

Preferred habitat wide, flat and sandy wadi spreads, with extensive, evenly spaced and in some places fairly dense, shrublets of low to medium height. Fringe habitats as above but with higher shrublets, well vegetated qa edges, grassy, pale, hammada near sandy wadi (twice) and even amongst *Retama* (twice).

*Ramphocoris clotbey***Thick-billed Lark**

(2) ? M

Desert, 23 birds at seven western localities in 1965 and 1966, with 14 at four places on hammada and nine at three on edges of adjacent wadi spreads; apparently no commoner in 1963, when seven birds seen at three localities. Courtship noted on 18 April and 5 May, nervous female probably flushed from nest on 24 April. Meinertzhagen (1954) listed no record for Jordan.

Preferred habitat uncertain but essentially associated with flat edges of hammada or adjacent interspersed wadis, bearing either many perennial shrublets or patches of annual grasses and other seed-bearing plants; food plants included *Euphorbia kahirensis* and *Plantago oveta*.

Calandrella brachydactyla

Short-toed Lark

(1) M

Cultivation, in cereals on western edge of desert, 20 birds at three localities in 1965 and 1966. Less widespread in such habitat than *C. rufescens* and *Galerida cristata* but clearly likely to invade it when advantageous breeding conditions exist. Nest building on 21 April.

Desert, 42 birds at six localities, with 38 at three places in wadi spreads again pointing to local but relatively dense colonisation and four at three places on hammada and overgrown qa edge clearly outliers among larger numbers of *C. rufescens*. Nest building on 20 April, clutch of three on 27 April, territorial males in song on 1 and 5 May. Breeding annually outside previously drawn limits in Jordan.

Calandrella rufescens

Lesser Short-toed Lark

(1) ? R

All habitats except silt dunes, 736 birds at 43 localities in 1965 and 1966, the high figures indicating respectively the highest overall count of all larks and the second most ubiquitous presence after Crested Lark *Galerida cristata*.

Cultivation, 125 birds at six localities in 1965 and 1966 and therein by far the commonest lark (73 per cent of all sightings). Drier marsh, 35 birds at six localities and therein the second commonest lark. Bare qa edges, 54 birds at three localities and along such by far the commonest lark (89 per cent of all sightings). Overgrown qa edges, 214 birds at seven localities and along and within such the commonest lark (56 per cent of all sightings), with apparent population density of c. nine birds/km. Desert, at least 326 birds at 20 localities, with 230 at 13 places in wadi spreads, 79 at four places on hammada but only 17 at three places within and along basalt shield. Within wadi spreads, by far the commonest lark (66 per cent of all sightings) with apparent population density of c. seven birds/km.. Within this habitat and overgrown qa edges, communities locally very dense (with five estimated at 5-7 pairs per acre). On hammada, locally common in silted, grassy areas but far less ubiquitous than *A. cincturus* and *E. bilopha*; since extent of suitable habitat clearly variable from year to year, not a typical member of the hammada community. Within basalt shield, the most local of six larks but once again exploiting isolated overgrown silt pans and wadis freely (and forming 16 per cent of all sightings therein). Apparently absent from eastern section of basalt shield and brown soil desert between Burku and H4.

Clutches of two, three (twice) and four (twice) from 20 to 28 April, one young in nest on 24 April, four fledglings leaving nest on 21 April and two fledglings out of nest on 8 May, several juveniles throughout all periods of observation.

Preferred habitat within hammada sandy patches and silted wadi spreads, with good scatter of low to medium shrublets and grasses. Avoids bare hammada at all heights.

Galerida cristata

Crested Lark

(1) R

All habitats, 455 birds at 61 localities in 1965 and 1966, the high figures indicating respectively the second highest overall count of all larks after *Calandrella rufescens* and the most ubiquitous presence (except in hammada).

Cultivation, 22 birds at six localities and therein the second commonest lark. Drier marsh, 103 birds at 15 localities and at such by far the commonest lark (73 per cent of all sightings). Bare qa edges, four birds at two places. Overgrown qa edges, 143 birds at only four places but the second commonest lark therein. Silt dunes, 65 birds at 12 localities, the only lark (except for one stray *C. rufescens*).

Desert, at least 118 birds at 22 localities, with 88 at 16 places in wadi spreads, nine at five within or along edge of basalt shield and 21 at only two places in hammada. Within wadi spreads more widespread than any other lark (occurring at 16 of 25 searched localities) and one of three common species (26 per cent of all sightings). Occurrence in hammada dependent on variable factors, such as presence of flood channels and clearly atypical. H4, one pair at rest house, 30 April 1965, but apparently absent from surrounding desert. Along measured foot counts, apparent population density *c.* 7 birds/km. in cultivation, *c.* 5 birds/km. in overgrown qa edges, *c.* 3 birds/km. in silt dunes and in drier marsh and *c.* 2 birds/km in wadi spreads but these rough measurements more linear than spatial, since *G. cristata* closely associated with narrow niches such as wadi channels or disturbed areas of harder silted desert surfaces.

Clutch of five on 8 May, carrying food in late April, up to five young in three nests on 22 April, 24 April and 10 May, two broods of two on 3 May.

Preferred habitat within wadi spreads, flood-disturbed bottoms and edges, tolerating close presence of large shrubs (providing these widely scattered).

*Eremophila bilopha***Temminck's Horned Lark****(1) R**

All habitats, 173 birds at 27 localities in 1965 and 1966; with *C. rufescens* and *G. cristata*, one of three most ubiquitous larks but far less common than the other two; apparently commoner in 1963 when 84 birds seen at 13 localities and *Calandrella* larks less numerous.

Cultivation, five birds at one locality close to sandy hammada. Bare qa edges, eight birds at one locality. Overgrown qa edges, 19 birds at two places. Clearly not a typical member of lark communities in such habitats.

Desert, 140 birds at 22 localities, with 89 at eight places in wadi spreads, 46 at 10 on hammada and five at four within or along the basalt shield. Within wadi spreads, marginally the second commonest lark (26 per cent of all sightings) but only half as wide a spread as the almost equally common *G. cristata*. On hammada, at least the third and probably in most years the second commonest lark (14 per cent of all sightings and, by interpolation, 25 per cent of normal community); apparently the commonest in the north-west sector of the area in 1963 and 1965; certainly the second most ubiquitous, though less than half as widespread as *A. cincturus* (occurring at only 10 of 24 searched localities). Along measured foot counts, apparent population densities *c.* 4 birds/km. in wadi spreads and *c.* 3 birds/km. on hammada, with quite marked concentration unlike *A. cincturus* and these preventing true comparison of status. Apparently absent from eastern section of basalt shield and only three seen on brown soil desert near Burku.

Clutches of three and four on 24 and 25 April, young in nest (? and 2) on 26 April and 9 May, juveniles out of nest on 30 April and 9 May.

Preferred habitat within wadi spreads flat border areas with few shrublets; within hammada sandy or silted areas with grasses.

*Anthus campestris***Tawny Pipit****(2/3) M**

Oasis, silt dunes south-east of Shishan, one pair 1965, one, probably two pairs, 1966. Desert, Wadi Butum, male in song and another bird, 1965; grassy, silted hammada west of Shishan, one pair, 1965 and 1966. The only observations indicative of breeding among records of 24 birds at 16 widely scattered localities; none dated later than 28 April.

*Motacilla flava***Yellow Wagtail****(1) M**

Oasis, Shishan, wet and dry areas of low rushes on northern edge of outfalls, at least six pairs in 1965, perhaps five pairs in 1966. Qa El Azraq, near marsh at Druz, salt pans with scattered shrublets, about six pairs in 1965. Clutch of three.

Males most resembled *f. flava*, having pale blue/grey heads with variably defined white supercilia; females puzzling, with dark and uniform heads and upper parts and very yellow underparts. Race clearly not any of the five migrant forms (see Wallace 1982.)

- Cercotrichas galactotes* **Rufous Bush Chat** (2) M
Oasis, Shishan, edges of marsh, *Nitraria* clumps and (once) hedge, up to 14 territorial males in song and display, at least one paired.
Desert, Wadis Aseimir and Butum and Umari depression, dense vegetation including *Nitraria*, up to three birds at each place, including a male in song, two males displaying at each other and a pair.
- Oenanthe hispanica* **Black-eared Wheatear** (2/3) M
Oasis, Druz, dry marsh near basalt edge, male and female in loose association, 17 April 1965. Desert, tall shrubs in silted hammada, Wadi Butum, apparently established pair, with male in song, 20 April 1965. Above records suggestive of breeding attempts but this species, *O. isabellina* and *O. oenanthe* not seen later than 30 April, except for a tailless *O. isabellina* on 9 May.
- Oenanthe deserti* **Desert Wheatear** (1) R
Oasis, Shishan and Druz, dry rushy areas, *Nitraria* clumps and dry tamarisk areas, up to 10 territorial males. New nest 10 cm. up in chenopod on 17 April 1963, eggs in nest within *Juncus* clump in late April 1965. Qa El Azraq, chenopod zone particularly along eastern shores and silt dunes, up to six territorial males (in incomplete search).
Desert, 12 wadis and adjacent ridges in both limestone and basalt areas (eight west of oasis), obvious, 90 birds, of which 71 males and including loose concentrations of up to eight in 3km. Near Burku, two males and a female, 30 April 1965. In limestone area, clutches of five on 6 May, one on 9 May on 28 April, males collecting food on 28 April and 6 May, three juveniles on 9 May; in basalt, sexual display on 29 and 30 April.
- Oenanthe moesta* **Red-rumped Wheatear** (2) ? R
Desert, gently sloping or level, sandy or silty, shrublet-covered hammada, south edge of Jebel El Fuluk, 2-4 birds, including a pair with territory including stone cairn; Wadi Esh Shaumari, a pair and a hen caught in mammal traps in late April and two others seen on 4 May 1966. The significance of the captures is considerable, for this species nests in rodent holes (Meinertzhagen 1954).
- Oenanthe picata opistholeuca* **Eastern Pied (Strickland's) Wheatear** (2) ? R
Desert, area of basalt shield where pipeline highway crosses northern defile of Wadi Rajil and runs east towards H4, at least two pairs, a male and two unsexed birds, 29 and 30 April 1965. Males conspicuous in hovering display flight and song, clearly holding territory. All birds within the area of November 1976 roadside sightings mapped by Clarke (*Figure 1*, 1981). That the species undertakes a partial south-westward migration is suggested by Clarke's records to the south of the basalt shield and a report from Eilat in December 1982 (Y. Golan *in litt*).
- Oenanthe lugens* **Mourning Wheatear** (2) ?
Desert, bare chalk cliffs and shrubs of Faidhat Edh Dhakikiya, up to five sedentary birds, including two males in song, 26 April and 4 May 1966. Niche similar to many occupied by *O. lugens* in the highlands which rise c.90 km. to the west.
- Cisticola juncidis* **Fan-tailed Warbler** (1/2) M
Oasis, outfalls of Shishan and Druz, areas of lower marsh vegetation, up to 42 males in song, perhaps 30-60 pairs. Nest building from 15 April. Desert, within alfalfa at Shaumari and cereals at Qasr Hamman Es Sarkh, males in song, respectively on 24 April and 1 May 1965.
- Prinia gracilis* **Graceful Warbler** (1) R
Oasis, outfalls of Shishan and Druz, areas of marsh vegetation, taller than that inhabited by *Cisticola juncidis*, 35-40 males in song. Nest-building from 18 April, one egg in nest on 19 April, newly fledged juvenile on 4 May.

- Scotocerca inquieta* **Scrub Warbler** (1) R
Desert, broad wadis with medium to tall shrubs, 43 adults and 20 juveniles at seven scattered localities, with densest populations in Wadis Aseimir, Butum and Esh Shaumari (at least seven pairs) and Wadis Rajil and Aseikhim (five pairs). Juveniles seen only in 1965, appearing between 20 April and 2 May. Conder detected nest building on 28 February 1979.
- Locustella luscinioides* **Savi's Warbler** (2) M
Oasis, Shishan and (once) Druz, edges and interior of reedbeds, up to three males in song, one apparently paired on 29 April and a bird collecting nesting material on 16 April.
- Acrocephalus melanopogon mimica* **Moustached Warbler** (2) R
Oasis, Shishan, edge of tallest reeds, lower reed and sedge beds and dense tamarisk complexes, along northern edge of outfall, up to 37 birds, including 11 males in song. Collecting food on 3 May. Conder estimated the 1978/79 winter population at 25-30 individuals.
- Acrocephalus scirpaceus* **Reed Warbler** (1) M
Oasis, Shishan, reedbeds, particularly those up to 2 metres high, and flooded tamarisks, at least 90, probably 300 and perhaps over 400 pairs. Population hard to estimate with density varying according to habitat, e.g. one pair/20 metres along edges of reedbeds, through one pair/30 to 40 metres to one pair/70 metres in breaks and around pools, to one pair/100 to 120 metres in centre of tallest reeds. Old nest, adult carrying food on 21 April, clutches of one and two on 29 April, of four on 3 May. Mimicking of *A. melanopogon* heard.
- Acrocephalus stentoreus* **Clamorous Reed Warbler** (2) ?
Oasis, Shishan, tallest belts of southern reedbeds, 3-7 males in song from 17 April to 3 May. Separated from *A. arundinaceus* on both appearances and voice (see Wallace 1973).
- Acrocephalus arundinaceus* **Great Reed Warbler** (2) M
Oasis, Shishan, tallest belts of central reedbeds, up to 22 males in song from 29 April and one carrying nesting material on 10 May, all in 1966. This species and the last were in sight of each other but their co-habitation is not unprecedented (see Zahavi 1957).
- Sylvia melanocephala* **Sardinian Warbler** (3) ? R
Oasis, Shishan, in *Nitraria* clumps, and Druz, in *Retama* wadi, up to eight birds but an obvious pair only once on 17 April 1965; none after 18 April. Males not in song. None in 1966. Conder noted paired behaviour on 7 February 1979.
- Lanius excubitor* **Great Grey Shrike** (1) R
Oasis, and Qa El Azraq, near Shishan and Druz, *Nitraria* clumps, 3-4, perhaps eight pairs. Broods of two out of nests on 18 April and 3 May. Desert, more densely vegetated wadis in hammada, Wadi Butum, 1-2 pairs, Wadi Rajil, at least one pair, Wadi Aseimir, one pair. Clutch of three in nest among *Pistacia* foliage on 5 May, food carrying on 6 May.
- Lanius nubicus* **Masked Shrike** (3) M
Oasis, Shishan, palm groves and sheltered cultivation, at least one bird present to end of all periods of observation.
- Corvus ruficollis* **Brown-necked Raven** (1) R
Desert, *Pistacia* stands and cliffs in limestone hammada, Wadis Aseimir, Aseikhim, Butum and Muheilán and Faidhat Edh Dhakikiya, at least 11 birds, out-numbered by 15 old and new nests. Clutch of 4 on 11 May. No other records free of confusion with next species. Hollom did not separate the two species of raven in 1955 but noted two old nests on Qasr Amra and one in use on a palm at Azraq.

*Corvus corax***Raven**

(3) ?R

Desert, northern basalt shield, Tell Uriemba, four birds, 29, between H5 and Druz, probably two birds, 30 April 1965. Also five unidentified ravens between H5 and Druz. Localities of the six identified birds 80–100 km. east of normal range of *C. corax*.

*Passer domesticus***House Sparrow**

(1) R

Oasis, Shishan and Druz, village houses and cultivation, no recorded count at Shishan actually over 13, absent from Druz in 1966. Nests, Qa El Azraq, Ain El Beida, buildings at spring, five, 16 May 1966. Police post, near H5, three, 30 April 1965. Conder's estimate of 250-300 in winter of 1978/79 thus unprecedented and suggesting colonisation or immigration.

*Carduelis carduelis***Goldfinch**

(2/3) M

Oasis, Druz, trees around village, male in song in 1965 and a pair in 1966. Hollom found none in 1955 and Conder only one in 1979.

*Bucanetes githaginesus***Trumpeter Finch**

(2) M

Desert, usually along edge of or within basalt shield and outcrops, 148 birds, of which 108 not settled but 40 at five localities included 12 couples or clearly bonded pairs and two aggressive cocks. None in 1963.

DISCUSSION

The particular character of the literature dealing with the birds of Azraq makes difficult the review of the mid 1960s observations on their breeding status. We were privileged to see the main oasis and its animal and human communities in what may be termed its 'last charmed' state. Following the various disturbances noted by Conder (1981), it is likely that the wetland complex will never return through a relatively normal water cycle to the near-climax vegetation (and the variety of niches) that were so attractive to aquatic species in the 1960s. Thus the final remarks in this paper cannot escape the character of a tombstone inscription.

Aquatic species

Meinertzhagen (1924) surmised that 13 aquatic species bred at Azraq but in the 1960s, their diversity extended to 28 species, almost equalling that of the wetland community at Lake Huleh, Israel in the 1950s (Zahavi 1957) and over twice that of the marshes around Habbinaya, Iraq in 1953 and 1954 (Chapman & McGeogh 1956). In particular, our observations produced the most southerly breeding records in the Western Palearctic for the Mallard *Anas platyrhynchos* and the Baillon's Crake *Porzana pusilla* and indicated (at least in some years) breeding attempts by up to nine other water birds whose breeding ranges normally lie mainly to the north. The opportunities presented by the astonishing spring flush of invertebrate food in both the freshwater outfalls and the saline gas were clearly too good to ignore. Whether they ever lasted long enough to sustain breeding success is a question that still begs. The evidence of our 'dry' year in 1966 is negative and human activity appears now to have removed all chance of further study of what must be a widespread phenomenon in steppe/desert communities.

Steppic and Desertic Species

Meinertzhagen considered that 13 non-aquatic species bred in Azraq's desert surround, restricting the Kestrel *Falco tinnunculus* and a raven *Corvus* to castles and 11 other birds to natural habitats. Sadly other data on breeding bird distribution for the area is insufficient to set a fuller historical potential for the desert community or to allow its comparison with other areas at similar latitudes. In the 1960s, 38 species occurred primarily in desert habitats but then their populations varied markedly in size. In terms of observed numbers, 18 species mustered under 10 pairs and only

five larks (in four genera), one chat, and one finch could be described as common, with their registrations reaching three figures. Habitat scarcity was clearly the factor controlling the presence of six species. These included the Kestrel and the Brown-necked Raven, whose nests in our time were nearly all in the few remaining *Pistacia* trees. Overall, however, it seems likely that annual fluctuations in the biomass of the whole ecosystem – shifting from degraded but briefly fertile steppe to quasi-desert and back again – were directly influencing the occurrence of all species and their commitment to nesting. As with the aquatic species, a degree of opportunism was apparent. This was most evident along the basalt edge after the wet winter of 1964/65. It may well be that as few as 16 species breed regularly in Azraq's arid regions.

All Species

On balance, the total Azraq community exhibited in the 1960s over twice as many breeding species as prior research had led us to expect. In particular, there was a greater incidence of Turkestanian and Mediterranean faunal types than normally inhabit desert areas. This argues that the community's ecological ancestry was essentially steppic and not as so often implied, desertic. It is interesting to compare the profile of Azraq's non-aquatic species with that established for the flatter and more arid habitats of central Arabia near Riyadh (Jennings 1980), where rainfall averages only about a quarter of that at Azraq. The two areas support together about 30 species but only 16 are present at both ends of the 1,400 km. NW/SE axis between them. The species that live within Azraq's steppic community alone include the Chukar *Alectoris chukar*, the Stone Curlew *Burhinus oedicnemus*, two *Charadrius* plovers, at least one *Pterocles* sandgrouse, the Short-toed Lark *Calandrella brachydactyla*, the Thick-billed Lark *Rhamphocoris clotbey* and four *Oenanthe* chats.

DISCREPANCIES IN THE RECORD OF AZRAQ'S BREEDING SPECIES

In the rather repetitious treatments of Azraq's breeding birds, there are confusions. The following notes attempt to remove these:

Species published as breeding but not doing so in 1963, 1965 and 1966

Black-bellied Sandgrouse *Pterocles orientalis* (Nelson 1973, Clarke 1980).

Olivaceous Warbler *Hippolais pallida* (Meinertzhagen 1924)

Species mapped as breeding but not doing so in 1963, 1965 and 1966

Squacco Heron *Ardeola ralloides* (Cramp & Simmons 1977)

Hoopoe *Upupa epops*

Pale Crag Martin *Hirundo obsoleta*

Swallow *Hirundo rustica*

Isabelline Wheatear *Oenanthe isabellina*

Desert Finch *Rhodospiza obsoleta*

(Last five above, Harrison 1981)

Species reported as possible breeding birds in the 1960s but now considered very unlikely to be so

Pintail *Anas acuta*

Teal *A. crecca*

Bimaculated Lark *Melanocorypha bimaculata*

Stonechat *Saxicola torquata*

Most significant discoveries from the record of breeding species

Chief among these were the certain or potential range extensions of the White-tailed Lapwing *Chettusia leucura*, the Greater Sand Plover *Charadrius leschenaultii*, the Dunn's Lark *Eremalauda dunnii* and, most surprising of all, the Eastern Pied Wheatear *Oenanthe picata*, in the phase *opistholeoca*. Less dramatic but still important discoveries featured an unknown race of *Motacilla*

flava, an isolated population of the Mourning Wheater *Oenanthe lugens*, the co-habitation of the two large *Acrocephalus* warblers (in 1966), the presence of the Raven *Corvus corax* in the northern basalt, and the wide occurrence of three largely unsuspected larks, namely the Thick-billed *Ramphocoris clotbey*, the Short-toed *Calandrella cinerea* and the Bar-tailed Desert *Ammomanes cincturus*.

All the finds noted in the last section deserved fuller study and it is sad that no initiative towards such research has come from a Jordanian scientist conscious of the diverse ecology of Azraq and able to revive Nelson's ill-fated programme. The reservation of a steppe patch at Shaumari is much to be welcomed but looked at from the wide context of the 1960s observations, this act only protects a small part of one lower wadi system in the limestone hammada. The much fuller need for conservation that lay behind our work beckons still. If it is not met, the prospects for the whole avian community at Azraq are bleak. The possible gains of such birds as the Spanish Sparrow *Passer hispaniolensis* and the Desert Finch *Rhodospiza obsoleta*, hinted by Conder (1981), and any others that may follow the increased human traffic form no bulwark against the loss of the hard won and energetically sustained diversity of breeding birds that so thrilled us in the mid 1960s.

SUMMARY

The records of 66 species that bred or may have bred at and around the Azraq Oasis, Jordan between August 1922 and April 1966 are listed. The overall diversity of both the aquatic and non-aquatic communities was remarkably wide, apparently exceeding that of any other like-sized area at similar latitudes in the Middle East and certainly twice as great as that previously indicated in the scattered literature. In the areas actually explored, breeding birds were outnumbered by migrants and only four aquatic and six non-aquatic species were at all common. The steppic/desertic community harboured more resident species than the aquatic community. The significance of many discoveries appeared little short of dramatic but the piecemeal nature of past observations allowed few conclusions about them. Past and recent confusions over breeding species are clarified. A plea for the resumption of wide conservation measures at Azraq ends the paper.

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TABLE I. BASIC HABITAT DIVIDE OF BREEDING BIRD OBSERVATIONS AT AND AROUND AZRAQ, 1963, 1965 AND 1966

	All searches/days: 15 April to 11 May	Disciplined searches registered	Extent of disciplined searches within 120 sq. km. along 104.6 km.
Oasis	40/22	37	
Desert	72/30	52	

TABLE II. MAIN AZRAQ HABITATS AND THEIR AVIAN INHABITANTS

Class ex Hemsley and George (1966)	Re-interpretation to fit ornithological survey	Particular habitat types	No. of breeding bird species Minimum/Maximum
(a) Open water and wetlands	Aquatic—fresh water, spring-fed	1. Reedbeds, <i>Tamarix</i> complexes and other tall plants	7/21
(b) Saline mud flats and other seasonally flooded depressions with standing water	Aquatic—brackish/saline water, spring and rain-fed	2. Outfall marshes 3. Outfall edge and seasonable gas	2/3 8/11
(c) <i>Nitraria-Tamarix</i> communities on saline alluvial soils	Alluvial—saline with soil accretion by wind	4. Silt dunes, with bushy crowns	2/4
(d) Wadi systems	Steppic/desertic plain—limestone hammada	5. <i>Pistacia</i> trees 6. High shrubs and shrublets 7. Shrubby trees	2/2 8/14 2/2
(e) Open scattered shrub perennial herb associations		8. Intersperses of sand and silt, with shrublets and grasses	4/4
(f) Rocky, stony terrain with annual plants (or perennial plants not conspicuous)	Steppic upland—limestone	9. Jebel ridges and summits	1/3
	Desertic fault—abutting limestone	10. Chalk cliffs	1/2
(g) Vegetation of rocky or stony basalt spreads	Desertic upland—basalt	11. Bluffs and edges, with seasonable run-off and seed bearing plants	4/5
Artificial	} Cultivation } Habitation	12. Interior shield	1/1
		13. Crops	3/3
		14. Trees	0/2
		15. Houses	2/2
		16. Castles	3/4

TABLE III. APPROXIMATE POPULATIONS OF BREEDING BIRDS AT AZRAQ SHISHAN AND DRUZ, 1963, 1965 AND 1966

Habitat class per TABLE II	Habitat description	Numbers of breeding birds	
		Minimal estimate (from all counts)	Interpolated population (from 40 full searches)
(a) 1	Pools and marsh surrounds	36	120
	Reed and tamarisk complexes	381	1,130
(a) 2 } (b) 3 }	Outfalls, marshes with short vegetation and qa edge	584	1,420
(c)	<i>Nitraria</i> dunes	36	70
none	Village buildings and gardens	11	24

TABLE IV. INCIDENCES OF BREEDING BIRDS IN STEPPIC/DESERTIC HABITATS AROUND AZRAQ, 1963, 1965 AND 1966

Habitat class per TABLE II	Habitat description	Total km. counted	Mean incidence of birds per km.	
			All	Breeding (% of all)
(b) 3	Wet playas with shrublet surround	4.0	95	19 (20)
(c) 4	Saline depression with thickets	4.0	45	6 (13)
(d) 6	Wadis with shrubs near oasis	3.8	57	19 (33)
6	Wadis with shrubs	19.6	34	21 (62)
5/6	Wadis with shrubs, trees and water	9.6	59	8 (14)
8	Silt fans with shrubs	5.2	27	27 (100)
8	Broad wadi fans with shrublets and grasses	22.8	15	10 (66)
(f) 10	Chalk-cliffed depression with shrubs	3.2	21	3 (14)
(g) 11	Lower slopes and edges of basalt	18.4	17	10 (59)
11/12	Gullies and small basins in basalt	3.6	15	10 (66)
13/14	Irrigated cultivation with trees	3.2	127	35 (28)
13	Dry cultivation	2.8	24	23 (96)

THE MIGRATION OF RAPTORS NEAR SUEZ, EGYPT, AUTUMN 1981*

by

Rob G. Bijlsma

INTRODUCTION

Whereas the migration of European and Asian raptors through Turkey (Porter & Willis 1968, O.S.T. 1977, Beaman *et al.* in Newton 1979; Sutherland & Brooks 1981) and Israel (Safriel 1968; Christensen *et al.* 1981; Davidovitz & Leshem 1981; Sherihai 1981; Dovrat 1982) is thoroughly documented by means of systematic counts, the continuation of the migration through Egypt is much less understood. Fragmented observations during short periods were made by Marchant (1941), Goodwin (1947), Mackintosh (1949), Goodwin (1949), Simmons (1951) and Tennent (1967); that is in an era in which the identification of raptors was far more problematical than it is nowadays with the help of field guides such as Porter *et al.* (1981), and in which the making of systematic observations was not as *en vogue* as it is today. However, those records, greatly supplemented by those of Meininger, Baha el Din and Mullié (1981) and Baha el Din and Bruun (1981), made it clear that the surroundings of Suez are the scene of massive raptor migration both in autumn and in spring.

This paper describes the migration of raptors over Suez from 4 September up to and including 5 November 1981.

TOPOGRAPHY AND WEATHER

The Sinai peninsula is flanked by the Gulf of Aqaba in the east and the Gulf of Suez in the west. It consists of sandy desert and high mountain ridges. The width of the Sinai between Suez and Eilat is 230 km. West of Suez lies Ataqa mountain (Gebel Ataqa) which nearly reaches the shore of the Gulf of Suez at Adabiya, a village some 20 km. south of Suez. The Gebel Ataqa is severely eroded and reaches its maximum height of 871 metres approximately 20 km. west of Suez. Between the mountain ridge and the Gulf of Suez stretches a flatland of semi-desert with low bushes. This area is in the process of being industrialised. The shortest possible crossing over the Gulf of Suez measures 10 km. between Port Tewfik, the harbour of Suez, and Ras Adabiya, a flat headland extending several km. into the Gulf of Suez (*cf. Figures 1 and 2*). The surroundings of Suez are flat, sandy, and, except for bushes and some date-palm groves, without vegetation. The city itself is divided in two parts, viz. the city and the harbour of Port Tewfik. The harbour is situated at the entrance of the Suez Canal. Just north of Suez and alongside the road to Port Tewfik several small artificial lakes can be found, partly in use as open-air sewage and partly containing brackish water.

The weather was very consistent throughout the observation period, with hardly any cloud formation except during the last few days of October and during November. A really good view was usually prevented by a haze, although both Gebel el Râha in the Sinai and Gebel Ataqa could be seen from the top of a ten storey building in Port Tewfik. The daily temperatures fluctuated between 28 and 35°C. The wind direction shifted between N.W. and N.E. (81 per cent of 57 days) and usually there was hardly any change in wind direction within an observation day. Winds from the south were exceptional. Wind forces of 2-4 (Beaufort scale) were the rule, but especially in the latter part of the observation period, stronger winds occasionally occurred. There was no precipitation during the entire observation period.

*This is an expanded and revised version of a paper by the same author published in 1982 *Vogeljaar* 30:141-151. — Ed.

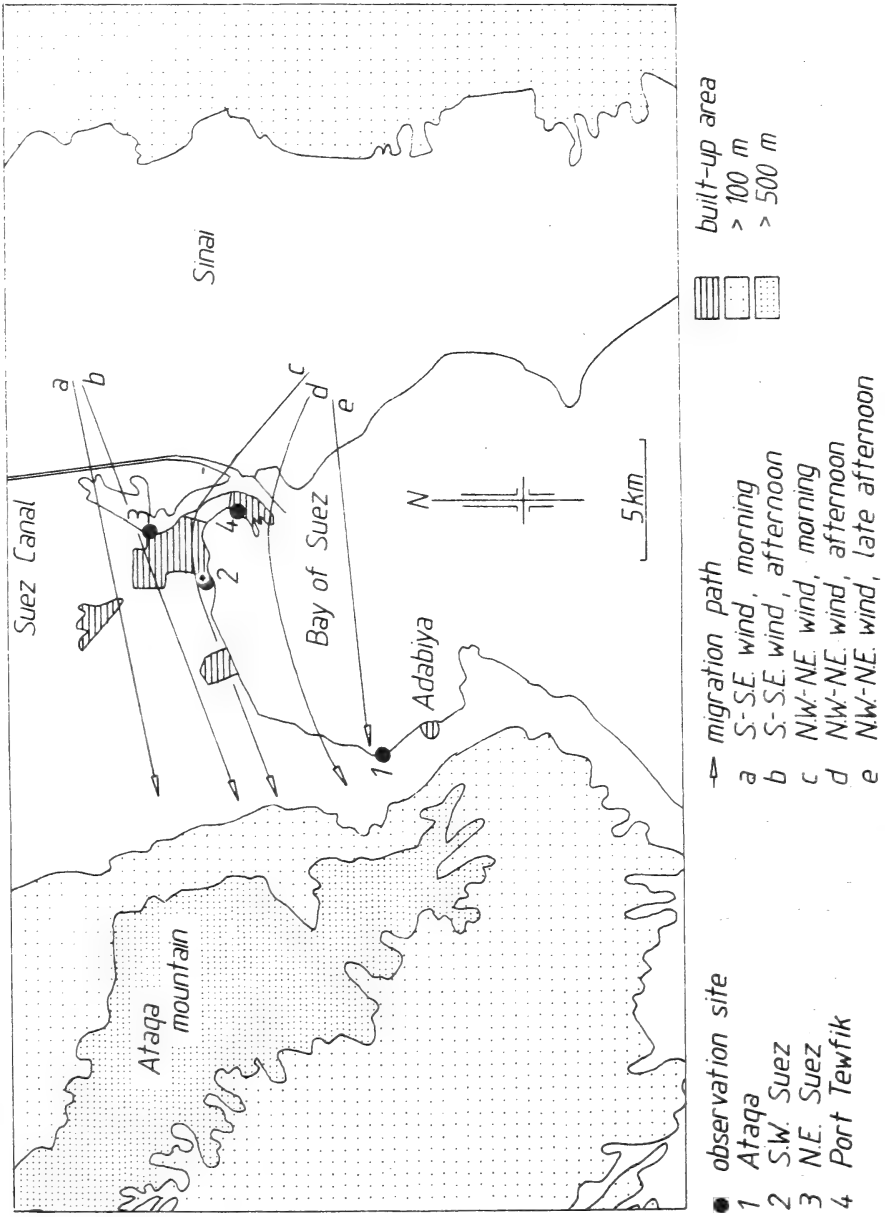


Figure 1. Map of the Suez area, showing main localities mentioned in the text and flight lines taken by the raptors under different wind directions.

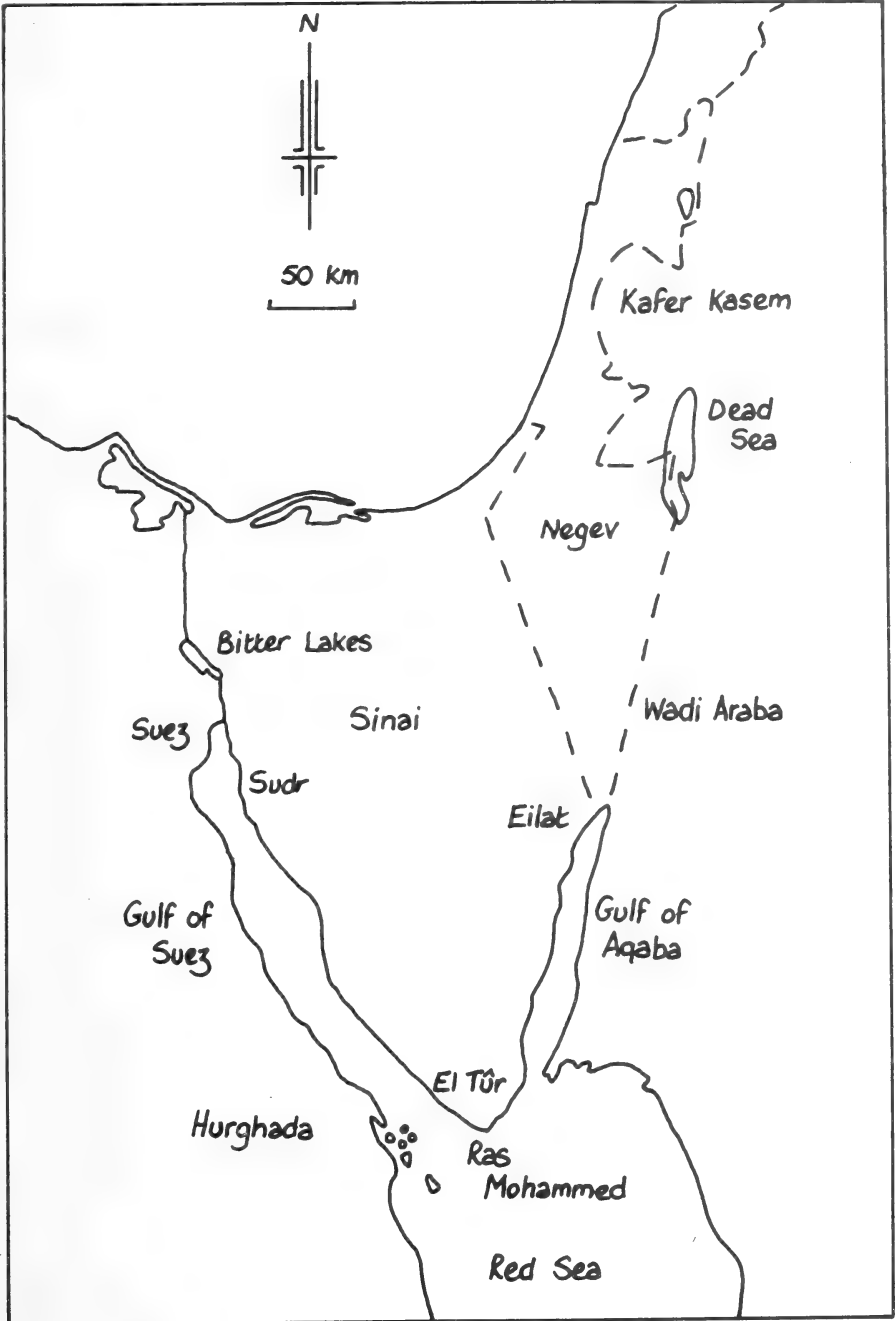


Figure 2. Map of the Middle East, showing main localities mentioned in the text.

METHODS

During the period 4 September up to and including 5 November 1981 422 hours on 57 days were spent watching raptor migration near Suez (*Figure 1*, TABLE 1), and, when possible, the migration of passerines as well (Bijlsma 1982). Because Goodwin (1949), Simmons (1951) and Meininger, Baha el Din and Mullié (1981) observed from the shore of the Gulf of Suez near Ataq (a few kilometres north of Adabiya, cf. *Figure 1*), it was decided to start the observations at the same spot. When crossing the Gulf of Suez, the raptors usually reached the shore close to observation site 1. However, on 25 September a southerly wind was blowing and hardly any migrating raptors were seen that day near Ataq. Simultaneous counts at Ataq and in Suez at observation sites 2 and 3 (*Figure 1*) during the following days proved that each day substantial numbers of raptors passed over the Suez area, irrespective of wind direction or wind speed. However, the wind direction had a profound effect on the flight path taken by the raptors after leaving the Sinai (*Figure 1*). With southerly winds, the birds passed several kilometres north of Suez (maybe even further north as well, but this was impossible to prove without suitable transport), hardly visible from the northernmost outskirts of the city. These birds disappeared in a W.-S.W. direction into the Gebel Ataq and were invisible from the Ataq observation site even with strong telescopes. Under these conditions the raptors passed over Suez during the afternoon (flight-line *b* in *Figure 1*).

Normally a moderate wind came from a northerly quarter, which resulted in a gradual southward shift of the soaring raptors. During the morning hours this drift was corrected by the birds gliding down in a N.E. direction until the head of the Gulf of Suez was reached. The Bay of Suez was then rounded and the flight-line was continued in a S.W. direction, thus entering the Ataq mountain approximately 5 km. north of observation site 1 (*Figure 1*). The greater part of this morning migration was impossible to see from the Ataq observation site. In the course of the day the migration path gradually shifted westwards (from *c* to *d* to *e*; *Figure 1*), probably as a response to improved soaring conditions in the Sinai which resulted in the birds gaining more height than in the morning hours. In the late afternoon most raptors were able to make the shortest possible crossing of the Bay of Suez from several kilometres S.E. of Port Tewfik to Adabiya or Ataq. During days with strong N. or N.E. winds, the birds of prey were drifted even further south in the Sinai than usual, but they never attempted to cross the Gulf of Suez under those conditions. They were then obliged to struggle back north along the Gulf of Suez. On those days circling was frequently alternated with laborious flapping in the preferred direction, and although the rounding of the Bay of Suez took much more time and trouble, the migration never ceased.

Based on these observations, a new observation site was chosen in Port Tewfik from the last ten days of September onwards, every now and then replaced by observation site 3 when southerly winds drifted the raptors out of sight for observers at the Port Tewfik site during the morning hours. Port Tewfik had an additional advantage in that the observations were made from the top of a ten storey building, which provided an excellent view of the Sinai, the Bay of Suez and the Gebel Ataq. From this site, reasonable to good counts could be made from the start of migration up to 1500 hrs. local time. In the late afternoon most raptors adopted flight line *e* (*Figure 1*), hence were difficult to detect and usually impossible to identify because of bad light conditions. Anyway, this site provided the most reliable census results for a small number of observers with no opportunities to carry out simultaneous counts.

The observations were carried out by 12 observers, staying several days up to several weeks. Usually two to four observers present simultaneously; Three weeks were covered by the author alone, mainly in the latter part of the observation period when the passage was at its maximum and sometimes up to three parallel streams of raptors passed the observation site. In order to perform a reliable census, many observers are needed at Suez and it must be stressed that our findings do not necessarily depict the complete migration pattern. Simultaneous counts between Suez and the Bitter Lakes, as well as at several spots in the Sinai and around Suez are urgently needed. Furthermore, as can be seen from *Figure 3*, the migration of raptors started relatively late, namely mid-September, reached a peak at the end of October and evidently continued far into November. The observations were broken off on 5 November, and the important tail end of the migration was,

therefore, missed. According to Sherihai (1981) the passage of Steppe Eagles *Aquila nipalensis** continues up to the end of November at Eilat, and our findings at Suez makes it plausible that the same applies to Griffon Vultures *Gyps fulvus*, Long-legged Buzzards *Buteo rufinus* and Imperial Eagles *Aquila heliaca*.

The use of telescopes during September and part of October proved to be very helpful in identifying distant flying raptors.

Usually the observations were started at 0900 hrs. local time. Nearly all raptors passed in the period 1000-1600 hrs. (Figure 4), only preceded by very small number of low flying Egyptian Vultures *Neophron percnopterus*, Short-toed Eagles *Circaetus gallicus*, Long-legged Buzzards and falcons *Falco spp.* Hardly any raptors were seen after 1630 hrs.

The height of migration varied according to the time of day. Before 0900 hrs. many eagles could be seen from the Port of Tewfik observation site, sitting widely scattered in the Sinai and sometimes gathering around pools of salt water just north of the Bay of Suez and east of the Suez Canal. As the air warmed up, these birds started circling with heavy wing flaps. With considerable difficulty they gained height, but after the air became warmer and warmer, flapping changed to soaring. At several places thermal currents developed, thus attracting raptors from surrounding areas. Most raptors spent a great deal of time soaring especially during the morning. After having reached the top of the thermal, they glided down in the preferred direction, often accompanying their glide with occasional wing flapping. Up to midday these downward glides were frequently interrupted by soaring up again. In the course of the day the height at which the birds arrived at Port Tewfik increased and they seemed able to ascend effortlessly. At midday and during the afternoon long lines of raptors passed over at considerable height, sometimes hardly detectable without binoculars, especially when the migration shifted away from the observation site. Even in the late afternoon very high incoming raptors could be seen at Ataqa, disappearing over the Gebel Ataqa. According to Mackintosh (1949) individual birds were tracked by radar at 4,000 feet (1,300 metres) and his claim that some go much higher when the opportunity occurs, can be readily agreed. It is, therefore, not impossible that many raptors passed unseen.

Mackintosh (1949) registered average speeds between 39 and 45 m.p.h. by radar (62-72 km. per hour). Particularly in the afternoon, when the raptors peeled off at the top of a thermal current, they developed a considerable speed when gliding down on stretched or partly folded wings (dependent on direction and speed of the wind) and using short flapping sequences. Furthermore, they seemed to be able to maintain height by doing so. Nevertheless, raptors flying below 50 metres were frequently noted, mainly in the early morning hours and during the late afternoon. This involved mainly Long-legged Buzzards and Short-toed Eagles, probably fatigued birds in view of the fact that they sometimes landed on ships in the Bay of Suez, on the ground in Port Tewfik or along the shore. According to Abd-el-Salam Gad, a worker at the Ataqa observation site, fatigued raptors sometimes landed *en masse* on the shore near Ataqa in October, and could be killed by throwing stones! This is probably exceptional for we did not notice such events whereas by far the majority of raptors passed overhead at considerable heights (*cf.* Wimpfheimer *et al.* 1983).

SYSTEMATIC LIST

Observations were made over the period 4 September up to and including 5 November 1981 on 57 days with a total of 422 observation hours. Most watches were kept between 0900 and 1700 hrs. The daily totals of the commoner species are listed in TABLE 1.

Nearly 134,000 raptors were counted, but due to problems in choosing the right observation site, the great height of passing raptors, the fact that no counts were made after 5 November and the possibility of considerable passage between Suez and the Bitter Lakes (Boyd 1917; Simmons 1951), the total number of migrating raptors could have been more than 200,000 in the autumn of 1981.

*See comment on the nomenclature of this species in previous volumes of *Sandgrouse*. — Ed.

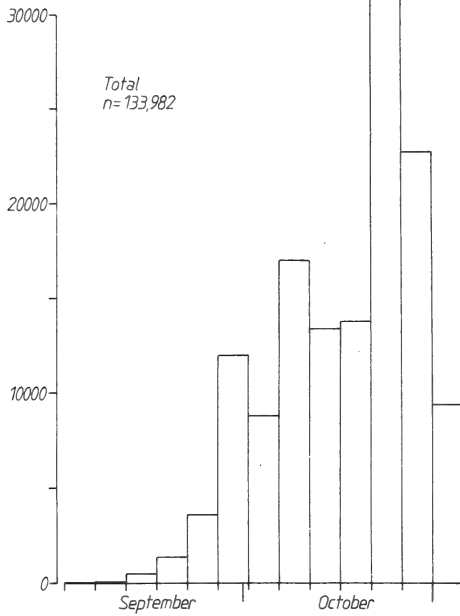


Figure 3. The total migration of raptors near Suez, 4 September-5 November 1981 in five day periods.

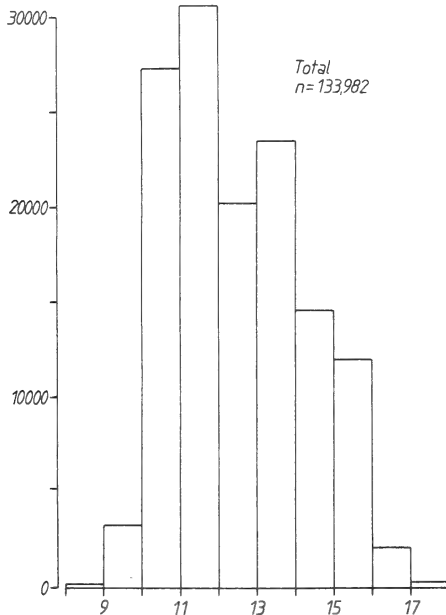


Figure 4. The total migration of raptors near Suez, 4 September-5 November 1981 per hour.

Besides raptors other soaring birds were seen and counted, such as: 8 Storks *Ciconia ciconia*, 9 Black Storks *Circonia nigra*, 5 Spoonbills *Platalea leucorodia*, 28 White Pelicans *Pelecanus onocrotalus*, 4,694 Cranes *Grus grus* and 2 Demoiselle Cranes *Anthropoides virgo*.

*Pernis apivorus***Honey Buzzard**

Recorded between 13 September and 27 October with only 79 birds (TABLE 1). Of 17 birds aged only three were adult. Partial and complete counts at Suez suggest that migration in spring is more impressive than in autumn (Maininger & Dielissen 1979; Baha el Din & Bruun 1981; Wimpfheimer *et al.* 1983), although not as striking as near Eilat (Christensen *et al.* 1981). The majority of European and Asian Honey Buzzards ends up along the coast of Israel (Dovrat 1982) and at Eilat (Krabbe 1980) in autumn, so that most birds fly south between the Gulf of Aqaba and the Gulf of Suez. The Gulf of Suez is probably crossed between El Tûr and Ras Mohammed, so that the birds enter Africa in the neighbourhood of Hurghada.

*Milvus migrans***Black Kite**

Recorded between 13 September and 3 November, the total of 106 birds being scattered over the entire observation period without peaks. The Black Kite can be considered a scarce migrant at Suez, at least compared to Eilat where regular passage in considerable numbers takes place in autumn (Safriel 1969) and spring (Christensen *et al.* 1981). Probably, the Black Kite follows the same route as the Honey Buzzard, thus avoiding Suez. In spring, the Black Kite is much more numerous at Suez (Wimpfheimer *et al.* 1983).

*Milvus milvus***Red Kite**

On 27 and 28 September and 2, 3, 4 and 7 October respectively four, one, one, one, two and two individuals were clearly observed and identified on account of the reddish colouration, long and angled wings with pronounced white patches on the hand and the long, flexible and deeply forked tail. Six birds were juvenile; the age of the others remaining unknown.

The southernmost wintering area in Eastern Europe can be found in S.E. Turkey and records from the Levant are scarce (Meinertzhagen 1920; Hollom 1959). In Egypt this species occurs accidentally; several collected specimens are known and there are some recent observations (P. L. Meininger *in litt.*). Wimpfheimer *et al.* (1983) observed five birds between 19 March and 17 April 1982 near Suez. Several hundreds of Red Kites enter North Africa via Gibraltar (Thiollay & Perthuis 1975), with return passage as far east as Cap Bon in Tunisia (Dejonghe 1980) and maybe Libya as well, where the Red Kite is an accidental visitor (Bundy 1976). The origin of the birds at Suez is obscure but possibly small numbers enter Africa via the Middle East. In this respect the recent observations in South Africa and East Africa are interesting (Brown, Urban & Newman 1982).

*Gypaetus barbatus***Lammergeyer**

A single, possibly as immature was seen on 10 October, migrating W.N.W. in the company of several Griffon Vultures.

Basically this species is a resident throughout its breeding range (Cramp & Simmons 1980); small scale dispersion can occur. Simmons (1951) for example saw an immature apparently migrating into the Sinai on 8 March 1950 near Suez. However, according to Mullié & Meininger (*in press*) the Lammergeyer still breeds in the southern Sinai and possibly also in the Gebel Gallala southwest of Suez.

*Neophron percnopterus***Egyptian Vulture**

A total of 437 birds was recorded between 4 September and 31 October with a pronounced peak of passage during the last 10 days of September. Probably small numbers did pass the Suez area before the count was started. Of 437 migrants, 280 birds were identified according to age: 85 per cent adult, 4 per cent sub-adult and 13 per cent juvenile. This result agrees with the findings of Sutherland and Brooks (1981) in S. Turkey. Under-recording of dark-plumaged birds presumably did not occur at Suez. No segregation in timing of migration between the different age classes could be established.

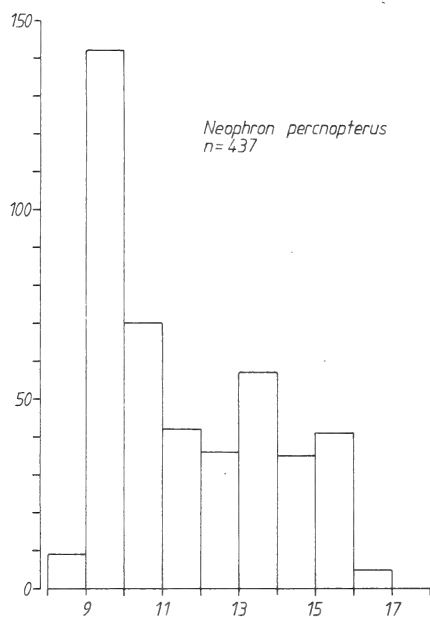


Figure 5. Egyptian Vulture—*Neophron percnopterus*. Birds per hour, autumn 1981.

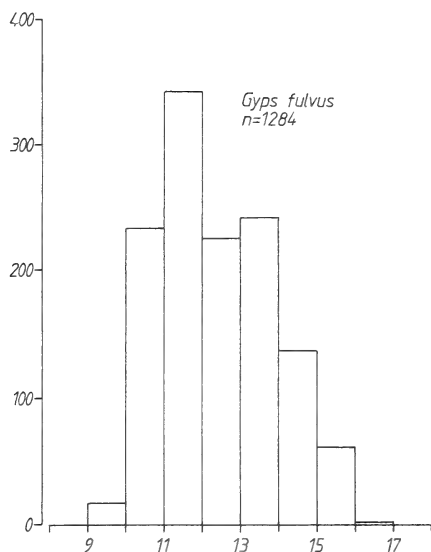


Figure 6. Griffon Vulture—*Gyps fulvus*. Birds per hour, autumn 1981.

Egyptian Vultures preferred to migrate in the morning hours (*Figure 5*). Laborious flapping was sometimes necessary to maintain height during the period 0800-1000 hrs. Many Egyptian Vultures passed singly (31 per cent) or in small flocks of two-six birds (50 per cent, $n = 289$). Flocks larger than six birds were occasionally seen and contained nine, 11, 12 and 23 birds. Except for the flock of 23 birds, all Egyptian Vultures freely mixed with other migrating raptors.

Compared to the results at the Bosphorus (Beaman *et al.* in Newton 1979) and the Belen Pass in S. Turkey (Sutherland & Brooks 1981), the Egyptian Vulture is scarce at Suez. In spring, this species is more than twice as numerous as in autumn (Wimpfheimer *et al.* 1983).

Gyps fulvus

Griffon Vulture

From 23 September to 5 November 1,284 Griffon Vultures were recorded. Notable migration started in the first 10 days of October with maxima at the end of October (123 birds on 25 October). During the first five days of November, each day 15-50 birds were counted at Suez, indicating that migration continued far into November. The majority of the birds consisted of juveniles and immatures (97 per cent, $n = 816$), although some mistakes in ageings cannot be excluded.

Griffon Vultures typically migrated during the warmest part of the day, i.e. 1000-1500 hrs. (*Figure 6*). Separate flocks of Griffons were never seen; they freely mixed with the stream of eagles in which they were easy to identify because of their size.

According to Brown, Urban and Newman (1982) breeding Griffon Vultures on the African continent are confined to Northwest Africa and Egypt, but Mullié and Meininger (in press) put forward convincing evidence that the Griffon Vulture probably never bred in Egypt. At the Bosphorus it is scarce and at Eilat a fairly common migrant in autumn (Cramp & Simmons 1980, Krabbe 1980). Both the origin and the destination of the birds at Suez is obscure.

This species has probably seriously declined during the last few decades, for Goodwin (1949) estimated 19.5 per cent of c. 20,000 raptors in the period 4-12 October 1947 at Suez to have been Griffon Vultures. When it is kept in mind that the majority of Griffons pass at the end of October, it is clear that this species has declined disastrously.

Aegypius monachus

Black Vulture

Three juveniles were identified on 17, 25 and 27 October respectively. Basically a resident or dispersive species (Cramp & Simmons 1980), it has been noted in small numbers at Eilat and the Gulf of Aqaba from late September to early November (Safriel 1968). Singles were seen in the Sinai and Egypt (Meinertzhagen 1930) and stragglers were seen in Sudan (Moreau 1972). Obviously this species has become extremely rare in the Middle East in recent years; it was for example rarely observed near Eilat in the period 1966-1979 (Krabbe 1980).

Circus gallicus

Short-toed Eagle

A total of 9,447 Short-toed Eagles was recorded between 6 September and 5 November, which probably spans the entire migration period at Suez. The majority passed during the last five days of September and the first half of October (maximum of 929 birds on 29 September).

Of the larger raptor species the Short-toed Eagles was one of the first to start migrating, viz. from 0900 hrs. onwards with a definite morning peak (*Figure 7*). Short-toed Eagles never formed single species flocks; usually each stream of eagles was accompanied by scattered Short-toeds. Hardly any Short-toed Eagle tried to cross the Bay of Suez during the morning hours. Instead the birds followed the rounding of the Bay of Suez and entered the Gebel Ataqa far north of the Ataqa observation site. Therefore, hundreds if not thousands of Short-toed Eagles were missed when counting was performed from the Ataqa site, and the actual number of migrants can be estimated at 10,000-12,000 birds. The diagnostic flight silhouette enabled us to identify distant flying Short-toed Eagles among non-descript eagles. Most or all of the 31,000 unidentified eagles therefore belonged to one or another of the *Aquila* eagle species.

Except for the Bosphorus with 2,342 birds in 1971 (Cramp & Simmons 1980) and Kafer Kasem, 18 km. east of Tel Aviv, with 3,744 birds from 30 August to 15 October 1981 (Dovrat 1982), the

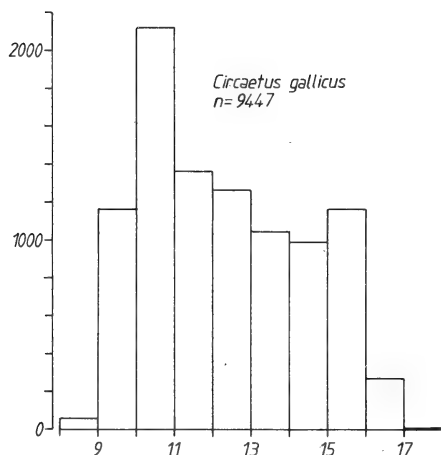


Figure 7. Short-toed Eagle—*Circus gallicus*. Birds per hour, autumn 1981.

Short-toed Eagle is a scarce migrant in the Middle East. Hardly any migrants are seen near Eilat either in spring (Christensen *et al.* 1981) or autumn (Safriel 1968; Krabbe 1980), which suggests a southward migration through Israel along the coast and the entering of Africa via Suez only. This is also in accordance with Goodwin (1949), who estimated 30 per cent of c. 20,000 raptors at Suez in 1947 to have been Short-toed Eagles, whereas Meininger, Baha el Din and Mullié (1981) counted 2,476 birds from 6-12 October 1980 near Suez.

Circus spp.

Harriers

A total of 65 harriers was recorded. Thirty-five Marsh Harriers *Circus aeruginosus* were seen between 13 September and 2 October with a maximum of 12 birds on 24 September. Sixty-nine per cent of the birds passed before 1200 hrs. The age composition was established in 24 birds, of which 71 per cent were juveniles. Five Hen Harriers *Circus cyaneus* were seen on 23 and 26 October and 4 and 5 November, viz. two adult males and three ring-tails. Eleven Pallid Harriers *Circus macrourus* occurred between 27 September and 3 November. Six adult males were identified, the remaining being adult females or juveniles. Only three Montagu's Harriers *Circus pygargus* were identified with certainty, viz. on 17, 15 and 22 October; the last two were adult males. Eleven unidentified harriers *Circus spp.* belonged to the Pallid/Montagu's Harrier-group.

Being exceptionally good fliers with a low wing loading (Brown & Amadon 1968), harriers easily cross large stretches of open water and are therefore less inclined to use narrow sea-crossings.

Accipiter gentilis

Goshawk

A single specimen was seen on 18 September, following the Bay of Suez in a W. direction. It is a rare bird in the Middle East with occasional records in and around Eilat (Krabbe 1980) and several winter observations in Egypt (Meinertzhagen 1930). This species is, however, not mentioned for Egypt by Brown, Urban and Newman (1982).

*Accipiter nisus***Sparrowhawk**

Twenty-three birds were seen between 23 September and 4 November. Most birds passed in the latter part of October, all of them solitary.

*Accipiter brevipes***Levant Sparrowhawk**

Remarkably scarce with only 41 migrants between 27 September and 24 October, of which 25 occurred on 14 and 15 October. Most of the 66 unidentified sparrowhawks *Accipiter spp.* probably belonged to this species since 68 per cent passed in small flocks (up to 27 birds in one flock), a feature typical of Levant Sparrowhawks (Porter *et al.* 1981).

The small numbers at Suez and at Eilat (Safriel 1968, Krabbe 1980) indicate that probably the entire Eurasian population migrates via Kafer Kasem in Israel, where from 30 August to 15 October 1981 16,479 Levant Sparrowhawks were counted (Dovrat 1982). These birds evidently maintained a predominantly southerly course through the Sinai because of the nearly complete absence at Suez. Although Levant Sparrowhawks readily make use of thermal currents and are more or less dependent on narrow sea-crossings, they probably have no difficulty in crossing the mouth of the Gulf of Suez.

*Buteo buteo***Buzzard**

A total of 640 birds passed between 13 September and 4 November, but mainly before 20 October and with a maximum of 66 birds on 9 October. All birds properly seen belonged to the *vulpinus*-subspecies, of which 579 were of the red-fox variety and seven of the grey-brown variety (*cf.* Christensen *et al.* 1981).

Like the eagles, Buzzards preferred to migrate in the period 1000-1600 hrs.; one specimen was seen migrating before 0800 hrs. (*Figure 8*).

Whereas the Steppe Buzzard can be considered as by far the most common trans-African migrant among the Palearctic raptors (Moreau 1972), it is surprising that this species is decidedly scarce in the Middle East during the autumn migration. The greatest numbers were recorded at the eastern end of the Black Sea, with a total of 204,959 Steppe Buzzards in the period 18 August-10 October 1976 (Cramp & Simmons 1980). Much smaller numbers are known from the Bosphorus (Cramp & Simmons 1980) and Eilat (Safriel 1968), and passage near Kafer Kasem (Dovrat 1982) and Suez (this study) is negligible. In spring, the Steppe Buzzard is the commonest migrant at Suez (Wimpfheimer *et al.* 1983), although less numerous than at Eilat (Christensen *et al.* 1981).

*Buteo rufinus***Long-legged Buzzard**

A total of 1,816 Long-legged Buzzards was recorded. Odd Long-legged Buzzards were identified from 18 September onwards, but the migration essentially started on 15 October, culminated in the last 10 days of October and probably continued far into November since 40-70 birds were seen daily during the first five days of November.

Compared to most other raptor species, the Long-legged Buzzard was an early morning migrant (*Figure 9*). Early birds usually passed below 50 metres in a powerful, elegant flight interspersed with long glides on slightly upheld, V-shaped wings in which the hand was held level. Many Long-legged Buzzards migrated singly, or otherwise in small, irregular flocks of two-eight birds. During peak migration, from 1000-1600 hrs. the birds passed scattered among eagles and vultures.

At places with concentrated migrations of raptors, the Long-legged Buzzard is surprisingly scarce: for example at the Bosphorus (Porter & Willis 1968), at the Belen Pass (Sutherland & Brooks 1981), in Lebanon (Cameron *et al.* 1967, Nielsen & Christensen 1969, 1970) and in Israel (Safriel 1968, Dovrat 1982). Most of the above-mentioned counts however, ceased at a time when migration of Long-legged Buzzards could be expected to start. Only from northeastern Turkey moderate or even strong passage of Long-legged Buzzards has been reported (Jähme 1965, Kumerloeve 1968). However, their identifications were doubted by Cramp and Simmons (1980). This doubt is probably justified with respect to the data of Jähme (1965), who observed 435 Long-legged Buzzards in the period 15-21 September (plus 2,600-2,900 Steppe Buzzards). In contrast to this Beaman *et al.* (*in*

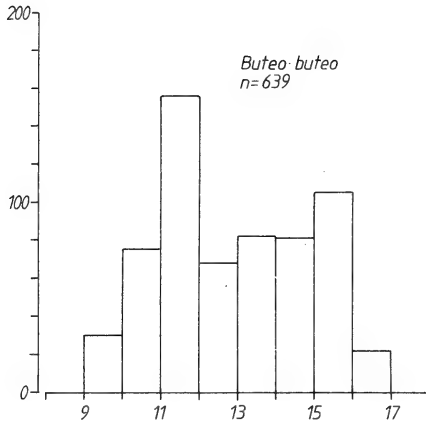


Figure 8. Buzzard—*Buteo buteo*. Birds per hour, autumn 1981.

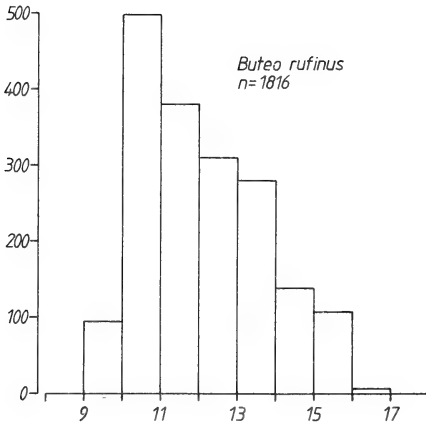


Figure 9. Long-legged Buzzard—*Buteo rufinus*. Birds per hour, autumn 1981.

Newton 1979) reported less than 10 Long-legged Buzzards among 380,000 migrating raptors from 17 August to 10 October 1976 at the Eastern Black Sea. The statement by Kumerloev (1967) of moderate passage of Long-legged Buzzards during the third 10 day period of October and the first 10 days of November near Erzurum may be a reliable indication of the origin of at least part of the migration through the Middle East during the second of October and during November. In the light of the recent observations at Suez there can be no doubt that considerable numbers of Long-legged Buzzards pass into Africa via Suez, probably even more than 2,000 birds each autumn.

Even at great distances Long-legged Buzzards were easily distinguished from Steppe Buzzards, mainly based on differences in proportions and flight silhouette. In general, Long-legged Buzzards appeared larger and more eagle-like than Steppe Buzzards. This feature was the result of noticeably longer and broader wings with a straight rear edge and an almost straight leading edge. When soaring, the wings were raised and slightly pressed forward, especially the hand. Gliding was invariably performed with V-shaped wings in which the hand was held flat. Active flight resembled that of the Honey Buzzard: elastic wing beats, deep down strokes and a clear bend between arm and hand. The colouration of most adult Long-legged Buzzards was diagnostic. The whitish head, the pale cinnamon, hardly barred and translucent tail, the pronounced white patch at the base of the hand on the upperwing, the translucent white patch on the hand of the underwing, the dark rufous-brown belly patch and the light breast were unmistakable when combined with silhouette characteristics. Some adult Long-legged Buzzards were much darker with a clear terminal tail-band, but even these birds showed prominent white patches on upper and underwing. Juvenile birds were less diagnostic: both head and tail were browner because of brown streaks and barrings respectively. The white patches on the wings were also less striking than in adult birds.

Aquila pomarina

Lesser Spotted Eagle

Nearly 22,000 birds were observed from 10 September up to and including 31 October, which spans the complete autumn migration period. Maxima were seen on 29 September and 9 October with respectively 2,708 and 3,193 birds (and respectively 3,251 and 1,498 unidentified eagles, mostly belonging to *Aquila pomarina* when the ratio Lesser Spotted/Steppe Eagle is taken into account). The migration was more or less restricted to the period of 24 September to 20 October. It is estimated that 45 per cent of the more than 31,000 unidentified eagles belonged to this species (based on the daily ratio *Aquila pomarina/nipalensis*) and that at least 5,000-10,000 birds were overlooked in the in the earlier part of the migration period because of absence of observers or wrong location of the observation site. This results in a tentative total of 40,000-45,000 birds. At Kafer Kasem, 18 kms east of Tel Aviv, nearly 41,000 Lesser Spotted Eagles were counted in the period 30 August to 15 October 1981 (Dovrat 1982). When the daily totals of Kafer Kasem (Dovrat 1982) are compared with those of Suez (this study), it is remarkable that the passage at Suez is more evenly spaced in time. It is fairly safe to assume that the entire population of Lesser Spotted Eagles migrates via Kafer Kasem and enters Africa via Suez for in the autumn of 1982 nearly 90,000 Lesser Spotted Eagles were counted at Kafer Kasem (Horin & Dovrat 1983) despite the fact that substantial numbers may have been missed.

The diurnal migration pattern was bimodal with a peak in the late morning and a second peak in the afternoon (*Figure 10*). Lesser Spotted Eagles typically congregated in flocks up to 200 birds, often mixed with Short-toed Eagles and Steppe Eagles. The composition of these flocks remained inconsistent, with one spiral partly or wholly mixing with others during migration. Flocks larger than 400 birds were exceptional. With respect to age, small samples were taken throughout the migration period, resulting in 45 per cent adults and 55 per cent juveniles and immatures ($n = 211$). This sample may be too small to be significant.

Aquila clanga

Spotted Eagle

Eighty-six birds were seen from 16 September to 1 November with a maximum of twelve birds on 9 October. It is estimated that more than a hundred birds passed Suez. Fifty-nine birds were identified according to age: 12 per cent adult and 88 per cent juvenile/immature, indicating that

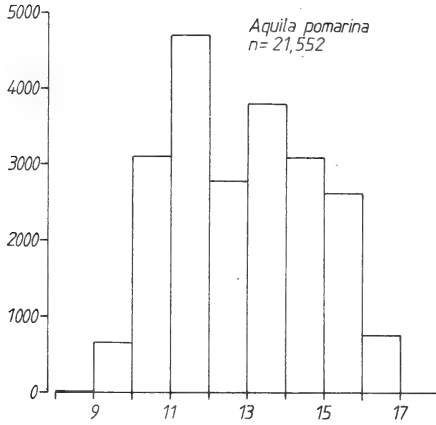


Figure 10. Lesser Spotted Eagle—*Aquila pomarina*. Birds per hour, autumn 1981.

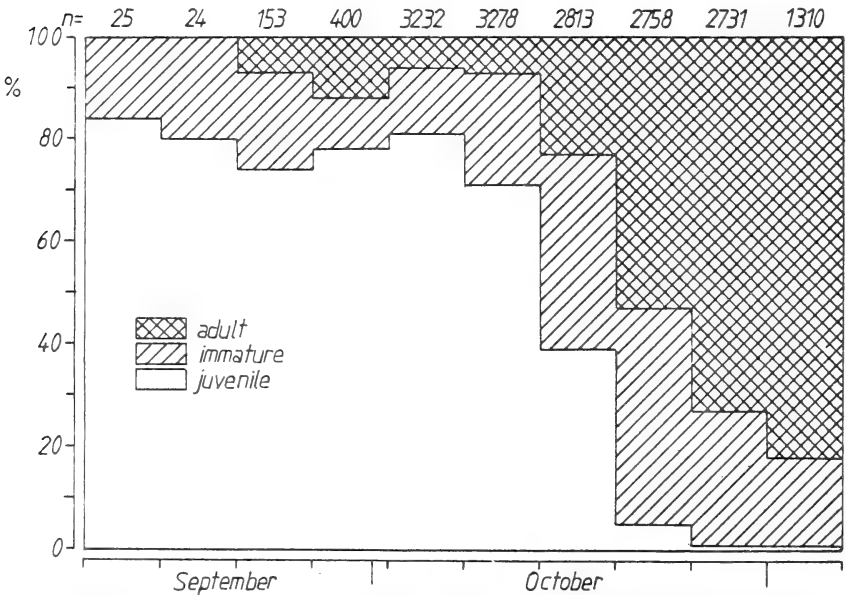


Figure 11. Age-composition of Steppe Eagles—*Aquila nipalensis* in autumn 1981. In five day periods.

probably many adults were missed among the numerous Steppe Eagles in the latter part of October and/or that adults are partly migratory or winter further north than juveniles and immatures.

This species is considered a very scarce migrant at the Bosphorus (Porter & Willis 1968), the Lebanon (Nielsen & Christensen 1970) and Israel (Krabbe 1980, Dovrat 1982). According to Brown, Urban and Newman (1982) the Spotted Eagle declined by 50-75 per cent in the period 1900-1950 and may be much rarer now (*cf.* Mullié & Meininger *in press*).

Aquila nipalensis

Steppe Eagle

By far the most numerous species migrating over Suez, probably amounting 100,000 or more birds when it is considered approximately 55 per cent of the unidentified eagles may have belonged to this species (based on the daily ratio *Aquila pomarina/nipalensis*) that many birds were missed because of the shift in migration in the course of the day and the fact that migration continued in to November after the fifth (Sherihai 1981). The first Steppe Eagles were seen from the middle of September onwards. Large scale migration started mid-October with the highest totals during the last week of October. On 25, 26 and 27 October respectively 8,240, 6,268 and 5,758 Steppe Eagles were identified, together with respectively 1,246, 1,230 and 1,689 unidentified eagles, probably all of them Steppe Eagles.

As was described by Christensen *et al.* (1981) and Sherihai (1981) the Steppe Eagles were classified into three groups, viz. birds in juvenile, immature and adult plumages, using the same criteria as Brooke *et al.* (1972) and Porter *et al.* (1981). In sum, 16,725 birds (26 per cent) could be identified according to age, of which 34 per cent were juvenile, 26 per cent immature and 40 per cent adult (Figure 11). Juveniles started the migration and made up the majority until the first ten days of October, to be successively replaced by immatures and adults. Hardly any juvenile birds were seen after 21 November and the mass migration of Steppe Eagles in the last week of October consisted mainly of adult birds. With regard to the continued migration of Steppe Eagles after 5 November, it should be kept in mind that the proportion of adult birds is under-recorded. Exactly the same migration pattern was found by Sherihai (1981) near Eilat in the autumn of 1980. In spring the adults leave the wintering areas before respectively immatures and juveniles (Christensen *et al.* 1981).

Like the Lesser Spotted Eagle, the Steppe Eagle had a bimodal occurrence over the day, with by far the strongest passage from 1000-1200 hrs. (Figure 12)), even when the unidentified eagles are considered (Figure 14). It is possible that soaring conditions deteriorated in the course of the season, especially in the afternoon. This is illustrated by the fact that the migration period contracted from 1000-1600 hrs. to 1000-1400 hrs. after approximately 25 October. Steppe Eagles dominated the scene of raptor migration at Suez from the middle of October onwards. Flocks of 30-800 birds were coming over at regular intervals. Especially at the end of October long lines of gliding Steppe Eagles could be seen, emerging from the haze in the Sinai and disappearing behind the Gebal Ataqqa on the other side of the Bay of Suez without interruptions in flight-lines. It is remarkable that such an impressive migration remained unknown for so long a period. Cramp and Simmons (1980) for example, were not able to mention the Steppe Eagle as a migrant for Suez and therefore hypothesized that most Steppe Eagles probably crossed the Gulf of Suez itself. Only recently Meininger, Baha el Din and Mullié (1981) detected considerable passage of Steppe Eagles near Suez, viz. 1,137 birds in the period 6-12 October 1980. Up to that time notable migration was known only from Eilat, where Sherihai (1981) counted 24,246 birds during 55 days in the period 24 September to 29 November 1980. Everywhere else in the Middle East it is a scarce migrant (Cramp & Simmons 1980), maybe partly due to premature finishing of counts, as for example at the Eastern Black Sea (17 August to 10 October 1976, *cf.* Beaman *et al.* *in* Newton 1979). Nevertheless, in Africa it is an abundant winter visitor on open plains (Brooke *et al.* 1972, Brown, Urban & Newman 1982).

Aquila heliaca

Imperial Eagle

A total of 556 birds was recorded, the first on 20 September. From 9 October onwards daily increasing numbers were counted, culminating in the last week on October (maximum of 97 birds

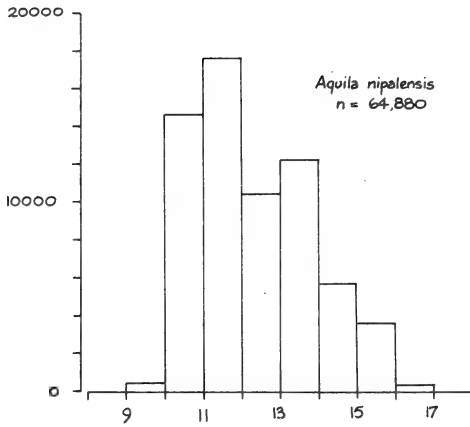


Figure 12. Steppe Eagle—*Aquila nipalensis*. Birds per hour, autumn 1981.

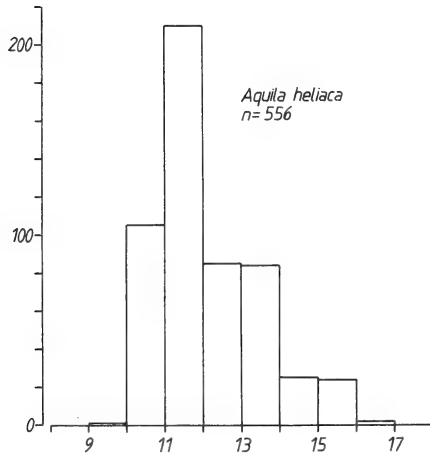


Figure 13. Imperial Eagle—*Aquila heliaca*. Birds per hour, autumn 1981.

on 27 October) and still continuing with 10-40 birds per day during the first five days of November. Bearing in mind that the identification of adult and immature birds presented some problems, especially when flying far away in the afternoon, and the migration evidently continued after 5 November, the actual number of Imperial Eagles may exceed 1,000 birds per autumn.

The distribution of Imperial Eagles over the day, as presented in *Figure 13* may not be entirely reliable since most eagles passed the Bay of Suez during the late afternoon under bad light conditions. Probably the same pattern as found in the Lesser Spotted Eagle (*Figure 9*) and the Steppe Eagle (*Figure 12*) applies for the Imperial Eagle.

The age-distribution of 511 Imperial Eagles was as follows: 11 per cent adult, 25 per cent immature and 64 per cent juvenile. Although juveniles were relatively common throughout the migration period, immature and adult birds were seen more frequently towards November (and were certainly under-recorded), thus roughly duplicating the pattern found in the Steppe Eagle (*Figure 11*).

The Imperial Eagle is rarely seen at other watch points of concentrated migration in Eastern Europe and the Middle East. Appreciable numbers are only known from Eilat in spring (Christensen *et al.* 1981). It is possible that the Imperial Eagles use the same 'route' as Steppe Eagles, which, despite their high numbers manage to fly from the breeding areas to Suez largely undetected. The statement of Brown, Urban and Newman (1982) that the Imperial Eagles at Suez migrate from late September to mid-October, is evidently incorrect.

Aquila chrysaetos

Golden Eagle

Only five birds seen, viz. two immatures on 18 September, one juvenile and one immature on 16 October and one on 25 October.

Aquila spp.

Unidentified eagles

More than 31,000 eagles could not be identified. Identifying eagles was particularly a problem at the start of the count when the most rewarding observation site had still to be discovered, during southerly winds when the birds were passing north of Suez and during the late afternoon when the birds were crossing the Bay of Suez directly south of Port Tewfik to Ataqa. It is thought that the flight-silhouette of the Short-toed Eagle was characteristic enough to find the odd Short-toeds among the *Aquila*-eagles. Based on the ratio Lesser Spotted Eagle/Steppe Eagle per day it is reasonable to assume that some 45 per cent of the unidentified birds belonged to the Lesser Spotted Eagle, the remaining 55 per cent being Steppe Eagles with several hundreds of Imperial Eagles and odd Spotted Eagles.

Hieraetus pennatus

Booted Eagle

Between 13 September and 5 November 761 Booted Eagles passed Suez, with the majority in the second half of September (maximum of 88 birds on 27 September), and only occasionally after 16 October. The ratio of light to dark phase birds was established in 487 birds (64 per cent): 65 per cent light and 35 per cent dark. Booted Eagles preferred to migrate between 1000-1500 hrs. mainly solitary or in small, irregular flocks, sometimes among other raptor species (*Figure 15*).

Less than 1,000 Booted Eagles can be seen at other watch points in Eastern Europe and the Middle East. Surprisingly, Dovrat (1982) counted 743 Booted Eagles from 30 August to 15 October 1981 at Kafer Kasem, 18 kms east of Tel Aviv. These birds probably take the route via Suez where approximately the same number of migrants was noted.

Hieraetus fasciatus

Bonelli's Eagle

Only six birds were identified with certainty, viz. one immature on 18 September, one immature on 20 September, two immatures on 27 September, one juvenile on 6 October and one juvenile on 7 October.

Pandion haliaetus

Osprey

Nine migrants were observed between 16 September and 30 October, with singles on 16, 17, 18, 19 and 30 September and 15 and 30 October, as well as two birds on 28 September.

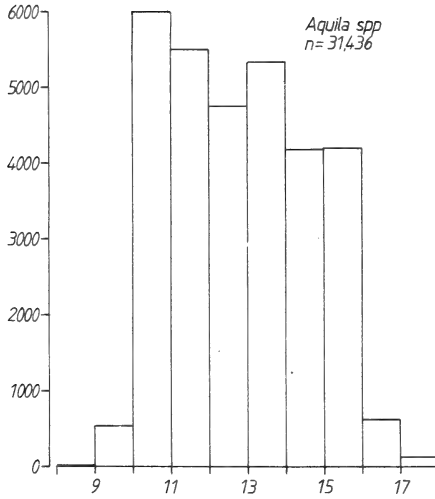


Figure 14. Unidentified eagles—*Aquila spp.* Birds per hour, autumn 1981.

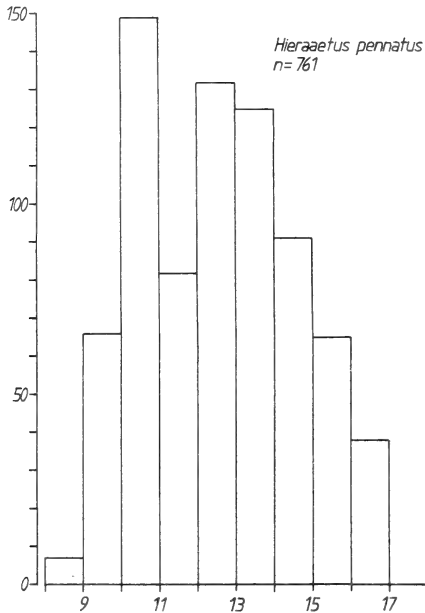


Figure 15. Booted Eagle—*Hieraetus pennatus.* Birds per hour, autumn 1981.

*Falco naumanni***Lesser Kestrel**

Between 5 September and 31 October 26 Lesser Kestrels were noted at Suez. Except for two birds on 26 October, all of them were solitary and occurred mainly after 27 September.

*Falco tinnunculus***Kestrel**

Between 20 September and 5 November 24 Kestrels were identified, all single and mainly during the last ten days of September.

*Falco naumanni/tinnunculus***Unidentified Kestrels**

Between 29 September and 4 November 26 unidentified kestrels were observed, mainly during the first ten days of October. Small falcons were most often seen before 1000 hrs. thereafter they were probably flying too high to be detected other than by chance.

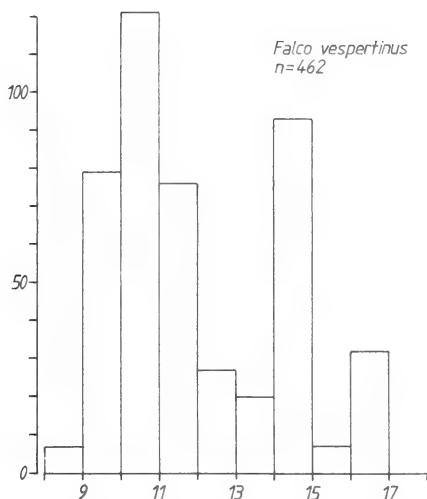


Figure 16. Red-footed Falcon—*Falco vespertinus*. Birds per hour, autumn 1981.

*Falco vespertinus***Red-footed Falcon**

Between 17 September and 3 November 462 Red-footed Falcons were recorded, scattered over the entire observation period. Only 6 per cent of the birds occurred singly; the remaining birds congregated in flocks of 2-61 birds ($\bar{x}=12$, $n=433$). The age composition in flocks in which all birds were properly seen, was as follows: 17 per cent adult male, 24 per cent adult female and 59 per cent juvenile or immature ($n=219$).

The Red-footed Falcon was mainly seen during the morning hours (Figure 16), although high flying birds were easily overlooked and passage around noon and in the afternoon probably took place at very great heights and was therefore missed. This can be illustrated by the flock of 61 birds which was detected by chance with binoculars, circling at great heights on 18 October at 1440 hrs.

All Red-footed Falcons followed a strictly southerly course, mainly along the western shore of the Gulf of Suez. No doubt considerable numbers were overlooked, especially after the Ataqa observation site was left in favour of Port Tewfik (Figure.1).

This species is nowhere common at watch points of concentrated raptor migration in Europe and the Middle East. However, large concentrations are known in Autumn north of the Black Sea (Lohman 1962) and under favourable conditions in Northern Europe as well (Bijlsma 1980, Waldenström *et al.* 1981). The majority of these birds probably fly due south along the western coast of the Black Sea (Lohman 1962, Königstedt & Robel 1982), passing Crete and Cyprus on the way (Bourne 1960, S. Christensen *in litt.*) and entering Africa in Libya and Egypt. This species is notoriously elusive during migration, both in Europe and in Africa (Brown, Urban & Newman 1982).

*Falco columbarius***Merlin**

Three females/juveniles were observed, i.e. on 27 and 29 October and on 2 November.

According to Meinertzhagen (1922) this species is fairly common in Spring in the Nile delta, indicating that there must be some influx in autumn.

*Falco subbuteo***Hobby**

Thirty-one birds were recorded from 14 September to 30 October, the majority during September and the first ten days of October.

The Hobby evidently crosses the Mediterranean Sea on a broad front, for it is a scarce migrant at other points of concentrated passage in East Europe and the Middle East (Cramp & Simmons 1980). Consequently, this species is not a prominent migrating raptor at Suez (*contra* Brown, Urban & Newman 1982).

*Falco eleonora***Eleonora's Falcon**

One, five, three and 18 birds were recorded on respectively 26, 27 and 31 October and 2 November, flying due south at great heights along the Suez Canal towards the Gulf of Suez. No doubt the number of migrants would have been much higher had the observations continued after 5 November, bearing in mind the late breeding season of this species (Walter 1979). Of these 27 birds, 17 proved to be juveniles, the remainder both dark and light phase adults.

Walter (1979) suggested departure from the breeding quarters via the eastern Mediterranean and the Red Sea to Somalia and Madagascar, but there are hardly any observations to prove this hypothesis. The records of migrating Eleonora's Falcons at Kafer Kasem (Dovrat 1982) and at Suez may support the idea that at least part of the population leaves the breeding area via the Middle East, probably at great heights as was observed at Suez.

*Falco peregrinus***Peregrine**

Only one record, viz. on 4 October: one adult flying south.

*Falco pelegrinoides***Barbary Falcon**

One adult flying south on 3 November, probably migrating, although suspected of being a resident in the Gebel Ataqa (*pers. comm.* P. L. Meininger).

*Falco spp.***Large Falcon**

Solitary large falcons were seen on 30 September (probably Barbary Falcon), 12 October, 26 October and 5 November (last three *Falco biarmicus/cherrug*).

DISCUSSION

The large number of migrating raptors at Suez in autumn was not wholly surprising. Authors such as Goodwin (1947), Cramp and Simmons (1980) and Brown, Urban and Newman (1982) had already speculated about the importance of the Suez area for migrating raptors. However, the fact that 96 per cent of 133,982 migrants were eagles (including Short-toed Eagle and Booted Eagle) poses several questions with regards to origin and destination of the respective species and the routes they take from the Eurasian breeding areas to Africa and vice versa.

The route taken by raptors from East-Europe and West-Russia to Africa is now relatively well described. Most birds cross the Bosphorus area (Porter & Willis 1968), fly in a S.E. direction to the Belen Pass in South Turkey (Sutherland & Brooks 1981), and follow the eastern coast of the Mediterranean Sea via Syria (Pyman 1953), the Lebanon (Cameron *et al.* 1967; Nielsen & Christensen 1969, 1970) and Israel (Dovrat 1982). This route is mainly used by Honey Buzzards, Short-toed Eagles, Levant Sparrowhawks and Lesser Spotted Eagles and, to a lesser extent, by Egyptian Vultures and Booted Eagles. Based on the census results at Kafer Kasem in Israel (Dovrat 1982) and at Suez in the same year (this study), it is likely that the majority of Short-toed Eagles, Lesser Spotted Eagles, Egyptian Vultures and Booted Eagles seen at Kafer Kasem alter their flight parallel to the Israelian Coast into a southwesterly course after reaching the Sinai, thus ending up near Suez. Apparently part of this stream passes between Suez and the Bitter Lakes, thus escaping attention of observers at Suez, especially with southerly winds (this study). Boyd (1917) and Simmons (1951) noted Buzzards, Long-legged Buzzards, Egyptian Vultures and unidentified eagles between the Bitter Lakes and Suez in autumn and spring, but were unable to estimate numbers. The other raptor species seen at Kafer Kasem, such as Honey Buzzards and Levant Sparrowhawks, probably continue their predominantly southerly course and migrate through the Sinai to its southernmost tip where they cross the mouth of the Gulf of Suez.

It is evident that, apart from the Lesser Spotted Eagles and a minority of Short-toed Eagles, all eagles seen at Suez must have a more easterly origin than the raptors which follow the coast of the Mediterranean Sea. Whereas hardly any eagles were observed from 17 August to 10 October 1976 at the Eastern Black Sea (Beaman *et al.* in Newton 1979), the origin of most eagles should be traced even further east. However, hardly anything is known about the migration (routes, numbers) of raptors from Russian breeding areas around the Caspian Sea. Most probably, this migration takes place at great heights and without concentration in 'straits'. This idea is consistent with the scattered observations in Iran (Mackintosh 1949, Nielsen 1969), Iraq (Marchant 1963), Syria (Meinertzhagen 1924, 1935) and Jordan (Bourne 1959, Cameron & Cornwallis 1966). Most of these observers hardly noticed any migration of vultures and/or eagles unless under unusual circumstances such as a sandstorm which forced many eagles to the ground in Jordan (Mackintosh 1949). Also, in spring only casual encounters with small numbers of migrating raptors are described for Jordan (Flaxman 1982), Iraq (Christensen 1958, Passburg 1959) and Iran (Gyllin 1974). Probably, the topography in these countries does not necessarily favour concentrated raptor migration, whereas the development of strong thermals in desert-like areas (Pennycuik 1972) can be responsible for migration at extremely great heights, thus escaping attention of even competent observers.

It is reasonable to assume that most Griffon Vultures, Long-legged Buzzards, Steppe Eagles and Imperial Eagles enter Israel via the Wadi Araba, cross the Sinai in a western or southwestern course and avoid the Gulf of Suez by rounding the Bay of Suez over land. Except for the Steppe Eagle, none of these species is recorded in notable numbers at Eilat in autumn (Krabbe 1980, Sherihai 1981), and even in the case of the Steppe Eagle, it is remarkable that the numbers at Eilat are much smaller than at Suez, viz. respectively 25,000 and 65,000 (100,000) (Sherihai 1981, this paper). The birds seen at Eilat fly due west and turn south after having passed the mountains northwest of Eilat. In the Moon Valley however, Steppe Eagles were flying north-south and east-west; the latter flight line might take the eagles in the direction of Suez. The absence of reliable, systematic observations from the Sinai makes it hard to explain the behaviour and flight lines of Steppe Eagles after having passed the Eilat area. It is improbable that many Steppe Eagles cross the Gulf of Suez at its southernmost tip in autumn, although more data are needed than published by Marchant (1941), Meininger, Baha el Din and Mullié (1981) and De Roder (1982). Having regard to the tendency of eagles to avoid water crossings, combined with the fact that the birds probably are not in a hurry to reach the wintering areas, it is likely that the majority of the Steppe Eagles, after having left the Eilat area, fly in a western or southwestern course through the Sinai (maybe supported by the local topography), reach the eastern shore-line of the Gulf of Suez and fly north until they reach Suez where the African mainland is entered. Observations of Mackintosh (1949) at Sudr, some 50 kms.

south of Suez along the eastern shore of the Gulf of Suez, seem to endorse this theory; the migrating raptors there were heading north along the coast and this phenomenon was seen on a number of different days, leaving the suggestion of a well-frequented path. Also during our observations in 1981, we frequently detected flocks coming in from the southeast. It seems therefore probable that most, if not all eagles and vultures enter Africa via Suez whereas most smaller raptor species make the crossing to the African mainland via the southernmost tip of the Sinai. The detailed observations of Christensen *et al.* (1981) near Eilat and Wimpfheimer *et al.* (1982) near Suez, supplemented by scattered observations along the coast of the Gulf of Suez (Borman 1929; Marchant 1941; Elliott & Monk 1952; de Roever 1980; Christensen *et al.* 1981; Sørensen 1982) suggest a completely different picture in spring. Many more systematic observations will be needed before the puzzling pattern of raptor migration through the Middle East will be unravelled.

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SUMMARY

From 4 September to 5 November 1981, 133,982 raptors were counted at Suez (Egypt) during 422 observation hours on 57 days. The most common species were Short-toed Eagle *Circaetus gallicus* (9,447), Lesser Spotted Eagle *Aquila pomarina* (21,552), Steppe Eagle *Aquila nipalensis* (64,880) and unidentified eagles *Aquila spp.* (31,436). Relatively numerous were Griffon Vulture *Gyps fulvus* (1,284), Long-legged Buzzard *Buteo rufinus* (1,816), Imperial Eagle *Aquila heliaca* (556) and Booted Eagle *Hieraetus pennatus* (761). Thirty-two migrating raptor species were recorded, of which 19 species passed with totals less than 75. Eagles (including Short-toed Eagle and Booted Eagle) accounted for 96 per cent of the total migration. It is thought that each autumn more than 200,000 raptors must pass over Suez.

Based on the literature it is argued that, except for the Lesser Spotted Eagle and a minority of the Short-toed Eagle, all abundant raptors at Suez originate from Russia around and east of the Caspian Sea. Migration from Russia to Africa takes place at great heights on a broad front. After having reached the Sinai, the eagles and vultures fly around the Bay of Suez whereas the smaller species leave the Sinai at its southernmost tip, thus crossing the Gulf of Suez.

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THE AUTUMN MIGRATION OF PASSERINES AND NEAR-PASSERINES AT THE BOSPHORUS, TURKEY

by

R. F. Porter

INTRODUCTION

During the autumn of 1966, for a period of nearly four months, M. J. Helps, A. R. Kitson, I. R. Willis and I carried out observations at the hill of Kuçuk Çamlıca at the southern end of the Bosphorus in north-west Turkey for the purpose of studying bird migration. The main emphasis was on soaring birds (Storks *Ciconia* sp, raptors and Cranes *Grus grus*) and the results of these observations have been published (Porter & Willis 1968).

The opportunity was also taken to study passerine and near-passerine migration, a subject on which little systematic work for a defined area has been published or undertaken in south-east Europe and Turkey.

Although many of the observations included in this paper have been summarised in the Bird Report of the Ornithological Society of Turkey (OST 1979) this paper considers the migration patterns in greater detail and, where relevant, makes comparisons with the previous brief systematic counts of Nisbet and Smout (1957) and Ballance and Lee (1961) who watched at the Çamlıca hills from 14 September to 1 October 1956 and 20 August to 8 September 1959 respectively. The paper also attempts modestly to provide a base-line pattern for those small diurnal and nocturnal migrants that pass in autumn over the southern end of the Bosphorus and the Çamlıca hills in particular. In the case of nocturnal migrants the habitats used by the commonest species occurring on Kuçuk Çamlıca are also considered; it should, however, be noted that these species in turn are probably a reflection of the habitats available.

Except for very few species no attempt has been made to consider the observations in the wider context of migration through Turkey and the Near East. This was considered inappropriate because of the lack of systematic work elsewhere. The general migratory pattern for most species is broadly known and contained in the Bird Reports of the Ornithological Society of Turkey (see OST 1969, 1972 and especially 1975 and 1978).

THE OBSERVATION AREA

A daily watch for visible migration was maintained at 225 metres above sea level from the top of Kuçuk Çamlıca, the slightly smaller of two hills – Buyuk and Kuçuk Çamlıca situated at the southern end of the Bosphorus on the Asian side (Figure 1). These hills stand approximately 4 km. from the ancient town of Uskudar and command an excellent view. We chose the Çamlıca hills because previous workers had used them as their base and had found their strategic position ideal for watching migration over the southern part of the Bosphorus.

In addition, daily counts of all species were made in a standard census area of approximately 10-15 hectares on the summit of the hill, Kuçuk Çamlıca. This comprised a number of habitats and was surrounded by a low wall thus making it readily identifiable. The top of the hill was flat and dominated by grass, falling away on all sides to well vegetated slopes. In places the vegetation was thick and bushy with much Holly Oak *Quercus coccifera*, Juniper *Juniper oxycedrus* and Blackberry *Rubus fruticosus* and taller stands of conifers, especially Pine *Pinus* sp, Firs *Abies* sp, Cypress *Cypressus* sp, and Cedar *Cedrus* sp. In other areas the aspect was open with a herb-rich ground cover including Rock Rose *Cistus incanus*, Heather *Erica carnea*, Flat-topped Carline Thistle *Carlina corymbosa*, Chicory *Cichorium intybus* and Greek Spiney Spurge *Euphorbia*

acanthothamnos. Plate 1 depicts an area near the top of the hill where open herb-rich areas merged into scrub and taller conifers. There was a small mature deciduous wood in the north western quarter of the area comprised mostly of oaks *Quercus robur* and Sweet Chestnut *Castanea sativa*. At the edge of the wood the habitat was park-like with the trees well spaced and ground cover poor (see Plate 2).

PERIOD OF OBSERVATION

Observations commenced on 14 July 1966 and continued until 8 November, with gaps on 16 to 18 July and 2 November. Observations were thus made on a total of 114 days. Each day, watching began at approximately 0700 hrs. (local Turkish time) and continued until the late afternoon or dusk. In addition each day a count was made by one observer (with back-up by others) of birds in the census area.

WEATHER CONDITIONS

Most days during the autumn of 1966 were hot and sunny, though becoming slightly cooler towards the end of October. Visibility was normally very good though there were frequent early morning mists over the Bosphorus and low ground to the east. Cloud coverage was generally between 2 and 4 okta but the frequency of cloudy days increased as the autumn progressed. Rain occurred on only six days and then, with the exception of two days, just for a short period. The prevailing wind was from the north-east, being from this direction on 74 days out of the 114 on which observations were made. After fairly calm mornings the wind usually increased in strength at around midday to become force 3 or 4 (Beaufort scale) by mid-afternoon. Thus the observations were made during an autumn of fairly settled and predictable weather – at least locally.

THE OBSERVATIONS AND KEY TO THE FIGURES

During the study period a total of 103 passerines or near-passerines was recorded in or over the census area of Küçük Çamlıca; of these species 29-31 bred or probably did so. A summary of the observations follows and records refer to the census area unless otherwise stated.

The length and peaks of the passage of the most commonly recorded species are represented in the histograms and graphs appearing in the *Figures*. They show in the case of (a) *histograms*: 10 day aggregates of daily counts of birds in the census area, and (b) *graphs*: 10 day aggregates of daily counts of birds observed flying in an easterly direction over the census area. For Swift *Apus apus* and Alpine Swift *Apus melba* (where histograms have been produced) no attempt has been made to distinguish between apparent migrants passing over the area and feeding birds which frequently used the air space above the Çamlıca hills. Where relevant, comments on the observation are also given and comparisons made with the observations of other workers.

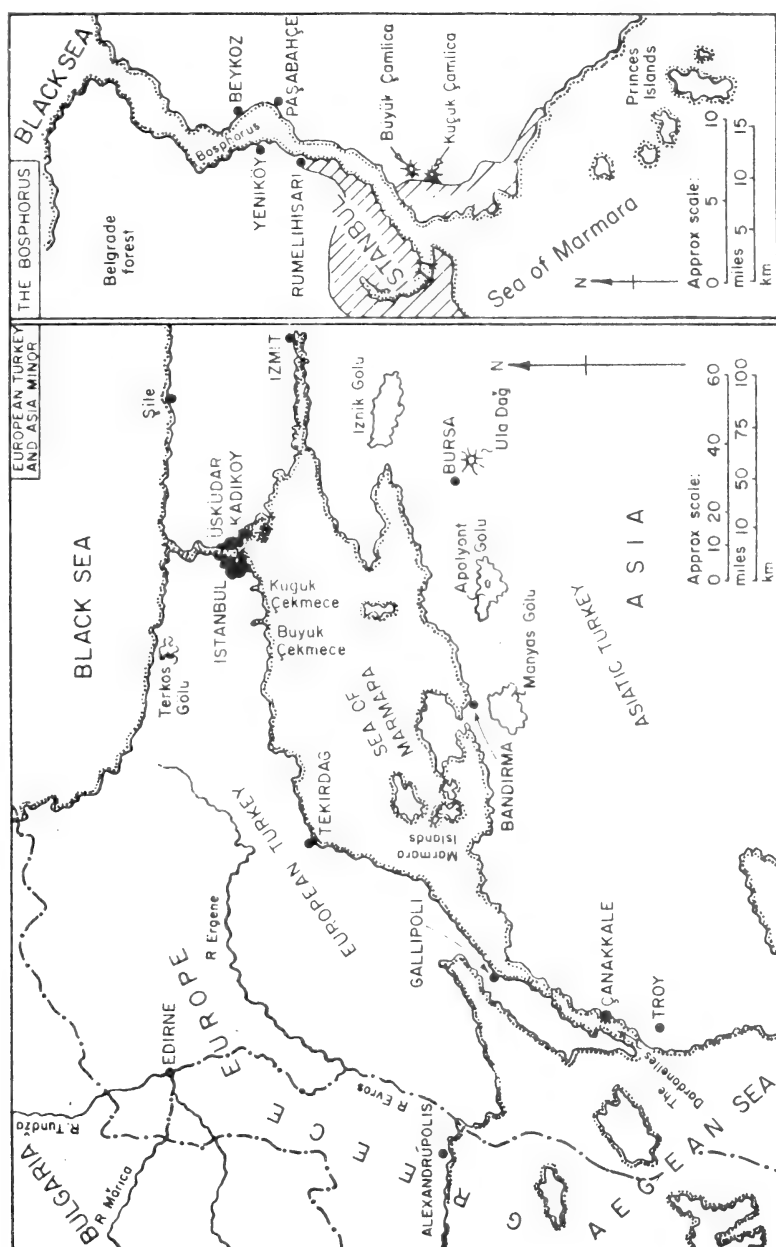
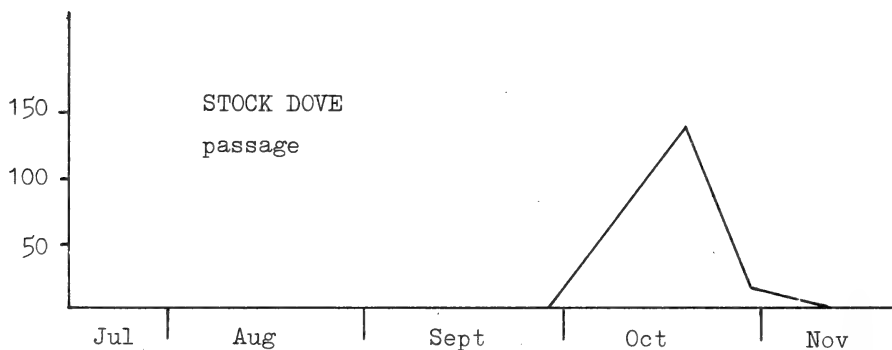


Figure 1. Map of Western Turkey and the Bosphorus

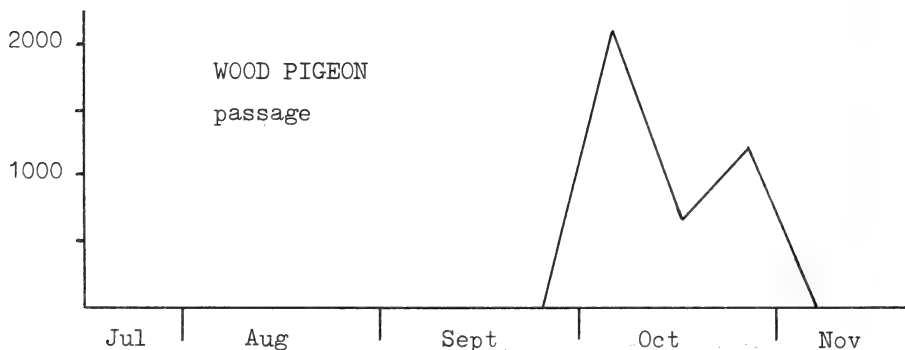
SYSTEMATIC LIST

*Columba oenas***Stock Dove**

Between 18 September and 25 October 226 flew E., the peaks being 66 on 17 October and 60 on 18 October (see Figure below).

*Columba palumbus***Wood Pigeon**

4,001 flew E. between 30 September and 24 October nearly all movement being in the morning (see Figure below). Up to 20 in census area in early October but normally not more than four present.

*Streptopelia decaocto***Collared Dove**

Up to two seen almost daily throughout autumn but breeding not proven. Breeds in Istanbul but in autumn numbers greatly reduced, birds appearing to move out to the surrounding countryside.

*Streptopelia turtur***Turtle Dove**

Seen regularly between 23 July and 3 October with largest numbers in early September when up to eight present. Probably bred. Ten flew E. on 16 and eight on 18 September. The peak movements at the Belen Pass, Southern Turkey were in the first half of September (Sutherland & Brooks 1981).

*Cuculus canorus***Cuckoo**

Recorded on seventeen dates between 24 July and 18 September. No more than three on any one date, and most regularly seen in September.

*Otus scops***Scops Owl**

The only record was one on 19 August.

*Athene noctua***Little Owl**

Three present on 19 July; thereafter one or two seen almost daily through to November. Probably bred.

*Strix aluco***Tawny Owl**

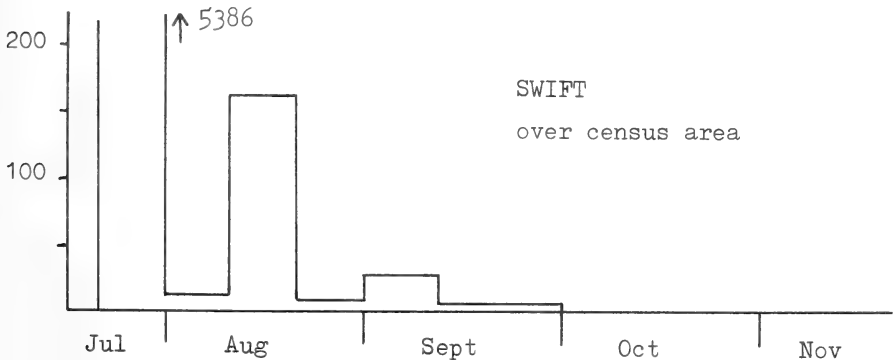
One or two recorded on five dates during autumn; two calling 1 km. east. of Kuçuk Çamlıca on 24 October. Probably bred locally

*Caprimulgus europaeus***Nightjar**

Single on 15 August and on four dates between 7 and 15 September.

*Apus apus***Swift**

Large numbers in July when there appeared to be a general S./E. passage across the southern end of the Bosphorus; up to about 1,000 recorded on several dates during the month and similar numbers over Istanbul. Small numbers seen in August and on nine dates in September up to 27th (see *Figure* below; also Alpine Swift *Apus melba* for full discussion of Swift *Apus* sp. movements).

*Apus pallidus***Pallid Swift**

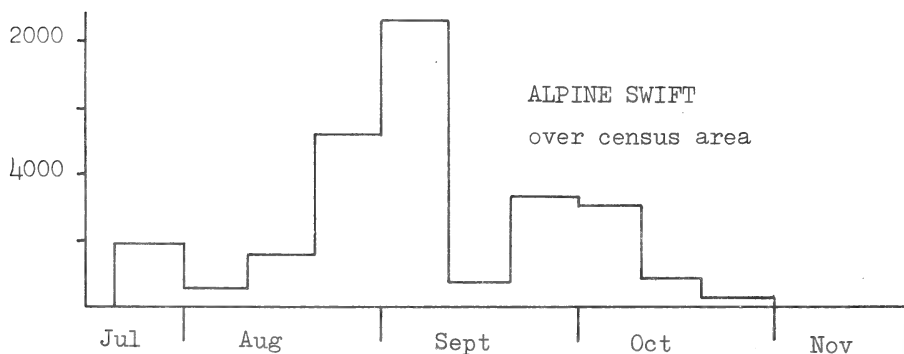
Singles flew E. on 6 August and 18 September. Several others suspected but only these seen well enough to identify.

*Apus melba***Alpine Swift**

Large numbers over Istanbul in July, August and September, up to about 2,000+ being estimated at times over the harbour area. Similar numbers, and occasionally up to about 3,000, over the census area during the same period were probably both passage and feeding birds from Istanbul. True migration confused by early morning feeding movements: birds at first thought to be on passage apparently returning to Istanbul later in the day. There was, however, a clear tendency for an easterly movement during July to September. By the end of October only small numbers present and the last seen were three on 5 November (see *Figure* below).

While the movements of the two commonest swifts *Apus sp* were obscured to some extent by local feeding movements, it was apparent that the majority of Swifts *Apus apus* had moved through by 10 September, at which time the passage of the later migrating Alpine Swifts *Apus melba* was at its peak. At the Belen Pass in southern Turkey, Sutherland and Brooks (1981) found the Swift *Apus apus* passage highest during 9-29 August; although in a different year (1976), this accords well with our observations for the more northerly Bosphorus where a major peak occurred between 10 and 20 August. Similarly with Alpine Swift *Apus melba* most were seen at Belen between 7 and 23 September, whereas the Bosphorus peak was predictably earlier: 1-10 September.

In 1959 Ballance and Lee (1961) also noted very few Swifts *Apus apus* in early September. However they observed very many Alpine Swifts *Apus melba* (up to 4,000 in a day) in late August and early September but, like us, had difficulty in interpreting the movements due to the presence of the large local breeding population in Istanbul, many of which remain until October; indeed they considered these movements unlikely to represent true migration.

*Merops apiaster***Bee-eater**

Recorded between 13 August and 24 September, a total of 150 only, passing east. Many other parties heard but not seen. It appears that the main passage of this species in Turkey is in the second half of August and throughout September (Sutherland & Brooks 1981; OST 1972). Whilst this is supported by the observations of Ballance and Lee (1981) and Nisbet and Smout (1957), the latter concluded because of the small numbers observed at the Bosphorus that the species passes to the west of Istanbul.

*Coracias garrulus***Roller**

Up to two seen on twelve days between 23 July and 16 September; in addition nine passed E. or S.E. in ones and twos. Probably bred locally. Ballance and Lee (1961) and Nisbet and Smout (1957) also saw few Rollers, but the latter observed them more commonly on the Evros Delta, Greece, this again suggesting that passage is mainly to the west of the Bosphorus.

*Upupa epops***Hoopoe**

Seen regularly from 25 July to 19 September with up to four present. Most recorded in second half of August. Probably bred.

*Jynx torquilla***Wryneck**

Singles on 4 and 26 September and 8 October.

Dendrocopos major **Great Spotted Woodpecker**

One on three dates in July and September. On all these occasions the bird was seen well enough to distinguish it from the similar *Dendrocopos syriacus*.

Dendrocopos syriacus **Syrian Woodpecker**

One to three present from July to November. Bred.

Dendrocopos medius **Middle Spotted Woodpecker**

One fairly regularly between 5 August and 17 October.

Dendrocopos minor **Lesser Spotted Woodpecker**

Up to four regularly throughout the autumn. An adult and juvenile present on 22 July almost certainly indicated breeding.

Calandrella brachydactyla **Short-toed Lark**

About 50 passed E./S.E. between 22 August and 25 September; in addition parties heard passing over on several dates.

Galerida cristata **Crested Lark**

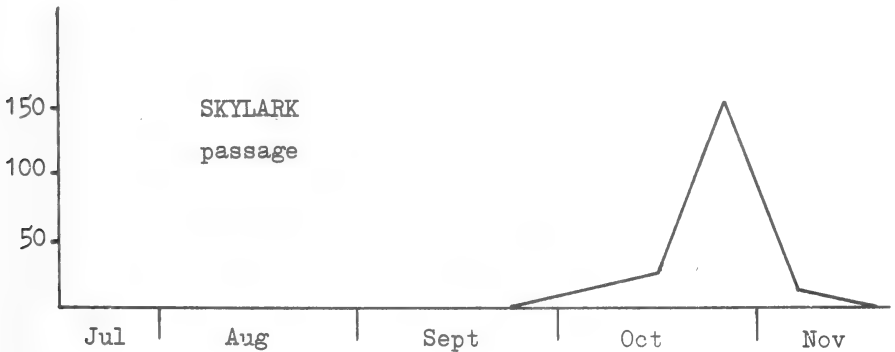
A common breeding resident of the open country to the northeast and east of the census area, and occasional birds ventured into it.

Lullula arborea **Woodlark**

Thirty two passed S.E. between 24 September and 25 October. A party of seven in the census area on 8 November.

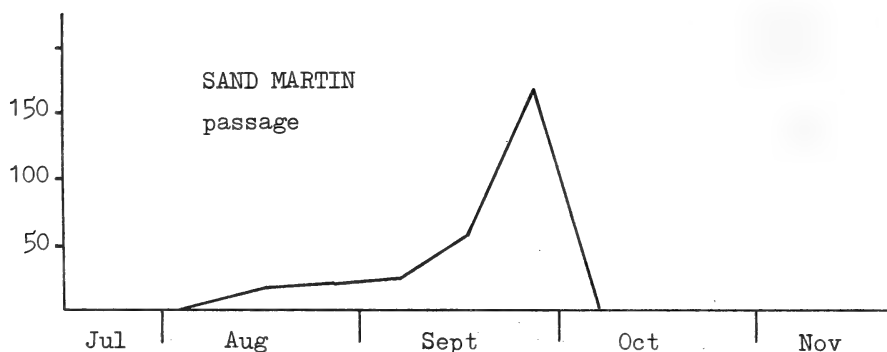
Alauda arvensis **Skylark**

About 200 passed over mainly in an easterly direction between 5 October and 5 November; the largest daily total being 33 on 25 October (see *Figure* below).

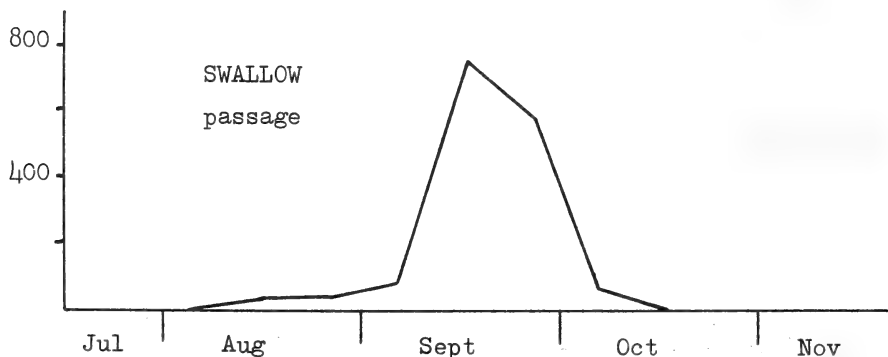


*Riparia riparia***Sand Martin**

An E./S.E. movement totalling 281 from 14 August to 27 October, most passing at the end of September (see *Figure* below). Nisbet and Smout (1957) similarly recorded small numbers.

*Hirundo rustica***Swallow**

1,494 passed E./S.E. from 14 July-17 October, most during 10-30 September (see *Figure* below). The Swallow was the commonest hirundine as it was in September 1956 (Nisbet & Smout 1957). In that year, however, there was a much greater movement of hirundines with thousands recorded per hour on some days. Their observations indicated that the birds were passing on a broad-front and they suggested that the numbers crossing the Bosphorus ran into millions. They also observed a vast movement across the Dardanelles. At the Belen Pass in Southern Turkey the Swallow was also found to be the commonest hirundine in 1976 (Sutherland & Brooks 1981).

*Delichon urbica***House Martin**

About 200 passed E./S.E. between 21 July and 19 September, most in September. Nisbet and Smout (1957) and Ballance and Lee (1961), similarly recorded small numbers.

*Anthus campestris***Tawny Pipit**

Between 26 July and 26 September there was a small, predominantly easterly movement: 35 flew east and 21 in other directions mainly northerly. In late July a pair with one young were present on the slopes of Kuçuk Çamlica outside the census area.



Plate 1.



Plate 2.

Plate 1. Kuçuk Çamlıca, Bosphorus, Turkey showing typical habitats in the census area: herb rich ground cover merging into scrub and the background dominated by mixed conifers. Photograph: R. F. Porter.

Plate 2. Kuçuk Çamlıca, Bosphorus, Turkey showing the park-like habitat at the edge of the small deciduous wood which formed part of the census area. Photograph: R. F. Porter

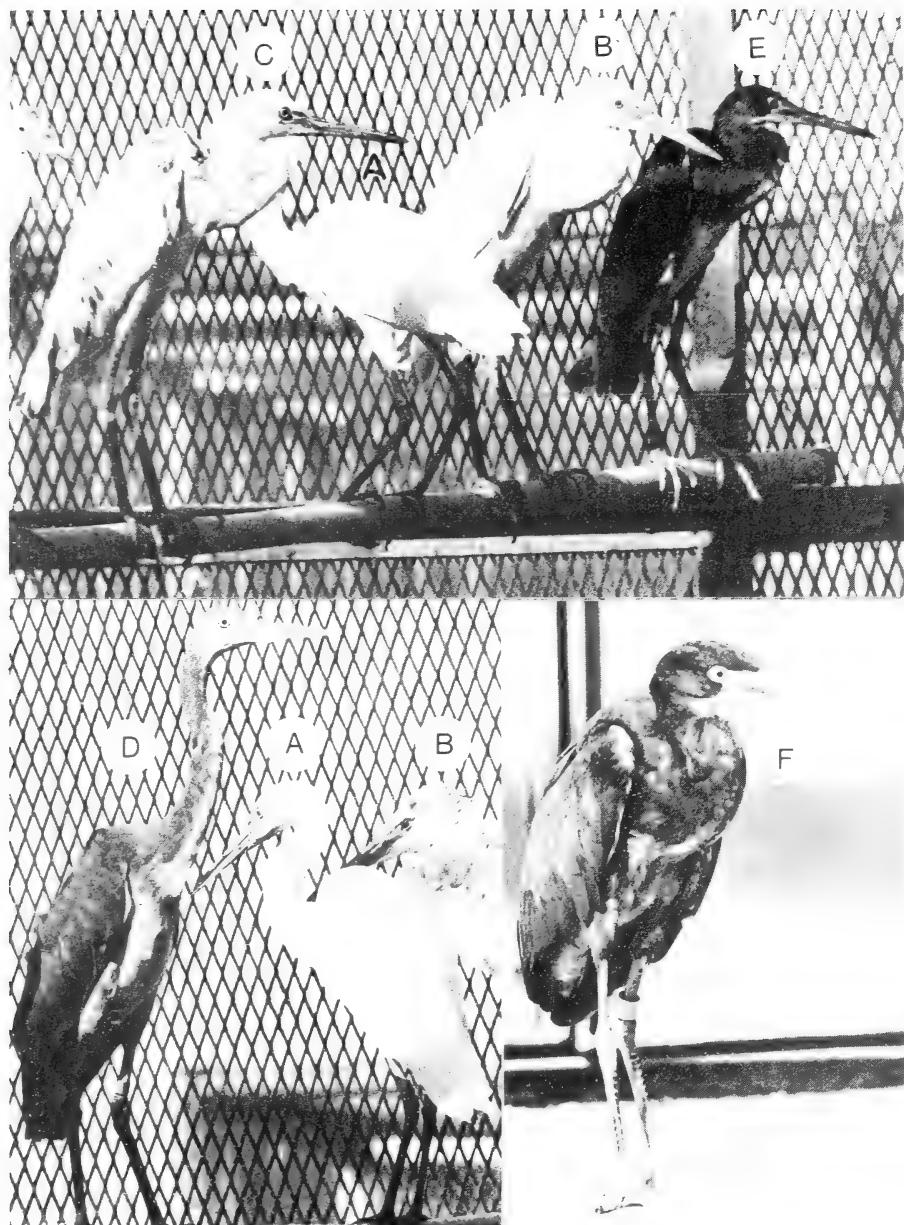


Plate 3. Plumage colour polymorphism in the Indian Reef Heron. All the birds illustrated here are in juvenile plumage. The white morph ranges from an almost pure white (A) to white dappled with a varying amount of grey (B, C). The grey morph has a plumage in varying tones of grey (D, E, F). In the adults (not shown here), the white morph has no dapples and the grey morph has uniformly grey underparts, except the chin and throat which are white.

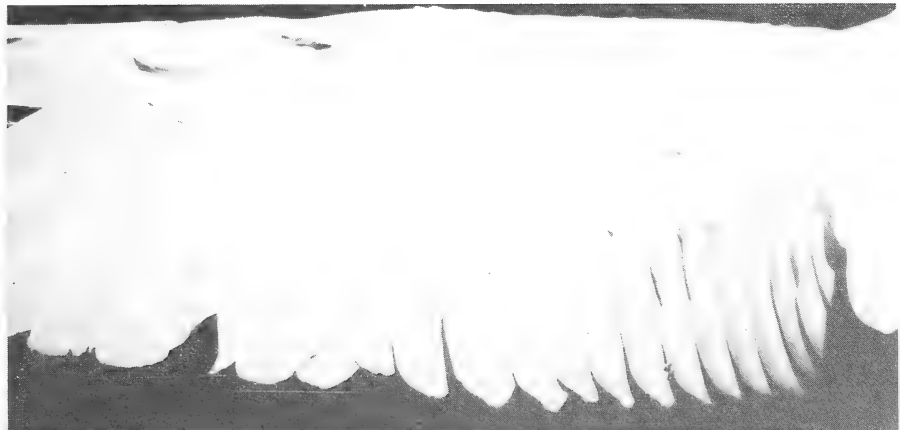


Plate 4. Top and Middle. A closer view of the left wing of bird A and C shown in Plate 3, illustrating that the white morph in a juvenile plumage has some grey either in the form of faint streaks (Top) or dapple (Middle) on some of the feathers.

Bottom. the wings of a grey morph in juvenile plumage spread out to illustrate the white wing-patch which occurs in some birds. Note an asymmetry in number of the white upper greater primary coverts in two (3 in left and 5 in right) wings.



Plate 5

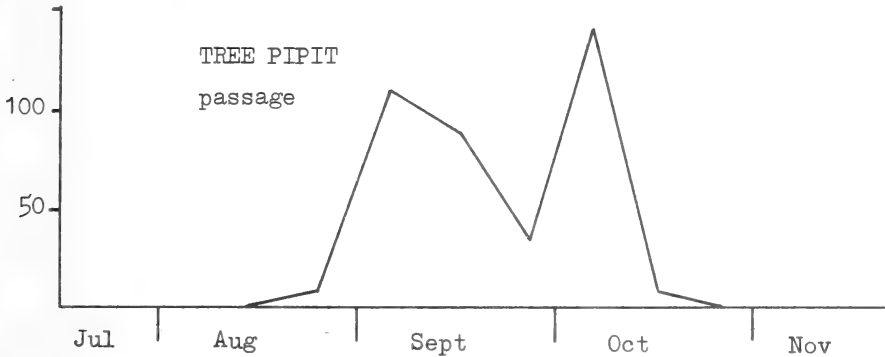


Plate 6

*Plates 5 & 6. Adult Long-legged Buzzards Buteo Rufinus in October 1981 at Suez, Egypt.
Photographs: R. G. Bijsema*

*Anthus trivialis***Tree Pipit**

A small steady easterly movement totalling c. 300 between 29 July and 12 October, most in early October (see *Figure* below). Birds present in the census area on most days during this period with a peak of 15 on 25 September. This was a much smaller movement than expected and may have been due to birds passing over very high and thus being missed altogether, a view also of Nisbet and Smout (1957).

*Anthus pratensis***Meadow Pipit**

Small movement between 9 October and 5 November with 86 flying east.

*Anthus cervinus***Red-throated Pipit**

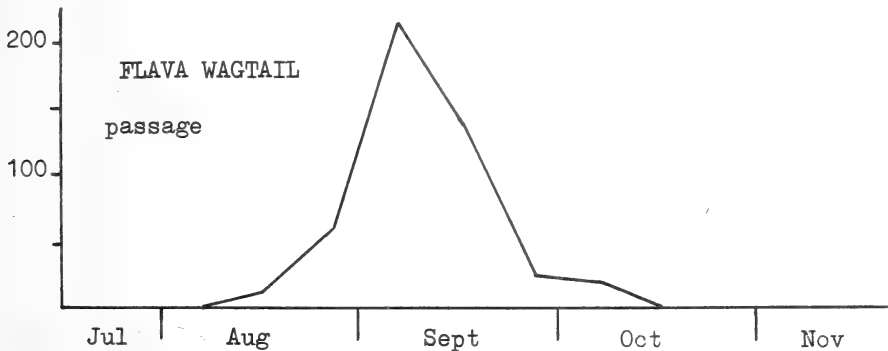
Forty one flew east between 28 September and 17 October.

Anthus spinoletta spinoletta/petrosus **Water/Rock Pipit**

Only one record: a single bird on 22 October.

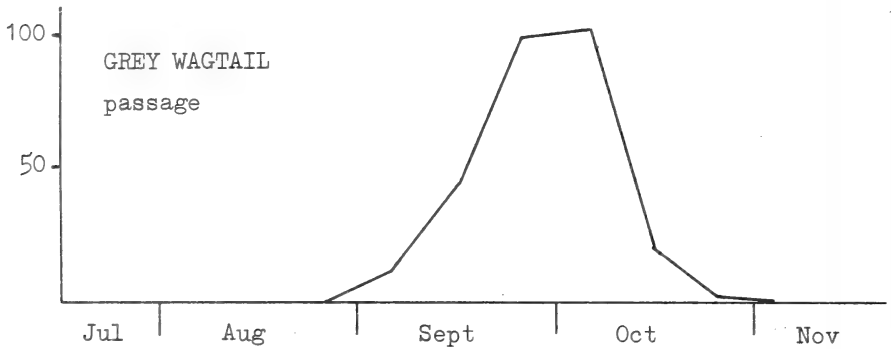
*Motacilla flava***Yellow Wagtail**

Seen on passage between 11 August and 9 October with 231 passing E. or S.E. and 172 passing W. or in other directions (see *Figure* below). This too was a much smaller movement than expected. Nisbet and Smout (1957) and Ballance and Lee (1961) similarly saw relatively few but the former saw many moving S.E. over the Dardanelles and Sea of Marmara and thus drew the conclusion that most move to the west of the Bosphorus.

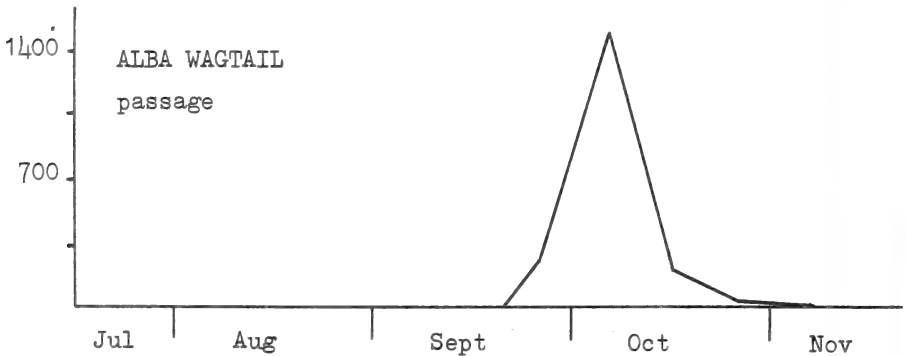


*Motacilla cinerea***Grey Wagtail**

Two hundred and eighty five birds passed east between 14 August and 27 October, the peak being at the end of September/beginning of October (see *Figure* below).

*Motacilla alba***White Wagtail**

Singles in July and August were probably breeding birds from Istanbul. Between 15 September and 27 October a total of 1,944 flew east with a peak of 1,400 between 2 and 7 October (see *Figure* below). On 7 November several seen along the shores of the Bosphorus at Kadikoy. Nisbet and Smout (1957) saw a broad-fronted movement over the Dardanelles and Marmara Sea in late September 1956 but otherwise saw few in the Bosphorus area. Steinfatt (1932) saw only 140 at the Çamlıca hills in autumn 1931. While this tends to suggest there may be annual variations in migration pattern at the the Bosphorus it is clear that this is a common migrant over western Turkey which probably passes on a broad front.

*Troglodytes troglodytes***Wren**

Present through the autumn. In late July up to ten, many of which juveniles; in August up to seven; September up to five; October up to eight and one on several dates in early November. Little to suggest migration.

Prunella modularis

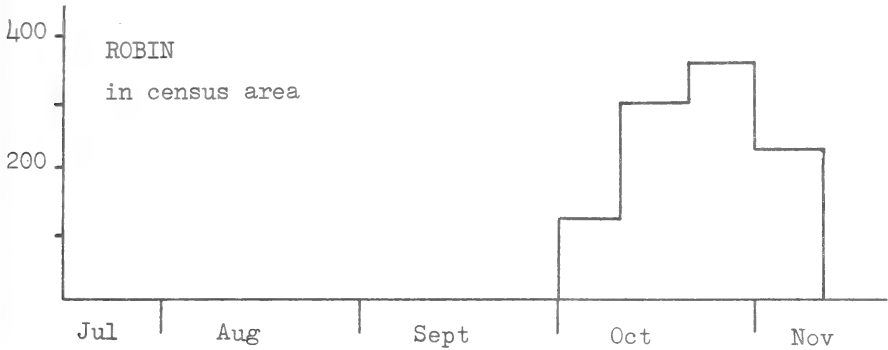
Duncock

Small numbers seen on five days between 17 and 29 October with a maximum of three on 24th. On 22nd, three calling loudly on the scrub-covered slopes flew up and after circling departed east high (1300-1400 hrs.).

Erithacus rubecula

Robin

None recorded until 24 September; from then to early November increasing in numbers with a maximum of 90 on 25 October (see *Figure* below).



Luscinia luscinia

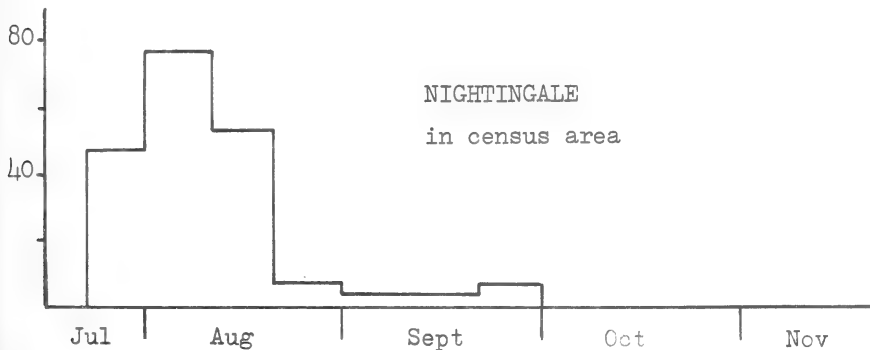
Thrush Nightingale

Singles on seven dates between 1 and 24 September were well seen.

Luscinia megarhynchos

Nightingale

Present between 15 July and 27 September. In July a juvenile was seen, indicating breeding in the area. Largest numbers in late July and early August when up to 12 present (on 4th, 7th and 9th); on eleven days in September with a maximum of three on 7th. The possibility of some of these records referring to *Luscinia luscinia* cannot be ruled out (see *Figure* below).

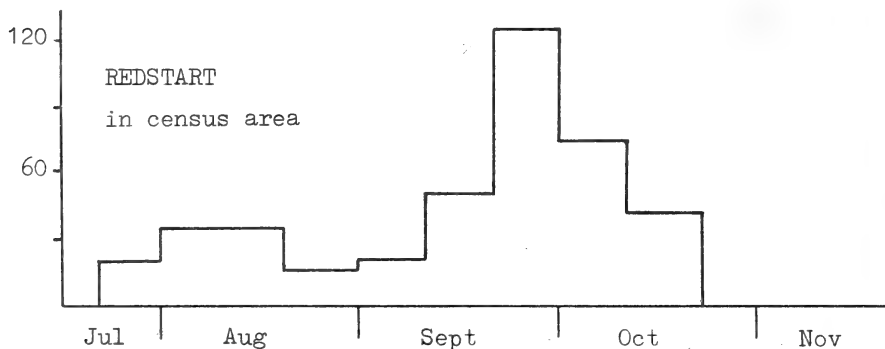


*Phoenicurus ochruros***Black Redstart**

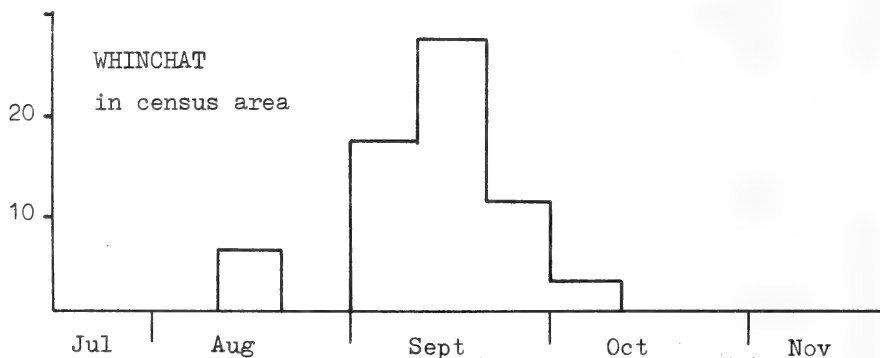
Small numbers between 22 October and 1 November, the most being ten on 24 October.

*Phoenicurus phoenicurus***Redstart**

Present in small to moderate numbers throughout the autumn from 15 July to 25 October. In late July two juvenile birds were present indicating that the species bred locally, probably in the census area. Monthly maxima: July (11 dates) three; August (26 dates) eight; September (28 dates) 25 on 25th; October (22 dates) 12; (see *Figure* below). Nisbet and Smout (1957) and Ballance and Lee (1961) also found this to be a fairly common nocturnal migrant.

*Saxicola rubetra***Whinchat**

Small numbers between 14 August and 4 October: in August on three dates, with a maximum of three; in September on 19 dates – maximum of eight; in October on two dates – maximum of two (see *Figure* below). Very small numbers were also recorded by Nisbet and Smout (1957) and Ballance and Lee (1961).

*Saxicola torquata***Stonechat**

Two or three family parties totalling c.14 birds throughout the autumn indicating breeding. There appeared to be no indication of migration through the area.

Oenanthe oenanthe

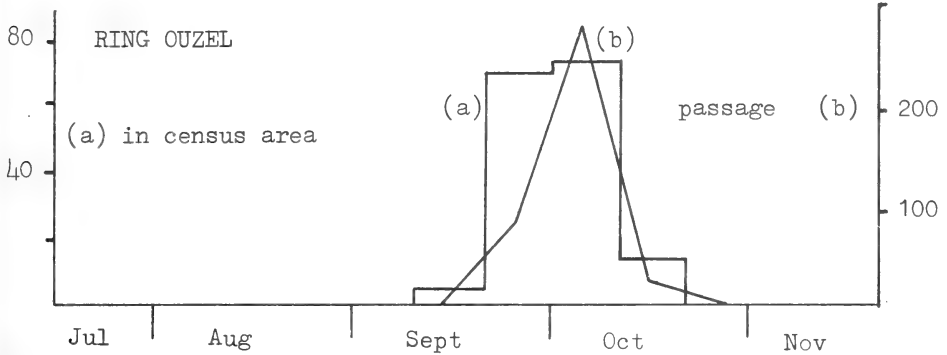
Wheatear

Small numbers on the slopes of Kuçuk Çamlıca, outside the census area between 20 July and 10 October. Highest number recorded was eight on 12 September. In July, a recently fledged juvenile (obviously locally bred) was seen.

Turdus torquatus

Ring Ouzel

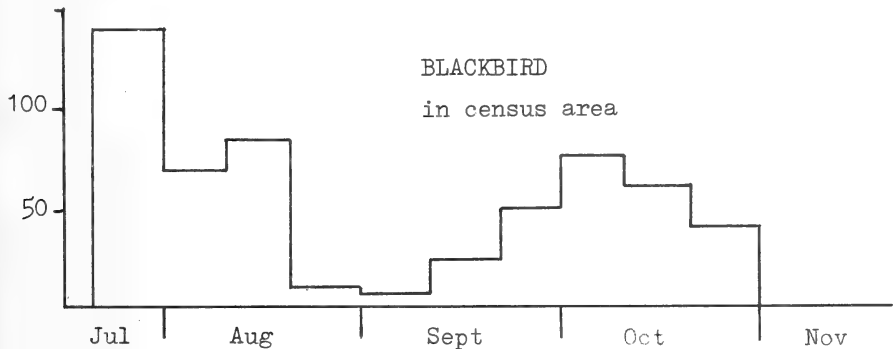
Recorded in the census area on twenty-nine dates between 8 September and 22 October the most being 26 on 23 September and 20 on 3 October. Visible migration occurred between 22 September and 21 October when 372 flew east; all flying quite low, often below top of hill. Occasionally birds settled in the trees but soon continued. The most seen was 147 E. on 3 October (see Figure below).



Turdus merula

Blackbird

Large numbers in July and early August suggested a high local breeding population. A gradual decrease in numbers in September and then an increase in October. Monthly maxima: 70 in July; 30 in August; 22 in September; 25 in October; 3 in November (see Figure below). 73 flew east between 25 September and 24 October. Heard overhead on nights of 24 October and 2 November.

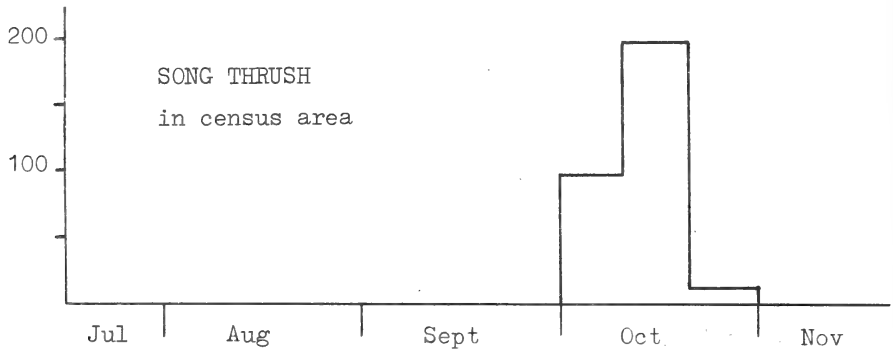


*Turdus pilaris***Fieldfare**

Forty two flew E. on six dates between 9 October and 7 November including a party of 35 on 7 November. Two heard calling at 2200 hrs. on the night of 24 October.

*Turdus philomelos***Song Thrush**

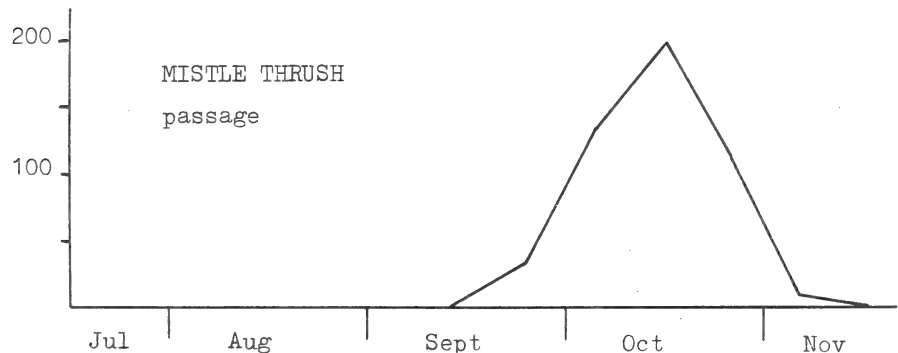
Very few recorded until early October. Large numbers in the middle two weeks of October and thereafter small numbers. Monthly maxima: July (two dates) two; August (two dates) one; September (three dates) five; October (24 dates) 50 on 9th and 19th; November (two dates) two (see *Figure* below). Visible migration noted on several mornings between 30 September and 16 October when groups often seen flying in a N. or E. direction after a nocturnal arrival. Largest movement on 9 October when 100 scattered north soon after dawn and 65 flew east between dawn and 0930 hrs. Heard on the nights of 17, 24, 26, 30 and 31 October.

*Turdus iliacus***Redwing**

Recorded on eight nights between 8 October and 5 November; usually only one or two heard calling but 12 on 30 October. Two flew east on 24 October at 1100 hrs.

*Turdus viscivorus***Mistle Thrush**

Up to seven in late July and no doubt bred. In August up to three on four dates to the 15th; none then until 17 September and from then to 5 November, small numbers (maximum eight) on many days. Visible migration observed between 22 September and 3 November when 442 flew east, the most being 94 on 17 October and 91 on 22 October (see *Figure* below).



Acrocephalus schoenobaenus **Sedge Warbler**

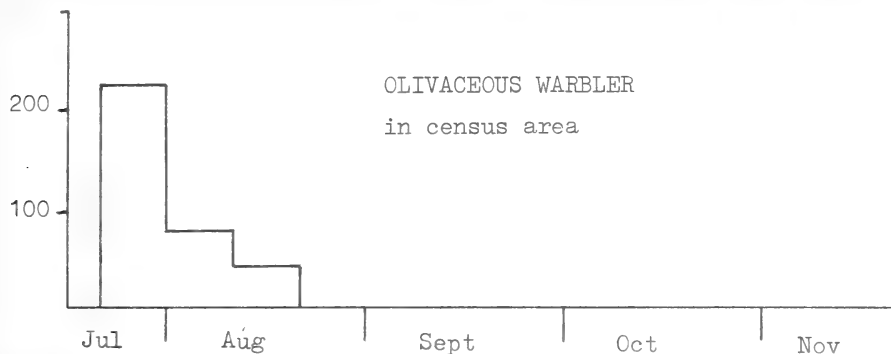
Singles on 30 August, 16 and 29 September.

Acrocephalus sp. **'Unstreaked Acrocephalus'**

Singles on 18 August, 3 and 7 September were almost certainly *A. scirpaceus* (Reed Warbler).

Hippolais pallida **Olivaceous Warbler**

About eight pairs with young present in July (up to 35 counted) and early August (up to 16); most had left by 18 August; thereafter seen on six dates to 22 September (see *Figure* below).

*Hippolais olivetorum* **Olive-tree Warbler**

None recorded in the census area, but a single bird at Buyuk Çamlica on 16 August.

Hippolais icterina **Icterine Warbler**

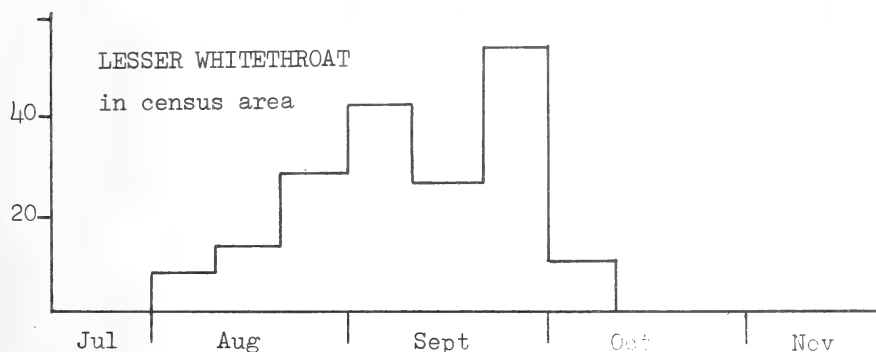
One on 10 and 11 September was the only record.

Sylvia melanocephala **Sardinian Warbler**

This and *Hippolais pallida* were the commonest breeding warblers. Present from mid-July to early November, with most (up to 35) in late July many of which were juveniles; the breeding population was estimated at about eight pairs. Smaller numbers in August-November when 10-15 present, though because of its secretive behaviour the true figure was probably higher.

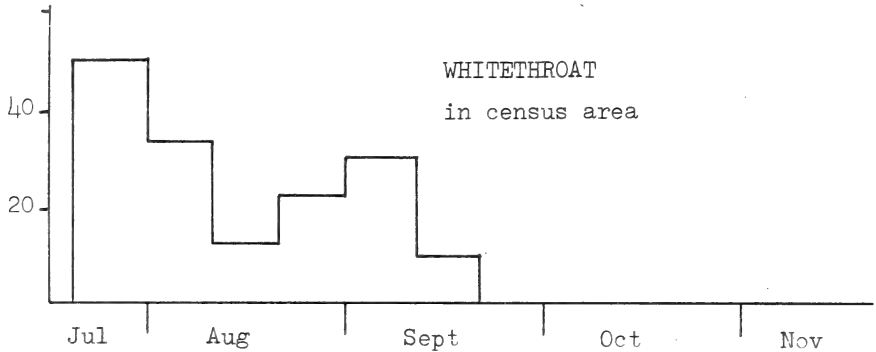
Sylvia curruca **Lesser Whitethroat**

Small numbers almost daily between 3 August and 5 October with a single on 24 October. No more than four on any one day in August; peaks in September were eight on the 1st, nine on the 10th, and twelve on the 23rd and 24th; in October no more than three on any day (see *Figure* below).



*Sylvia communis***Whitethroat**

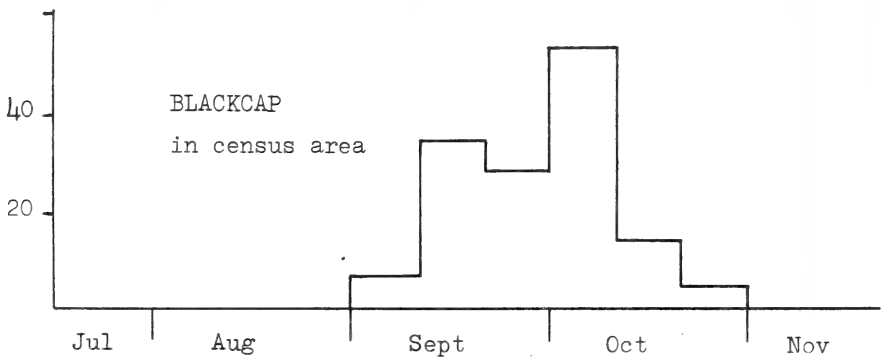
Small numbers between 15 July and 4 October. In late July up to 12 recorded, including several juveniles indicating that the species bred in the area. In August recorded almost daily with a maximum of six on 1st and 4th; on sixteen dates in September, most during the first half with a maximum of six on 3rd; in October one on 4th was the only record (see *Figure* below).

*Sylvia borin***Garden Warbler**

Very few records: two on 21 July and then singles on 14 dates to 25 September.

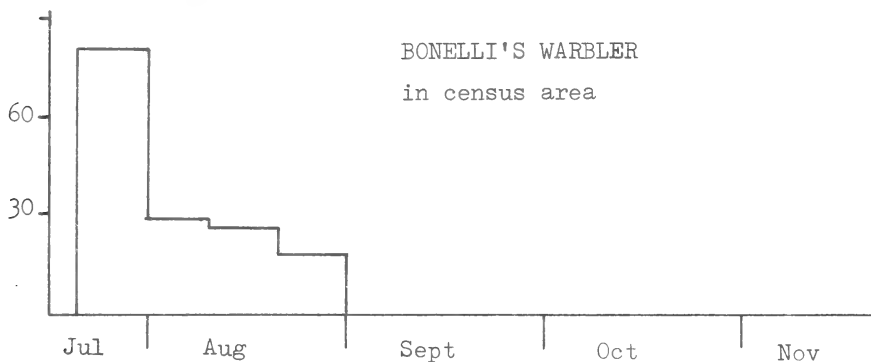
*Sylvia atricapilla***Blackcap**

A small passage, most being in mid-September. Monthly summary: one on 19 July; single birds in August on six dates; on 18 days in September with peaks of 20 on 16th and 10 on 24th; on 17 days in October up to 27th with a maximum of eight on the 1st (see *Figure* below).

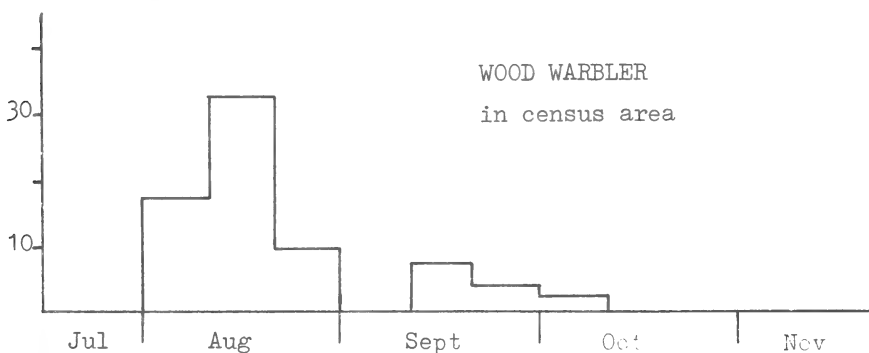


*Phylloscopus bonelli***Bonelli's Warbler**

Present from 24 July to 28 August with a single nearly a month later, on 22 September. Highest numbers in late July with 18 on 25th; 14 on 26th and 12 on 30th and 31st. In August one to six recorded (see *Figure* below).

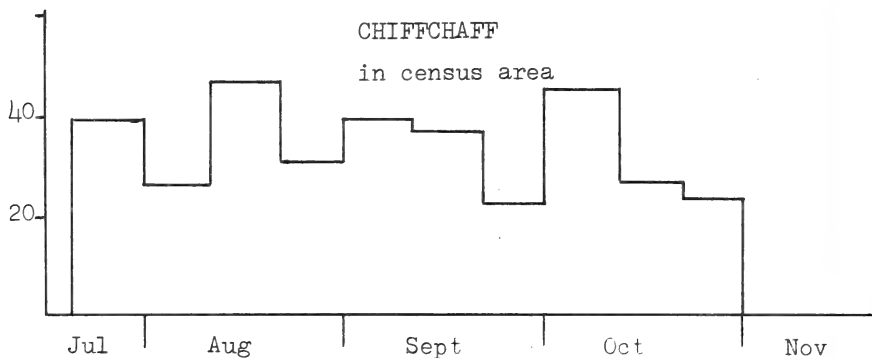
*Phylloscopus sibilatrix***Wood Warbler**

Small numbers from 4-30 August (maximum 10 on 18th) and again from 13-28 September (maximum 3); a single on 2 and 5 October (see *Figure* below).

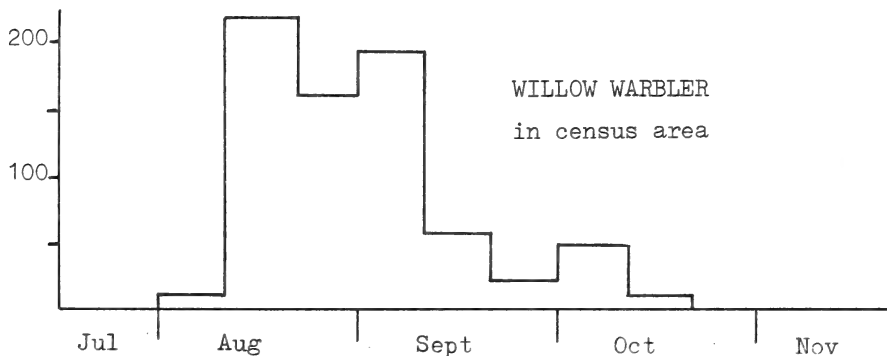


*Phylloscopus collybita***Chiffchaff**

Bred and up to nine present during July; up to 15 in August, eight in September, 12 in October and three in November probably indicated a small to moderate passage but this was almost certainly confused by resident birds and the problem of distinguishing from *P. trochilus* (see *Figure* below; see also *P. trochilus/collybita* and *P. trochilus*).

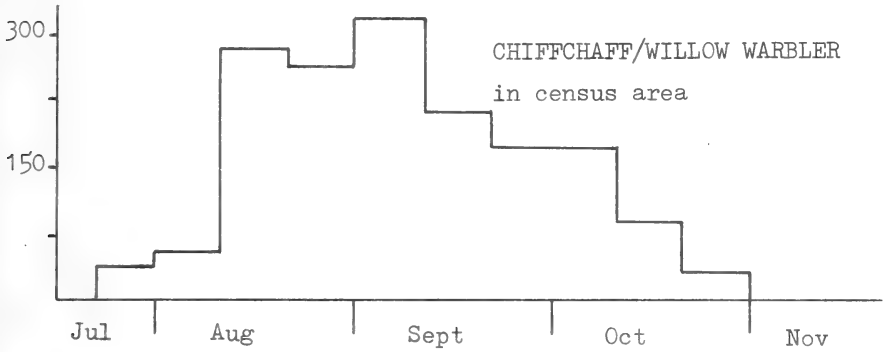
*Phylloscopus trochilus***Willow Warbler**

None until 6 August; thereafter until mid-October the commonest warbler, and on many days the commonest migrant. Last recorded on 29 October. Much daily fluctuation with peaks of 70 (14 August), 40 (28 August) and 40 (5 September). Thereafter no more than 12 seen on any one day and very few in the last three weeks of October (see *Figure* below; also *P. trochilus/collybita*). Ballance and Lee (1961) and Nisbet and Smout (1957) also found this to be the commonest nocturnal migrant.

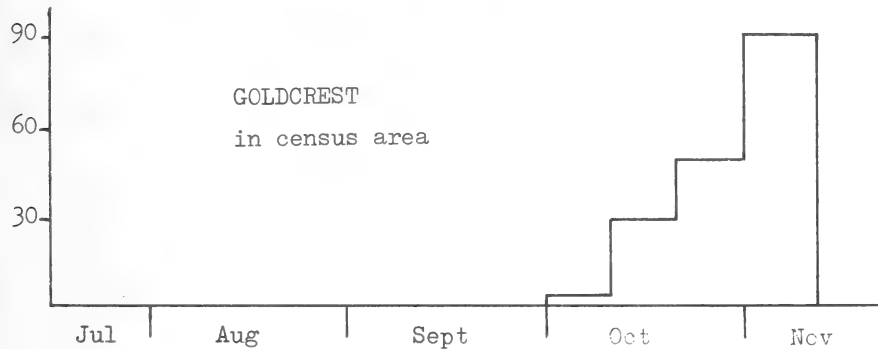


Phylloscopus collybita/trochilus **Chiffchaff/Willow Warbler**

Phylloscopus warblers were present throughout the whole autumn, *trochilus* was the predominant species on passage, but *collybita* bred (whereas *trochilus* did not). The large numbers in August and September often prevented specific identification but most were clearly *trochilus* (see Figure below; see also *P. trochilus* and *P. collybita*).

*Regulus regulus***Goldcrest**

None until 8 October and then in increasing numbers to 8 November. Peak October count was 15 on 17th, and in November, 20 on 5th (see Figure below).

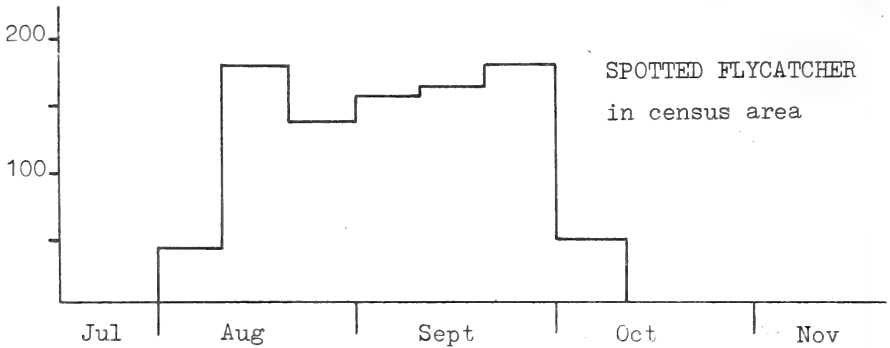
*Regulus ignicapillus***Firecrest**

Small numbers on ten dates between 3 and 29 October with maximum of five on 3rd and 29th.

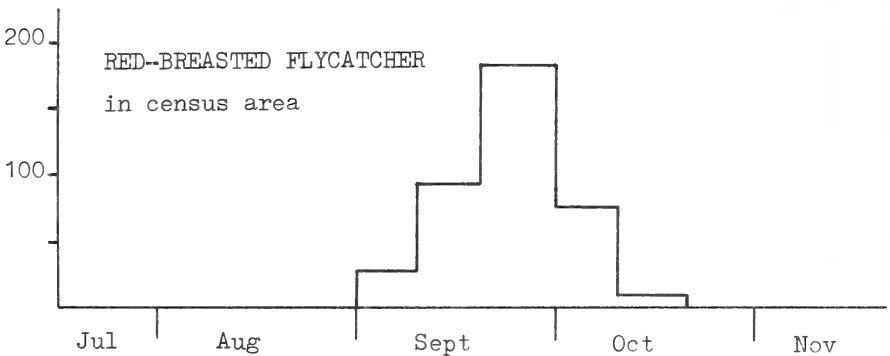
*Muscicapa striata***Spotted Flycatcher**

Singles on 15 and 29 July; then present in moderate numbers from 4 August to 15 October. In August peaked at 35 on 14th and 50 on 18th with over ten on most days; in September numbers were higher with 10-20 present on most days and peaks of 35 on 1st and 40 on 24th; in early

October up to ten present (see *Figure* below). Ballance and Lee (1961) and Nisbet and Smout (1957) also found this to be a common nocturnal migrant occurring in numbers similar to those we observed.

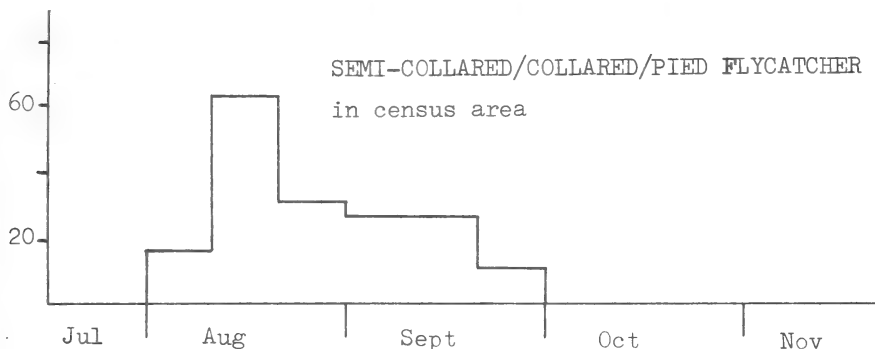
*Ficedula parva***Red-breasted Flycatcher**

Recorded on nine dates between 9 and 31 August with a maximum of three on 18th; in September seen almost daily with peaks of 25 on 16th, 50 on 24th and 55 on 25th; in October present on most days up to 18th with a maximum of 15 on 7th (see *Figure* below). Nisbet and Smout (1957) also found this to be a relatively common nocturnal migrant, with a peak at the end of September.

*Ficedula semitorquata/
albicollis/hypoleuca***Semi-collared/Collared/
Pied Flycatcher**

Small numbers from 19 July to 27 September. In July singles on three dates; in August present on most days with a maximum of 11 on 11th, ten on 12th and 12 on 15th; in September one to six recorded. Most identified were *albicollis* but on ten days birds considered to be *hypoleuca* were seen. Stresemann (1943) states that *hypoleuca* passes west of Crete in autumn and thus only small numbers would be expected at the Bosphorus. However, in view of the difficulty of differentiating between these two species in autumn and the possibility of confusion of *hypoleuca* with *semitorquata* all

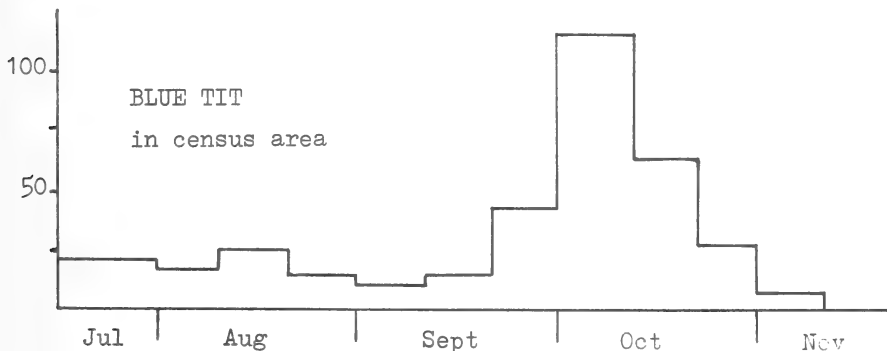
these records have been presented under one heading (see *Figure* below). Nisbet and Smout (1957) witnessed a fall at the end of September 1956 when our passage had terminated.

*Aegithalos caudatus***Long-tailed Tit**

In late July a family party of eight was observed and apparently the same birds were present through the autumn to early November.

*Parus caeruleus***Blue Tit**

Numbers were much lower than those of *Parus major*. Recorded almost daily with up to eight present in July, August and early September, up to 15 in late September and a peak of 20 in early October (5th and 6th). Thereafter a decline with only five in late October and early November (see *Figure* below). From 24 September to 31 October, parties passed from bush to bush over the hill and on reaching the eastern side, departed high to east; this movement totalled 220 birds, the largest number being on 4 October when 27 were counted passing east.

*Parus major***Great Tit**

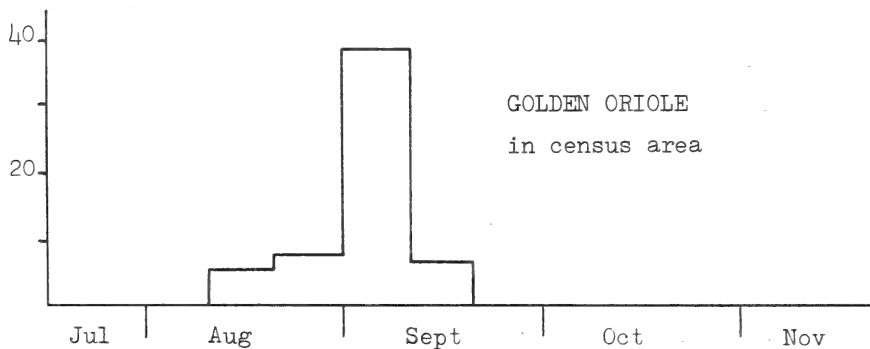
One of the commonest birds. In mid-July up to 30 juveniles present indicating a fairly large breeding population. Numbers throughout autumn did not vary greatly from day to day, being normally 30-40; peak 75 on 9 August.

*Certhia brachydactyla***Short-toed Treecreeper**

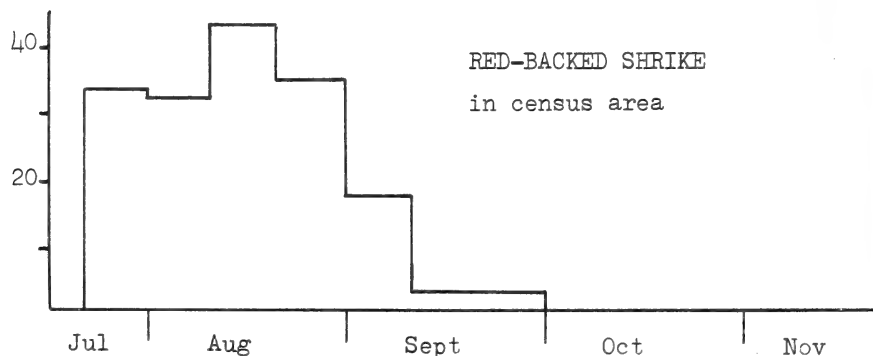
Present in the oakwood throughout the autumn. Five in July were probably a family party. Thereafter up to 15 in August (post breeding dispersal?), ten in September and three in November.

*Oriolus oriolus***Golden Oriole**

Recorded on nineteen dates between 5 August and 17 September, the peak occurring at the end of August/beginning of September with 18 on 1 September (see *Figure* below).

*Lanius collurio***Red-backed Shrike**

A pair with at least one young in July. The first arrival was on 29 July when six birds present. Then seen on most dates through August until 8 September: usually six but eight on 15 August. Singles on 16, 20, 23 and 29 September (see *Figure* below).

*Lanius minor***Lesser Grey Shrike**

Three on 15 August and two on 18th; then single birds on nine dates to 9 September.

*Lanius nubicus***Masked Shrike**

A pair nested raising six young, the first of which were seen out of the nest on 23 July and all six juveniles were being fed by the adults up to at least 4 August. The young were fully fledged by 16 August and venturing up to about 800 metres from the nesting site. The adults disappeared completely at this time but two juveniles remained in the area to 26 September.

*Garrulus glandarius***Jay**

Recorded daily, numbers increasing from four in July and August (probably a pair and young) to seven in September and ten in October. Visible movement observed on three days: nine flew E.N.E. high on 13 October, one likewise on 22 October and five E. on 29 October.

*Pica pica***Maggie**

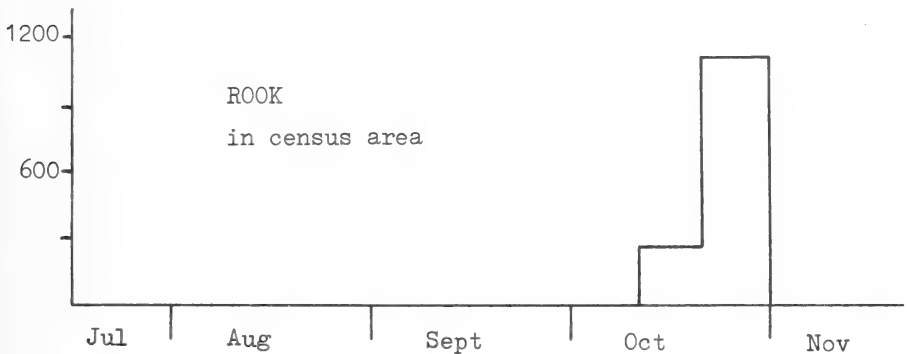
Recorded daily with maximum of 14 in August and September. Probably bred.

*Corvus monedula***Jackdaw**

A common bird of the Istanbul/Uskudar area. Large roosting movements were observed daily in the census area, the maximum being about 700 in late October and November.

*Corvus frugilegus***Rook**

First recorded on 7 October when 39 passed east; thereafter seen almost daily until 8 November. During this period 168 passed east and in late October and early November up to 300 were present in the census area and neighbouring areas of Kuçuk Çamlıca (see *Figure* below).

*Corvus corone cornix***Hooded Crow**

Up to 25 recorded daily; probably bred.

*Corvus corax***Raven**

Four flew S.E. on 23 July and then up to three recorded between 27 and 30 July. None seen then until 12 October when one flew east, and 15 October when three flew east.

*Sturnus vulgaris***Starling**

Although present as a breeding bird in small numbers in Istanbul, none was seen in census area in July and only two singles in August. Small numbers appeared in September with flocks of up to five in the first half and up to 60 in the second half of the month. In October and early November flocks increased in size and over 100 were seen on several days; highest count was 200 on 4 October.

*Sturnus roseus***Rose-coloured Starling**

An adult on 24 July was the only record.

*Passer domesticus***House Sparrow**

Small numbers throughout autumn with no more than 40 on any one date. Bred in local village of Bulgurlu.

*Passer hispaniolensis***Spanish Sparrow**

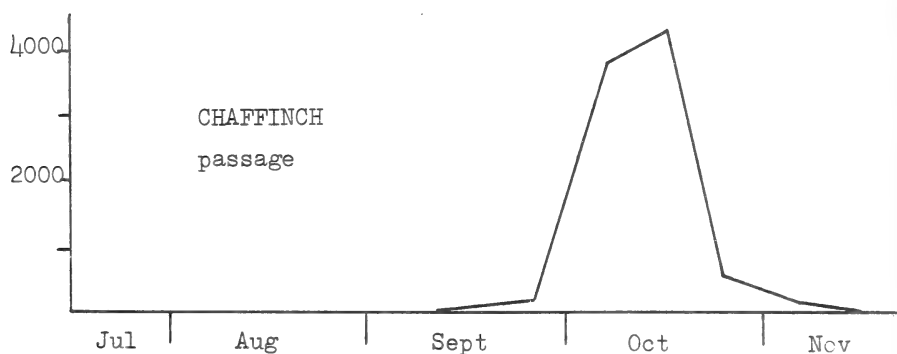
The only record was a male on 29 July.

*Passer montanus***Tree Sparrow**

One to three on four dates in October. Three flew east on 18 October.

*Fringilla coelebs***Chaffinch**

This was the commonest finch and present throughout the autumn. Largest numbers were in late July when up to 35 present probably representing a small to moderate breeding population as several were singing and many juveniles were seen. Between 24 September and 8 November a total of 8,865 flew east. Peak days were 8 October (1,730), 17th (1,832) and 6-13 October when there were six days with over 400 passing. Observations elsewhere on the Bosphorus showed that the movement was broad-fronted and as the majority were passing low many would have been missed from the top of Kuçuk Çamlica (see *Figure* below).

*Fringilla montifringilla***Brambling**

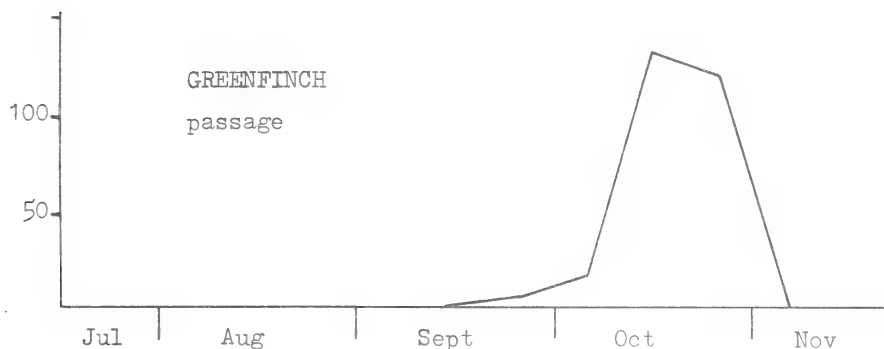
Twenty eight flew east between 12 and 29 October.

*Serinus serinus***Serin**

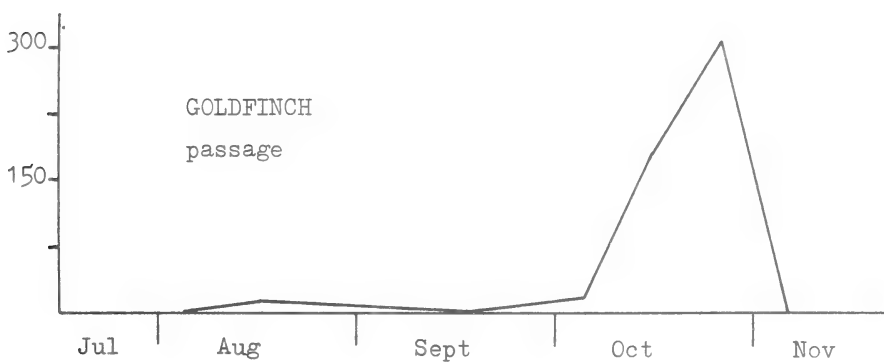
One or two pairs with young in late July and one carrying nesting material on 21st; highest July count was 15. Thereafter present throughout autumn with peaks of 15 on 8 and 11 October and small movement between 3-11 October when 25 flew east.

*Carduelis chloris***Greenfinch**

Two hundred and sixty eight flew east between 25 September and 29 October, most in the last half of October, the peak day being 17th when 60 flew east (see *Figure* below).

*Carduelis carduelis***Goldfinch**

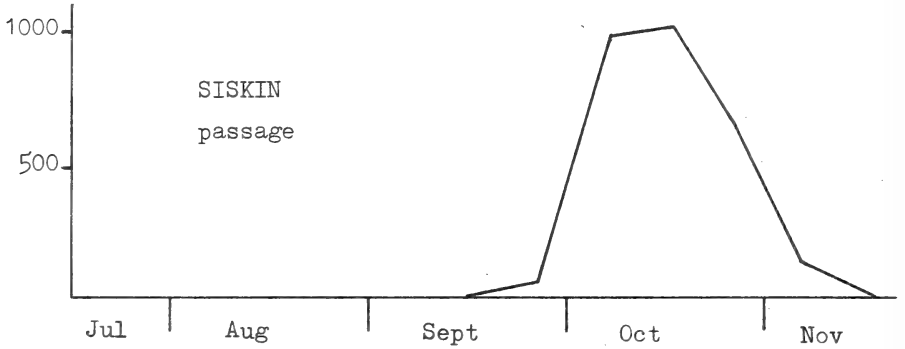
Small numbers (up to five) in late July suggested the species bred locally. Thereafter 524 flew east between 14 August and 31 October most in the last half of October with peaks of 68 (21st) and 80 (22nd) (see *Figure* below).



Carduelis spinus

Siskin

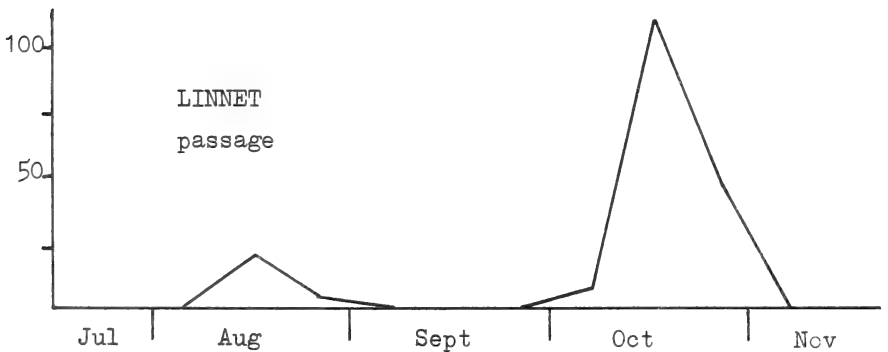
The second commonest migrant finch (after *Fringilla coelebs*), a total of 2,810 flying east between 26 September and 6 November. A steady movement with a moderate passage each day and no marked peaks (see *Figure* below).



Carduelis cannabina

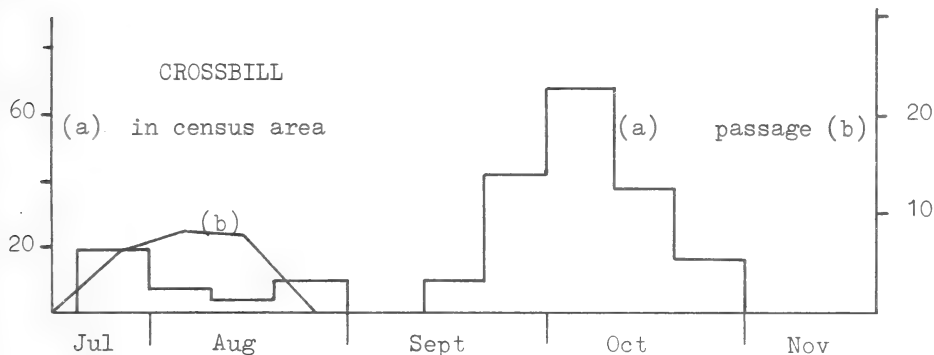
Linnet

Up to seven birds in July suggested local breeding. Thereafter between 11 August and 27 October 190 flew E./N.E., most during the last two weeks of October (see *Figure* below).



*Loxia curvirostra***Crossbill**

Small numbers present from 23 July to 27 October with peak at end of September/early October when 12-15 present on three dates. In addition between 23 July and 15 October 86 flew east. Visible migration and 'falls' were in two small peaks: the first at end of July/early August and the second at end of September/early October (see *Figure* below).

*Coccothraustes coccothraustes***Hawfinch**

One on 26 July. In October there was a small easterly movement: 11 (4th), 11 (9th) and two (18th).

*Emberiza citrinella***Yellowhammer**

Thirty nine flew east between 17 and 25 October.

*Emberiza cirius***Cirl Bunting**

Present throughout autumn in decreasing numbers. Up to 35 in July when the local breeding population was estimated at 3-5 pairs. From August to November recorded almost daily with up to ten present.

*Emberiza hortulana***Ortolan Bunting**

Small numbers between 14 August and 16 September with a maximum of six on 24 August. Between 31 July and 7 September 13 flew E. or S.E.

*Emberiza melanocephala***Black-headed Bunting**

Only recorded in July when up to seven (including one adult male) present between 15 and 26; probably a family party.

*Miliaria calandra***Corn Bunting**

One or two on four dates from late July to early September. A small movement between 3 and 24 October when 66 flew east.

DISCUSSION

Numbers passing: diurnal migration

Apart from three species of swift *Apus sp.*, 41 passerines or near-passerines were observed passing over Kuçuk Çamlica in an easterly direction during the autumn of 1966. Numbers varied considerably between species but the overall impression clearly gained was that the southern end of the Bosphorus was a place where the visible migration of small birds could be easily observed and where perhaps for some species there was a concentration. The peak of the visible migration occurred in October with Wood Pigeons, White Wagtails, thrushes and finches (especially Chaffinch), forming the bulk of the passage.

With the exception of swifts (for which species see the systematic list) the species most commonly observed migrating overhead at Kuçuk Çamlica are listed below under order of magnitude of the passage.

Numbers**observed moving****Species**

Over 1000:	Wood Pigeon, Swallow, White Wagtail, Chaffinch, Siskin.
200-500:	Sand Martin, Tree Pipit, Yellow Wagtail, Grey Wagtail, Ring Ouzel, Mistle Thrush, Goldfinch, Greenfinch.
50-200:	Bee-eater, Short-toed Lark, Skylark, House Martin, Meadow Pipit, Song Thrush, Rook, Linnet, Crossbill, Corn Bunting.
Less than 50:	Turtle Dove, Roller, Woodlark, Tawny Pipit, Red-throated Pipit, Fieldfare, Redwing, Brambling, Hawfinch, Yellowhammer.

It is probable that little or no migration had been missed before we commenced observations on 14 July. When we terminated our observations on 8 November there was little migration in progress and we felt that no significant passage was likely to occur later in the month.

Sporadic observations carried out elsewhere on the Bosphorus to the north of Kuçuk Çamlica indicated that the movement of, at least, the commoner species was fairly broad-fronted. However, as no observations were made from adjacent areas of the Sea of Marmara, it was not possible to ascertain whether these passerines and near-passerines were being concentrated by the Bosphorus 'land-bridge' as was the case with soaring birds. (Porter & Willis 1968).

Nisbet and Smout (1957) believed that the Bosphorus (and Dardanelles) attracts an important concentration of at least some northern passerines in autumn. While our observations would tend to support that general view it is surprising that Steinfatt (1932) noted very little migration of passerines at the Çamlica Hills and that Mauve (1938) came to the conclusion that the Bosphorus is of no importance for species other than soaring birds.

Time of migration: diurnal and nocturnal migrants

The systematic list and more particularly the histograms and graphs indicate that most migratory species had a peak of movement when the highest numbers were recorded either in the census area (nocturnal migrants) or passing over (diurnal migrants). Analysis reveals the following monthly migratory weightings for the commoner species recorded at Kuçuk Çamlica during the autumn of 1966. For ease of presentation 'peaks' have been ignored.

July and August:	Swift, Nightingale, Olivaceous Warbler, Bonelli's Warbler.
August:	Hoopoe, Red-backed Shrike.
August and September:	Alpine Swift, Bee-eater, Roller, Whitethroat, Wood Warbler, Willow Warbler, Spotted Flycatcher, Pied/Collared Flycatcher, Golden Oriole.
September:	Turtle Dove, Short-toed Lark, Sand Martin, Swallow, House Martin, Yellow Wagtail, Whinchat, Lesser Whitethroat, Red-breasted Flycatcher.
September and October:	Tree Pipit, Grey Wagtail, Redstart, Ring Ouzel, Blackcap, Blue Tit.

October:	Stock Dove, Wood Pigeon, Woodlark, Skylark, Meadow Pipit, Red-throated Pipit, White Wagtail, Dunnock, Black Redstart, Song Thrush, Mistle Thrush, Chaffinch, Brambling, Greenfinch, Goldfinch, Siskin Linnet, Hawfinch, Corn Bunting.
October and November:	Robin, Fieldfare, Redwing, Goldcrest, Rook, Starling.
Throughout autumn:	Chiffchaff, Crossbill.

Nocturnal migrants in the census area

Of the 50 or so migrant passerines and near-passerines recorded in the census area, twenty-three could be described as common or fairly common. These are listed below, in approximate descending order of abundance, together with the habitat they most frequently (and often exclusively) occupied and the period when their migration was at its peak.

Species	Habitat	Peak Passage
Robin	Deciduous and coniferous woodland	Late October
Song Thrush	Deciduous and coniferous woodland; scrub	Mid-October
Willow Warbler	Deciduous and coniferous woodland; scrub	August and early September
Olivaceous Warbler	Deciduous woodland and scrub	Late July
Red-breasted Flycatcher	Deciduous and coniferous woodland	Late September
Spotted Flycatcher	Deciduous and coniferous woodland	August and September
Redstart	Deciduous and coniferous woodland	Late September
Blue Tit	Deciduous and coniferous woodland	Early October
Goldcrest	Coniferous woodland	Early November
Nightingale	Deciduous woodland and scrub	Early August
Ring Ouzel	Scrub	Late September/early October
Bonelli's Warbler	Deciduous and coniferous woodland	Late July
Collared/Pied Flycatcher	Deciduous woodland	Mid-August
Blackbird	Deciduous and coniferous woodland; scrub	Early October; but also post-breeding dispersal
Crossbill	Coniferous woodland	Early October
Lesser Whitethroat	Scrub	September
Blackcap	Deciduous woodland; scrub	Early October
Whitethroat	Scrub	August and early September
Chiffchaff	Deciduous and coniferous woodland	Throughout
Red-backed Shrike	Scrub	August
Wood Warbler	Deciduous and coniferous woodland	Mid-August
Golden Oriole	Deciduous woodland	Early September
Whinchat	Scrub	Mid-September

The actual composition of the northern migrants in the census area warrants a brief comment. Because of the lack of suitable habitat it was obvious that certain species would be absent. Thus it was not surprising there were no records of *Locustella*, *Oenanthe* or Bluethroat *Luscinia svecica* and only a few of *Acrocephalus* species. However, it was surprising that a few wood and scrub dwelling species which are relatively common northern migrants were absent or rare. For example, there were very few records of Garden Warbler, none of Barred Warbler *Sylvia nisoria* and Icterine Warbler was very rare. Lesser Grey Shrikes and Wrynecks were only occasionally observed.

The woodland component of the census plot, occupying less than 20 per cent of the area seemed the most important feeding habitat for the commonest nocturnal migrants. Although the scrub-covered slopes appeared suitable for migrants observations showed that most species quickly gravitated towards the trees, especially those in the deciduous wood.

Unfortunately there was not time to make comparative observations at areas around the census area of Kuçuk Çamlıca or at other patches of deciduous woodland adjacent to the Bosphorus so as to put these observations into context. It is therefore not possible to say whether this small deciduous woodland area acts as a focus for certain nocturnal migrants because of its comparative scarcity as a habitat or perhaps its elevated position on Kuçuk Çamlıca. Alternatively it could be that the migrants present on the hill can be found in similar densities and relative abundance throughout any suitable habitat in north-west Turkey.

Whilst this would repay further study it is obvious that woodland, especially deciduous woodland, is an important habitat for several species of northern birds that pass through the Çamlıca hills on migration.

SUMMARY

From July to November 1966 the migration of passerines and near-passerines was studied at Küçük Çamlıca at the Bosphorus, Southern Turkey. A total of 103 species in these groups was observed of which 82 showed migratory behaviour. Counts were made of diurnal migrants passing in easterly directions of which the commonest were Wood Pigeon *Columba palumbus*, Swallow *Hirundo rustica*, White Wagtail *Motacilla alba*, Chaffinch *Fringilla coelebs* and Siskin *Carduelis spinus*; the large passage of Swifts *Apus apus* and Alpine Swifts *Apus melba* was obscured by confusion with local feeding movements. Counts of nocturnal migrants were made in a standard census area: the commonest were Robin *Erithacus rubecula*, Song Thrush *Turdus philomelos*. Willow Warbler *Phylloscopus trochilus*, Olivaceous Warbler *Hippolais pallida*, Red-breasted Flycatcher *Ficedula parva* and Spotted Flycatcher *Muscicapa striata*, but 16 other species could also be described as common. Counts are summarised in a systematic list and, for the commoner species, presented in graphs (for diurnal migrants) and histograms (census area counts) in 10 day aggregates. Details of favoured habitats for species recorded in the census area are also given.

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SEQUENCE OF PLUMAGE CHANGES AND POLYMORPHISM IN THE INDIAN REEF HERON *EGRETTA GULARIS*

by

R. M. Naik and B. M. Parasharya

INTRODUCTION

The Indian Reef Heron, also called the Western Reef Heron, *Egretta gularis* has two basic colour phases, white and grey, in both sexes. In India the bird was considered to be migratory by Ali and Ripley (1968) because few known breeding sites of this bird were located at the two ends of its range on the western coast of the Indian region. Recently, however, we have found a series of breeding sites of this bird distributed on the sea coast and mouth of the large rivers of Gujarat. (Naik *et al.* 1981; Naik & Parasharya, unpublished).

The bird is an ideal subject for a detailed investigation on polymorphism for several reasons. The series of populations of this bird on the coast of Gujarat live in a wide variety of habitats and the proportion of morphs in these populations tends to differ. The nesting season spans a period from February to August-September at the Gogha and Bhavnagar New Port colonies (Naik *et al.* 1981; Naik & Parasharya, unpublished); in these colonies, different morphs interbreed (Naik *et al.* 1981) so that data on a variety of families can be collected and pooled for genetic studies.

This paper is an attempt to analyse the plumage variations and to identify different morphs of the Indian Reef Heron. Some authors (see Amadon 1953, for example) have described plumage colour variations in museum specimens of *Egretta gularis*. However, a detailed study of the plumage variations and frequency and sequence of plumage changes in different forms has so far not been made. The notable lacunae in our knowledge are that (1) the sequence of plumages in the grey phase has not been definitely established (Ali & Ripley 1968), and that (2) 'intermediate' forms between grey and white (Ali & Ripley 1968), lavender coloured forms (Hancock & Elliot 1978) and grey forms with white wing-patch (Abdulali 1968; Ali & Ripley 1968; Hancock & Elliot 1978) have only been casually referred to in the literature without any definite reference to their status in the sequence of plumage changes or frequency in a population. The present investigation was undertaken to fill this gap in our knowledge, and to provide a basis for studies into the genetics and biological functions of polymorphism that are being carried out at present.

METHODS

The present study was made at the recently discovered (Naik *et al.* 1981) breeding colonies at Gogha (21° 41' N, 72° 16' E), Bhavnagar New Port (21° 45' N, 72° 11' E) and Bhavnagar City (21° 46' N, 72° 11' E). A number of nests at these breeding colonies were marked with numbered plates during the incubation period in 1981. The chicks in these nests were banded with numbered aluminium rings and a record of their physical features was maintained. Thirteen of such chicks whose parentage was known and several others of unknown parentage were transported to the University campus and housed in an out-door aviary. The physical features of these birds were noted at periodic intervals for a period of about twelve months (May 1981 to April 1982).

The characteristics of adult plumage were noted and the frequencies of juveniles and adults in different phases were determined by observing the birds at the breeding colonies, roosting sites and nearby sea coast during 1980.

STAGES AND TYPES

Natal down

The natal down is white in most of the feather tracts. It is subject to some colour variation ranging from light grey to grey in the dorsal tract. The variations, however, do not seem to correlate with the colour variations in the subsequent plumages.

Juvenile plumage

The juvenile plumage is categorised into white and grey, though there are considerable variations in the plumages of both the categories.

White

Juvenile white plumage is never pure white; a variable amount of grey pigment is always present. Depending upon the amount of grey pigments, the white juveniles can be arbitrarily separated into (1) almost pure white, and (2) white dappled with grey.

(1) Almost pure white. Only a few white feathers on the back, neck, trunk and wings are lightly streaked or splashed with grey, whereas the rest of the feathers are pure white (bird A in *Plate 3* and *Plate 4 top*). On the body feathers, the grey streaks or splashes being usually restricted to the distal end of the outer vane, tend to wear out in course of time. These birds are difficult to distinguish from the adult white ones when they are viewed in the field from a distance; this fact provides the basis for separating the almost pure white birds from those of the next category.

(2) White dappled with grey. In general appearance these birds are white but distinctly splashed with grey; the conspicuousness of the grey splashes vary from individual to individual (B and C in *Plate 3*). Entirely pure white feathers are only present on the breast and abdomen; most of the feathers elsewhere including remiges and rectrices (*Plate 4 middle*) are dappled. The grey dapples on individual feathers vary in size, so that feathers ranging from almost entirely grey to pure white may be found in the same region. A few juvenile birds with the dapples much more numerous and conspicuous than those on bird C illustrated in *Plate 3*, have been observed in the field.

Grey

Overall appearance of the bird in this juvenile plumage is grey, but it is distinctly light coloured ventrally. Depending on the intensity of grey, a majority of birds in the grey juvenile plumage can be arbitrarily separated into (1) light grey and (2) dark grey.

(1) Light grey (D and E in *Plate 3*). The chin, midventral part of the neck, abdomen and breast are white while the feathers on the rest of the body are light grey.

(2) Dark grey (F in *Plate 3*). The chin and midventral part of the neck are light grey instead of white, the abdomen is white but the breast is light grey, and the feathers elsewhere are dark grey. This plumage, not having conspicuously white underparts, can be confused with the adult grey plumage under field conditions.

The juveniles, whether light or dark grey, can be divided into (1) those without a wing-patch, and (2) the others with wing-patch.

(1) Grey without a wing-patch. Characteristically, the bird does not have any of the primaries or upper greater primary coverts white. The upper greater primary coverts in some birds, however, may have very light coloured outer margins forming a light grey strip on the manus.

(2) Grey with wing-patch/ Outer 1 to 5 (occasionally up to 7) upper greater primary coverts are white forming a white wing-patch on the dorsal side of the wing. A few outer primaries may also be white, thus enlarging the wing-patch in some exceptional cases. The wing-patch may be present on any one of the wings or both the wings (*Plate 4 bottom*). Among the grey chicks with the wing-patch only on one wing, left (4) or right (15), handled by us in the breeding colonies, the incidence of wing-patch being on the right wing has a relatively higher frequency; the difference was statistically significant ($P < 0.025$). Usually several consecutive upper greater primary coverts may be white, but in some birds one or two grey coverts may appear in the middle of the series of white. The wing-patch even when present on both the wings may not be symmetrical (*Plate 4 bottom*).

We saw 'lavender coloured' juvenile birds at various places from about October to May. Grey feathers in the juvenile birds kept in our aviary, gradually acquired a lavender tinge by the time they grew to between five and seven months old. In these birds, the 'lavender' feathers were replaced by the grey feathers during the post-juvenile moult. Obviously, the juvenile grey plumage turns lavender with wear.

The birds in juvenile grey plumage can be clearly distinguished from those in the adult grey plumage by the white belly. These white-bellied birds were in the study area almost throughout the year, because the young herons kept on fledging from April to September and the post-juvenile moult was not synchronised in the population. A count of the birds made periodically at the roosts throughout the nesting season (TABLE 1) revealed that the white-bellied ones constituted about one to two per cent of the grey form throughout the year, though they were more numerous at the end of the nesting season.

We saw the white-bellied birds among the breeding birds at heronries throughout the nesting season (TABLE 1). The soft part colour changes, namely, turning of the yellow facial skin and feet into crimson, during the early (pair formation) stage of the nesting cycle occurred in these birds as in the others. Once, a white-bellied bird paired with one in adult plumage and successfully raised a chick. The white-bellied grey birds lacked the nuchal crest in all the cases described above, indicating that these birds were still in the juvenile plumage and had started breeding before acquiring the adult plumage. Breeding attempts by subadults or birds still in non-breeding plumage, are noted in the *Nycticorax* group of herons (Hancock & Elliot 1978; Serrao 1981; Personal observation), Boat-billed Heron *Cochlearius cochlearius* (Hancock & Elliot 1978), Great Blue Heron *Ardea herodias* (Pratt 1973) and Cattle Egret *Bulbulcus ibis* (personal observation).

Adult plumage

The adult plumage may be white or grey. It is well known that two or exceptionally three lanceolate feathers on the head and the filamentous feathers on the breast and back develop during the breeding season.

White

White adult plumage is always pure white and there is no grey pigment on any of the feathers.

Grey

The adult grey plumage is grey to dark grey in colour, with breast and abdomen of the same colour as the back. The adult grey may have a wing-patch on one or both the wings as in the juvenile grey plumage. Among the grey adults with wing-patch only on one wing, left (2) or right (14), observed by us in the breeding colonies, the incidence of wing-patch being on the right wing had a relatively higher frequency; the difference was statistically significant ($P < 0.005$). A variable number of the upper greater primary coverts, or the primaries and coverts, form the wing-patch.

Intermediate

During our three years observations on the breeding colonies of Gogha and Bhavnagar New Port, we have come across only a single bird which could be considered to be an intermediate between the grey and white forms. This bird in its full breeding plumage was in the heronry on 10 February 1981. Its head and face were pure white, the neck back and breast were light grey, the abdomen was lighter than the back or breast, and there was a white wing-patch consisting of several distal upper greater primary coverts and a few primaries on both the wings.

Plumage succession

The juvenile white plumage, whether almost pure white or dappled with grey, is replaced by the adult white plumage during the post-juvenile moult. This is indicated by the observations that all the four white juvenile birds, ranging from an almost pure white one to the one heavily dappled with grey, acquired adult white plumage by the post-juvenile moult in our aviary, and also that no bird in the adult white plumage (clearly distinguished in the field during the breeding season) has even been found to have grey dapples. (see *Figure 1*.)

The juvenile grey plumage is replaced by the adult grey plumage. The intensity of grey is variable, as we have seen, in both the juvenile as well as adult plumages, but, these variations being almost continuous, cannot be accurately quantified. Consequently, we do not know whether the successive plumages of a dark grey juvenile always tend to have a darker shade of grey and those of the light grey juveniles a lighter one.

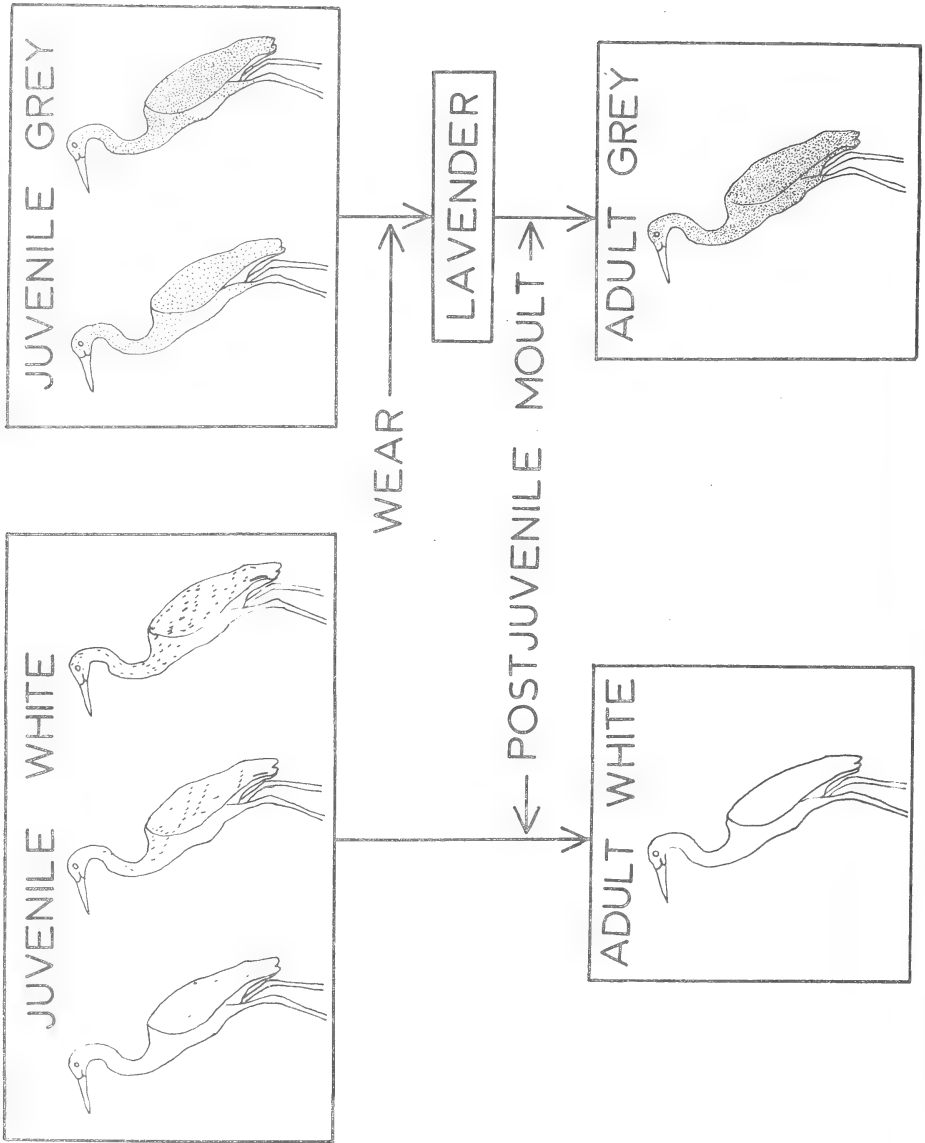


Figure 1. Summary of the plumage succession in the Indian Reef Heron.

TABLE 1. PERCENTAGE OF INDIVIDUALS IN JUVENILE GREY PLUMAGE (P.G.J.) AMONG TOTAL NUMBER OF GREY PHASE OF INDIAN REEF HERON OBSERVED AT BREEDING COLONIES AND ROOSTS

MONTH	BREEDING COLONIES		ROOSTS	
	Total No. of grey birds observed	No. of birds in P.G.J. %	Total No. of grey birds observed	No. of birds in P.G.J. %
February	222	0.9	249	1.6
March	1,311	1.7	613	2.0
April	1,090	0.4	488	0.4
May	318	0.3	339	1.2
July	522	1.0	727	1.1
September	68	5.9	73	9.6
December	—	—	80	3.8

TABLE 2. FREQUENCY OF GREY PLUMAGE WITHOUT WING-PATCH AND WITH WING-PATCH ON RIGHT, LEFT, OR BOTH WINGS IN PARENTS AND CHICKS IN INDIAN REEF HERON

STATION	STATUS OF BIRDS	NO. OF GREY BIRDS OBSERVED	WING-PATCH			
			Absent %	On Right Wing %	On Left Wing %	On Both the Wings %
Gogha	Chicks	16	50.0	31.3	12.5	6.3
	Adults	32	75.0	12.5	6.3	6.3
Bhavnagar New Port	Chicks	94	74.5	10.6	2.1	12.8
	Adults	83	83.1	10.8	0.0	4.8
Two stations Combined	Chicks	110	70.9	13.6	3.6	11.8
	Adults	115	80.9	12.2	1.7	5.2

Significance of difference between the frequencies for chicks and adults:

Gogha	: Not significant; $p > 0.25$
Bhavnagar New Port	: Not significant; $p > 0.10$
Two stations combined	: Not significant; $p > 0.10$

The juvenile grey plumage with wing-patch is probably replaced by the adult grey plumage with wing-patch. This is indicated by the observations that the wing-patch has about the same frequency for the juvenile and adult grey plumages (TABLE 2).

DISCUSSION

The white and grey forms in the Indian Reef Heron are discretely different at any stage of the plumage development except at the earliest, natal down, stage. Since these two forms are now known to interbreed (Naik *et al.* 1981) and the frequency of the grey-white pairing in our study colonies was as high as 27 per cent (unpublished), we would like to identify the heterozygotes if they can be recognised from the plumage colour.

Some authors have used the term 'intermediate' to refer to the grey birds with a white or lightly coloured belly. This term is not precise and the birds for which it is commonly used are, in any case, the grey forms in juvenile plumage. Similarly, the birds in 'lavender' plumage are the juvenile grey ones whose plumage colour is modified by wear and tear or mere fading of pigments. If the term 'intermediate' form is meant to imply that the phenotypic expressions of the grey as well as white are about equally represented in this form, then such a form was seen only once (with a frequency of one in several thousand birds seen) and may be considered a freak. On the other hand, if one is trying to identify a heterozygote by looking for an intermediate form, we have the grey birds with white wing-patch; the white wing-patch has about the same range of variability and frequency in the juvenile and adult grey forms and this indicates that the feature may have a genetic basis. These birds could be heterozygotes that resemble more the grey (without wing-patch) than the white. If this is so, the fact that the white wing-patch is highly variable (involving only a few upper greater primary coverts to a series of coverts and several primaries as well) feature and has a relatively low frequency, would indicate that the resemblance of the heterozygote to the homozygote grey may range from 'more closely' to 'completely'. The pooled data of many heron families studied by us (Naik & Parasharya, unpublished) indicate that the polymorphism appears to be determined by a single pair of alleles and the gene for grey (G) has an incomplete dominance over the gene for white (g). The grey chicks (Gg) of grey x white parents, may or may not have a wing-patch.

The range of variations in the juvenile plumage is profound even among the birds in fresh plumage, and it is further increased when the progressive changes in plumage colour by wear and tear, are set in. Since the post-juvenile moult is not synchronised in the population, the birds of the year and first-year birds display a wide spectrum of almost continuous variations ranging from the pure white to dark grey, during a greater part of the year. The situation is further complicated by the fact that these birds also frequent the breeding colonies and some of them may even actually breed.

The variations in the plumage colour, whether genetic (such as by modifier genes), environmental or both, are reduced after the post-juvenile moult. Some genetic homeostatic mechanism is clearly operative; the plumage colour variation in adults is limited in the grey and totally eliminated in the white morphs in all the seasons, so that the adult grey and white morphs are always discrete. The obvious conclusion is that while the selective forces operative on the juvenile plumage permit or even favour a wide range of plumage colour variations, those operative on the adult plumage favour only the grey or white.

It is generally conceded that white and dark morphs in herons (Ardeidae) are maintained in populations because each has a selective advantage under certain conditions; the selective advantage may be related to foraging conditions in the habitat, or thermoregulatory capacity of a morph under certain physical environmental conditions (Recher 1972; Recher & Recher 1972; Kushlan 1977; Ellis 1980; Mock 1980), though conclusive evidence for, or against, either of these hypotheses is still not available.

SUMMARY

The distinction between the grey and white forms of the Indian (or Western) Reef Heron, *Egretta gularis*, can be made at every stage of the development from juvenile to adult plumage. The juvenile white plumage ranges from an almost pure white to a heavily dappled with grey. The juvenile grey is light grey or white ventrally, and the grey turns into lavender with wear. Occasionally, the birds in juvenile plumage have been known to breed. The adult white plumage is pure white and the adult grey is also grey ventrally. Both the juvenile grey and adult grey plumages may, or may not, have wing-patch of variable size on one (more frequently on the right) or both the wings.

It is concluded that the selective forces operative on plumage colouration favour a wide range of colour variations in the juveniles and discrete morphs in the adults.

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A CONTRIBUTION TO THE ORNITHOLOGY OF THE SIWA OASIS AND QATTARA DEPRESSION, EGYPT

by

Steven M. Goodman and Peter L. Ames

INTRODUCTION

In 1976 Peter L. Ames (PLA) and Ibrahim Helmy visited the western portion of the Qattara Depression (*see Figure 1*) from 4 to 9 March, working principally in the vicinity of Qara. The following year PLA returned under the auspices of the Qattara Project Authority, with Drs. Dale J. Osborn and Jana Kosinová. The 1977 work was carried out between 12 and 20 April and centred primarily near El Moghra, but a trip was made to the east central portion of the Depression. While on these expeditions PLA was able to observe and make a small collection of birds. These specimens were preserved in fluid and are housed in the Field Museum of Natural History, Chicago. The purpose of his collecting birds was primarily to obtain anatomical material for systematic studies. All of the bird sightings reported in the annotated list under 'Observation(s)' are PLA's.

PLA's itinerary was as follows:

- 4 March 1976 arrived at western edge of Qattara Depression and set up camp 2 km. N. of Qara.
- 5 March 1976 day trip from Qara camp to fresh water springs near Qaneitra Crossing. On the way back stopped at another well with reed beds.
- 6 and 7 March 1976 brief trips (one each day) south from Qara camp to Roman well.
- 8 March 1976 day trip to area just east of Qara.
- 9 March 1976 dismantled Qara camp and travelled to the Siwa Oasis, stopping at El Zeitun.
- 10 March 1976 drove from the Siwa Oasis to Mersa Matruh.
- 2 April 1977 reconnaissance aerial survey of the Qattara Depression. Flew from Alexandria to the areas surrounding El Moghra, Ras el Qattara and Qara.
- 12 April 1977 arrived at extreme eastern end of Qattara Depression and set up base camp on open gravel desert near El Moghra.
- 13-17 April 1977 worked in the vicinity of El Moghra and made trips to the nearby lake and Bir Nahid.
- 18 April 1977 travelled from El Moghra to acacia groves north of Cicely Hill and spent the night at French Camp No. 2.
- 19 April 1977 explored the area near Cicely Hill along the edge of the Depression and made camp in acacia grove approximately 10 km. N.W. of Cicely Hill. Several local acacia groves visited.
- 20 April 1977 returned to El Moghra camp via Minqar Abu Dweiss.
- 21 April 1977 left for Cairo.

The second collection reported here was obtained by expeditions under the direction of Dr. Harry Hoogstraal, Medical Zoology Department, U.S. Naval Medical Research Unit No. 3 (NAMRU-3). In August 1964, and May 1965 and 1975 expeditions from NAMRU-3 made bird collections in the vicinity of El Moghra, Qattara Depression. The 1975 collection was prepared by Sherif Tewfik and forms an important contribution to this paper. In March 1964 and February 1974 NAMRU-3 expeditions visited the Siwa Oasis (*see Figure 1*) and obtained further bird material. The 1974 birds were collected and prepared by Ibrahim Helmy and Hassan Touhamy. All NAMRU-3 specimens described herein are housed in the Field Museum of Natural History, Chicago and some are part of the Conover Collection. For over two decades Dr. Hoogstraal and his colleagues have been studying the transmission of arboviruses, particularly the relationship between ticks and their vertebrate hosts. As part of their research programme it was necessary to collect birds in order to obtain material and/or document the identity of the hosts. A detailed itinerary of the NAMRU-3 expeditions is not available.

DESCRIPTION OF THE AREAS AND SUMMARY OF PREVIOUS ORNITHOLOGICAL WORK

The Siwa Oasis lies between 29° 6' to 29° 21' N and 25° 16' to 26° 8' E in a depression approximately 1,100 km.² with the lowest point at 30 metres below sea-level. Ornithologically it is one of the better known oases of the Egyptian Western Desert. The more important works on Siwan birds include Meinertzhagen (1922, 1930); Moreau (1928, 1934, 1941); Almond (1937) and Al-Hussaini (1939, 1959). To date the most extensive bird collection from the Siwa Oasis was obtained between 15 April and 11 September 1935 by an expedition from Armstrong College (sometimes referred to as the Omer-Cooper Expedition) and is housed in the British Museum (Natural History), Tring. Although the main focus of the Armstrong College Expedition was hydrobiological (Omer-Cooper 1937, 1947), both notes and collections were made of local Siwan birds (reported and reviewed by Moreau 1941). For more information of the history, inhabitants and physical features of the Siwa Oasis see Fakhry (1973), and for its ecology see Zahran (1972).

The Qattara Depression lies north-east of the Siwa Oasis and approximately between 28° 55' to 30° 28' N and 26° 24' to 28° 55' E. The lowest point is 134 metres below sea-level (near Qara) but more than two-thirds of the Depression lies at least at 50 metres below sea-level (Abu Al-Izz 1971). Its total area is in excess of 19,000 km.², making it one of the largest and deepest depressions in the world. Zoologically the Qattara Depression is virtually unknown. Hitherto no systematic list has been published on the birds of the Qattara Depression. The available material from the area on reptiles and amphibians has been reviewed by Marx (1968), as have the mammals by Osborn and Helmy (1980). Botanically it is better known, particularly at El Moghra, a fresh water oasis in the north-east corner of the Depression (Girgis *et al.* 1971).

INTRODUCTION TO ANNOTATED LIST

Wherever possible the gazetteers of Osborn and Helmy (1980) and United States Board on Geographic Names (1959) have been used for Egyptian locality spellings and coordinates (see list under map for the coordinates of the Siwa Oasis and Qattara Depression localities mentioned in text). As is used here, the area 'Western Desert' is meant to include all the region of Egypt west of the Nile Valley and Delta except the Faiyum, Wadi Natroun and the coastal zone along the Mediterranean Sea. Unless otherwise stated all specimens are in adult plumage. The PLA specimens were checked for moult, and only when this condition was found, is it mentioned. The wing measurement is the arc (flattened wing), and the tail and tarsus were measured in the standard manner. Measurements (in mm.) and trinomial names are only given for forms that are known or presumed breeding residents in the Siwa-Qattara area. All fat deposit and skull-ossification notes from the HH specimens were taken directly from the specimen labels. The systematic order and English names follow Voous (1977).

CC = Conover Collection (housed in FMNH)

FMNH = Field Museum of Natural History, Chicago

HH = field catalogue numbers of Dr. Harry Hoogstraal

PLA = Peter L. Ames, also reference to his field catalogue numbers.

UMMZ = The University of Michigan Museum of Zoology

ANNOTATED LIST

Nycticorax nycticorax

Night Heron

Material. El Moghra - 1 male (FMNH 296995, HH 8293), 20 May 1975, fat:heavy.

Comments. This species has not been previously recorded from the Siwa-Qattara area. Records during spring migration from the Western Desert include birds on 23 April in the Kharga Oasis and 28 April in the Bahariya Oasis (Meininger, Mullié and Goodman; *pers. obs.* 1981).

*Ardeola ralloides***Squacco Heron**

Material. El Moghra – two females (FMNH 296993, HH 8283; FMNH 296994, HH 8284), 16 May 1975 (both, fat: medium, light (respectively)).

Comments. Hitherto, there were no published records of this species from the Western Desert, although Meininger, Mullié and Goodman (*pers. obs.*, 1981) observed 15 individuals on 23 April in the Kharga Oasis and two on 28 April in the Bahariya Oasis. It has been found on spring migration in the Libyan Desert on several occasions (Moreau 1934; Cramp and Conder 1970; Bundy 1976), indicating that it moves across the Sahara along a broad front.

*Egretta garzetta***Little Egret**

Observation. El Moghra, 14 April 1977, five or six individuals.

Comments. This species has been recorded on several occasions during migration in the area. The Armstrong College expedition observed or collected individuals on 17 April, 21 April and 31 May in the Siwa Oasis (Moreau 1941). Al-Hussaini (1939) observed between 7 and 13 February a flock of four pairs at Lake Aghurmi, in the Siwa Oasis, of which "one of these was shot."

*Ardea cinerea***Grey Heron**

Observation. SE of El Moghra, 13 April 1977, one individual.

Comments. Al-Hussaini (1959) implied that this species is a possible breeding resident in the Siwa Oasis. However, there is no evidence to suggest this. It has previously been recorded in the Siwa Oasis between 7 and 13 February (Al-Hussaini 1939) and on 17 April (Moreau 1941).

*Ciconia ciconia***White Stork**

Observation. Near Ras el Qattara, 2 April 1977, one individual.

Comments. At least on occasions White Storks move north from the African wintering grounds across the Western Desert rather than along the Nile Valley corridor. The Armstrong College expedition observed two on 8 May, one on 9 May and one on 1 June in the Siwa Oasis (Moreau 1941). Moreau (1934) found White Stork corpses in the desert halfway between the Dakhla Oasis and Gebel Uweinat, further indicating a trans-Saharan movement.

*Plegadis falcinellus***Glossy Ibis**

Material. El Moghra – two females (FMNH 296996, HH 8272; FMNH 296997, HH 8278), 13 May 1975, 15 May 1975, fat: light, medium (respectively). Qara – one female (FMNH 284690, HH 8175), 17 May 1965.

Comments. Moreau (1941) reported that the Armstrong College expedition observed eight individuals on 25 April, six on 4 May and one on 13 May in the Siwa Oasis. This species is strictly a Palearctic migrant through the area.

*Phoenicopterus ruber***Greater Flamingo**

Material. Siwa Oasis – one female (FMNH 296927, HH 8230), 1 February 1974.

Comments. The Flamingo is an occasional passage visitor to the Siwa Oasis. Belgrave (1923) noticed it on the salt lakes during an unspecified time, as did Kiepenheuer and Linsenmair (1965) between 14 and 15 May and 19 and 27 September.

*Milvus migrans migrans***Black Kite**

Material. El Moghra – one female, one male (FMNH 296998, HH 8292; FMNH 296999, HH 8291), 19 May 1975 (both), fat: light (both).

Comments. These birds appear to be the first specimen records of the Black Kite in the Western Desert, where it is strictly a migrant. The black bills of these specimens distinguish them from the Nile Valley and Delta breeding form, *M. m. aegyptius*.

Circus aeruginosus

Marsh Harrier

Material. El Moghra – one male (FMNH 297000, HH 8289), 18 May 1975, fat: medium.

Observation. El Moghra, 17 April 1977, one female.

Comments. This species has been noted on several occasions during spring migration in the Western Desert: Moreau (1927) reported one on 23 March in the Bahariya Oasis and one on 11 April in the Dakhla Oasis; and (1928) two on 25 March in the Siwa Oasis.

Circus cyaneus

Hen Harrier

Observations. El Moghra area, 13 and 14 April 1977, single birds and 17 April 1977, one pair.

Comments. Al-Hussaini (1938) found this species in the Bahariya Oasis during February. Winter visitors and migrants begin to move out of and through Egypt in early April (Meinertzhagen 1930).

Pandion haliaetus

Osprey

Observation. S.E. of El Moghra, 13 April 1977, two-three individuals.

Comments. These observations appear to be the first of this species from the Western Desert. The birds were probably migrating, but seemed to be flying south-east.

Falco naumanni

Lesser Kestrel

Material. El Moghra – one male (FMNH 297001, HH 8276), 15 May 1975, fat: light.

Comments. The Lesser Kestrel has previously been recorded in the Western Desert on spring passage in the Bahariya Oasis between 22 and 23 March (Moreau 1927). Meinertzhagen (1930) described it as passing over the Kharga and Dakhla Oases in great numbers but did not specify the season. Cramp and Conder (1970) found it to be the most common avian predator in the Kufra Oasis, Libyan Desert, Libya, between 31 March and 4 April.

Falco tinnunculus

Kestrel

Observations. Qaret Nanous, 8 km. E. of El Moghra, 13 April 1977, several out in desert. El Moghra area, 13 and 14 April 1977, one dead female, two live males.

Comments. Moreau (1928) observed a few Kestrels between 24 and 28 March in the Siwa Oasis. The Armstrong College Expedition collected one bird on 8 May in the Siwa Oasis which Moreau (1941) listed as the nominate form. Al-Hussaini (1939, 1959) obtained specimens in the Siwa Oasis which he identified as *rupicolaeformis*. Thus, these sight records could be of nominate *tinnunculus* which is a winter visitor and migrant in Egypt and/or *rupicolaeformis*, which is a breeding resident in portions of the country.

Falco biarmicus tanypterus

Lanner

Material. 70 metres S. of El Moghra – one male (FMNH 276070, HH 8120), 27 August 1964, wing: 352, tail: 194.

Comments. The Lanner has been recorded on several occasions in the Western Desert: a pair was observed between 10 and 13 April in the Dakhla Oasis (Moreau 1927); an egg and foot of this species or Barbary Falcon *F. pelegrinoides* were found south of the Farafra Oasis (Moreau 1934); and an individual was collected on 20 May in the Siwa Oasis (Moreau 1941), where it is thought to nest (Cramp & Simmons 1980). PLA observed a large, pale falcon on 6 March 1976, 8 km. north of Qara chasing six shorebirds *Tringa* sp. Based on size and colour it could have been either a Lanner or Saker *F. cherrug*.

Rallus aquaticus

Water Rail

Observation. El Moghra, 15 April 1977, one bird.

Comments. The present breeding status of this species in Egypt is not clear, but all the records from the Western Desert are almost certainly of migrants or winter visitors rather than breeding residents. Although never actually observing one, Moreau (1927) tentatively identified a bird vocalizing in a reed bed in the Bahariya Oasis as a Water Rail. Scharlau (1963) observed this species in the Dakhla Oasis between 2 and 4 October.

Fulica atra

Coot

Material. El Moghra – one unsexed (FMNH 284688, HH 8218), 18 December 1967.

Comments. The breeding status of this species in the Western Desert is uncertain. Meinertzhagen (1930) observed one carrying nest material in the Dakhla Oasis, where it was recently observed on 24 April (Meininger, Mullié and Goodman, *pers. obs.*, 1981). Moreau (1927) learned that the native Bahariyans were familiar with this species. Abdel Rahim *et al.* (1980) found it in the Farafra Oasis between 29 March and 10 April. It is possible that this species may breed in the Western Desert and at El Moghra, but this needs to be substantiated.

Grus grus

Common Crane

Material. El Moghra – one female (FMNH CC 25556, HH 8265), 12 May 1975, fat: light.

Observation. Near Qaret Nanous, 8 km. E. of El Moghra, 13 April 1977, one bird out in desert.

Comments. Cranes have been observed near the Siwa Oasis in the late winter and spring on the following occasions: between 7 and 13 February six pairs at Lake Aghurmi (Al-Hussaini 1939); in the middle of March (Almond 1937); and a flock on 27 March (Moreau 1928).

Cursorius cursor

Cream-coloured Courser

Observations. Qaneitra Crossing, 7 March 1976, one bird. One km. S. of El Moghra, 15 April 1977, two individuals.

Comments. The present breeding status of this species in the Western Desert is unclear. The above observations appear to represent the first from the Siwa-Qattara area. Al-Hussaini (1959) listed this species as a breeding resident in the Kharga and Dakhla Oases. Abdel Rahim *et al.* (1980) found it in the Farafra Oasis some time between 29 March and 10 April.

Glareola pratincola

Pratincole

Material. El Moghra – one female (FMNH CC 25560, HH 8268), 13 May 1975, fat: medium.

Comments. The Armstrong College Expedition observed this species in the Siwa Oasis on 29 April and 10 May, and collected it on 14 May (Moreau 1941). It is strictly a migrant through the region. The El Moghra specimen was taken from a group of six.

Charadrius hiaticula

Ringed Plover

Observation. Bir Nahid, 4.5 km. E. of El Moghra, 14 April 1977, one bird.

Comments. The only published record of this species in the Egyptian Western Desert is of Scharlau (1963) who observed it in the Dakhla Oasis in early October.

Charadrius alexandrinus

Kentish Plover

Observation. Bir Nahid, 4.5 km. E. of El Moghra, 14 April 1977, one bird.

Comments. This observation appears to be the first published record for this species from the Egyptian Western Desert. This is somewhat surprising, for it is known to cross the Sahara while in transit to or from the sub-Saharan wintering grounds (Heim de Balsac & Mayaud 1962; Moreau 1966). Cramp and Conder (1970) observed one bird on 31 March in the Kufra Oasis, Libyan Desert, Libya.

Vanellus vanellus

Lapwing

Observation. Bir Nahid, 4.5 km. E. of El Moghra, 14 April 1977, one dead.

Comments. Meinertzhagen (1930) considered this species a winter visitor to the Siwa Oasis.

Calidris ferruginea

Curlew Sandpiper

Material. El Moghra – one male, one female (FMNH CC 25552, HH 8287; FMNH CC 25551, HH 8290), 17 May 1975, 19 May 1975 (respectively), fat: medium (both).

Comments. This species has been previously recorded on passage in the Western Desert only in the Dakhla Oasis between 2 and 4 October (Scharlau 1963) and on 24 April (Meininger, Mullié and Goodman; *pers. obs.*, 1981).

*Philomachus pugnax***Ruff**

Material. El Moghra – three females (FMNH CC 25557, HH 8274; FMNH CC 25558, HH 8273; FMNH CC 25559, HH 8275), 13 May 1975 (all), fat: medium, medium, light (respectively). 30 km. N. of Qara – one male (FMNH 291465, PLA 142), 6 March 1976, testes: not enlarged.

Observations. Near Qaneitra Crossing, 5 March 1976, six birds.

Comments. The Ruff is a not uncommon spring migrant in the Western Desert. Individuals have been previously collected on 17 and 21 April in the Siwa Oasis (Moreau 1941).

*Gallinago gallinago***Common Snipe**

Observation. Bir Nahid 4.5 km. E. of El Moghra, 14 April 1977, one bird.

Comments. Spring passage records from this area include: one on 26 March in the Siwa Oasis (Moreau 1941); a "few" in the Bahariya Oasis between 20 and 24 March (Moreau 1927); and in the Dakhla Oasis in mid-March (Meinertzhagen 1930). It may on occasion winter in the area, for Al-Hussaini (1938) found it "common" in the Bahariya Oasis during February.

*Tringa nebularia***Greenshank**

Observations. South edge of El Moghra, 14 April 1977, three dead.

Comments. Spring records of this species in the Western Desert include: birds observed by Moreau (1927) in the Bahariya Oasis between 20 and 24 March; and in the Dakhla Oasis on 24 April by Meininger, Mullié and Goodman (*pers. obs.*, 1981). Unidentified *Tringa* sp. were observed by PLA near Qaneitra Crossing on 5 March 1976, and 3 km. south of Qara on 7 March 1976.

*Tringa ochropus***Green Sandpiper**

Material. El Moghra – one male (FMNH CC 25553, HH 8267), 12 May 1975, fat: light.

Comments. The Green Sandpiper has been recorded on spring migration in the Kharga, Dakhla and Bahariya Oases (Moreau 1927). Al-Hussaini (1938) found it common around pools during February in the Bahariya Oasis.

*Tringa glareola***Wood Sandpiper**

Material. El Moghra – one female, one male (FMNH CC 25554, HH 8270; FMNH CC 25555, HH 8271), 13 May 1975 (both), fat: light (both).

Comments. The only record that we are aware of for this species from the Siwa-Qattara area is two individuals recorded on 26 March in the Siwa Oasis (Moreau 1941).

*Pterocles coronatus coronatus***Coroneted Sandgrouse**

Material. Qara – one male (FMNH 291466, PLA 141), 6 March 1976, testes: not enlarged.

Comments. Hitherto the only records of this species from Egypt west of the Nile have been from Wadi Natroun and the Mediterranean coastal region (Meinertzhagen 1930: 521-522), although Meinertzhagen (1930, *Appendix A*) considered it a resident of the Western Desert. The size of the specimen's gonads indicates that the bird was not in breeding condition. The bird was taken from a flock of approximately 12.

*Otus scops***Scops Owl**

Material. El Moghra, 15 April 1977, one bird netted, photographed and released by PLA.

Comments. A small owl was flushed on 13 April 1977 from a clump of date palms *Phoenix dactylifera* at El Moghra, that may have been the same individual captured two days later. As far as we can determine this is the first published record of this species from the Egyptian Western Desert oases. This form is known to winter in sub-Saharan Africa (Moreau 1966) and would presumably pass through the area with greater frequency than this single record indicates. Cramp and Conder (1970) found a recently dead Scops Owl during the spring in the Kufra Oasis, Libyan Desert, Libya.

Bubo bubo ascalaphus

Eagle Owl

Material. 15 metres E. of Siwa Oasis – one male (FMNH 246578, HH 8104), 7 March 1964, wing: 335, tail: 173.

Comments. This species is widely distributed in the Western Desert. It has been recorded breeding 15 km. south-east of Baris in the Kharga Oasis (Al-Hussaini 1959), observed in the Farafra Oasis (Abdel Rahim *et al.* 1980), and recorded in the Dakhla Oasis (Meinertzhagen 1930). Even though the specimen is very pale and fits the description of *Bubo bubo desertorum*, we agree with Vaurie (1965) in treating *ascalaphus* and *desertorum*, as synonyms. A note on the data tag reads, "shot at night in rocky sandy area."

Apus apus

Swift

Observation. El Moghra, 12 to 15 April 1977, dozens.

Comments. Moreau (1927) saw a large migration of this species in the Bahariya Oasis on 22 March and the Armstrong College Expedition observed one bird in the Siwa Oasis on 29 May (Moreau 1941). It is possible that these sight records could be of the very similar-looking European breeding forms of *A. pallidus*.

Merops apiaster

Bee-eater

Material. El Moghra – one female (FMNH 297012, HH 8277), 15 May 1975, fat: medium.

Observation. El Moghra, 17 April 1977, flock moving NE.

Comments. This species is a common migrant in the Western Desert. The Armstrong College Expedition observed "many" up until 14 May in the Siwa Oasis, some of which were collected (Moreau 1941). Other spring records include a flock in the Dakhla Oasis between 10 and 13 April and in the Kharga Oasis on 16 April (Moreau 1927).

Coracias garrulus

Roller

Material. El Moghra – one female (FMNH 297013, HH 8266), 12 May 1975, fat: heavy.

Comments. Meinertzhagen (1922, 1930) pointed out that this species is less common in Egypt during the spring than the autumn passage. Spring records from the Western Desert include birds in the Dakhla Oasis on 25 April and in the Farafra Oasis on 26 April (Meininger, Mullié and Goodman, *pers. obs.*, 1981).

Upupa epops

Hoopoe

Observations. El Moghra, 16 April 1977, one bird. 10 km. NW. of Cicely Hill, 19 April 1977, one bird.

Comments. Meinertzhagen (1922) considered this species to be common on spring passage from March to early April in the Siwa Oasis. It has also been recorded during the spring in the Dakhla, Kharga and the Bahariya Oases (Moreau 1927).

Jynx torquilla

Wryneck

Observation. S. edge of El Moghra, 14 April 1977, one dead.

Comments. The Wryneck moves across a broad front while passing through Egypt on migration. It has been recorded in spring in the Siwa, Dakhla (Meinertzhagen 1930), Kharga and Farafra Oases (Meininger, Mullié & Goodman, *pers. obs.*, 1981).

Ammomanes cincturus arenicolor Bar-tailed Desert Lark

Material. El Moghra – one female (FMNH 297016, HH 8260), 11 May 1975, wing: 86, tail: 47, fat: none, skull: ossified.

Comments. Meinertzhagen (1930) considered this species a resident in the Siwa Oasis and in the desert around the Faiyum and Wadi Natroun.

Alaemon alaudipes alaudipes

Hoopoe Lark

Material. El Moghra – two males (FMNH 297018, HH 8264; FMNH 297019, HH 8263), 11 May 1975 (both), wing: 123, 130, tail: 82, 88, fat: heavy, medium, skull: ossified (both). Minqar Abu

Dweiss – one male (FMNH 297020, HH 8285), 17 May 1975, wing: 120, tail: 78, fat: light, skull: ossified. Qaneitra Crossing, in acacia grove, 100 km. N.E. of Qara – one male (FMNH 291467, PLA 150), 7 March 1976, wing: 130, tail: 90, testes: left – 4x3, right – 2x1.

Comments. On the basis of gonad size of the Qaneitra Crossing specimen, this species may be a breeding resident in the Qattara Depression. Al-Hussaini (1939) observed one bird north of the Siwa Oasis on 6 February. Meinertzhagen (1930, *Appendix A*) considered this species a resident in the Kharga, Dakhla, Bahariya and Siwa Oases.

Calandrella brachydactyla **Short-toed Lark**

Material. 1 km. S. of El Moghra – one female (FMNH 291535, PLA 177), 14 April 1977, ovary: not enlarged.

Observation. El Moghra, 15 April 1977.

Comments. Short-toed Larks were recorded on spring passage in the Siwa Oasis by Moreau (1928) each day from 24 to 28 March and by Almond (1937) during the middle of March "in good numbers." Unidentified *Calandrella* sp. were observed by PLA at Bir Nahid, 4.5 km. east of El Moghra on 14 April 1977.

Calandrella rufescens **Lesser Short-toed Lark**

Material. 3 km. S. of Qara – two males (FMNH 291471, PLA 155; FMNH 291469, PLA 148), 6 March 1976, 7 March 1976, wing: 93, 97, tail: 57, 61, testes: not enlarged (both). El Zeitun – two females (FMNH 291470, PLA 161; FMNH 291472, PLA 162), 9 March 1976 (both), wing: 87, 83, tail: 51, 53 ovary: not enlarged, slightly enlarged (respectively).

Observation. Between Qaneitra Crossing and Qara, 5 March 1976, near well.

Comments. Two subspecies of Lesser Short-toed Larks are known from Egypt. *C. r. nicolli* is a breeding resident of the Nile Delta (Vaurie 1959) and *C. r. minor* breeds in portions of central and western North Africa and has been reported from scattered localities in northern Egypt (Meinertzhagen 1930). Although these records appear to be the first from the Western Desert it could conceivably breed there. The specimens cannot be confidently assigned to either form.

Galerida cristata **Crested Lark**

Observation. 2 km. N. of Qara, 4 March 1976.

Comments. Excluding Wadi Natroun, the Faiyum and Mediterranean coastal area, this observation appears to be the first for this species in the northern portion of the Western Desert. It is possible that it may be a breeding resident in the region.

Eremophila bilopha **Temminck's Horned Lark**

Material. Siwa Oasis – one male (FMNH 296933, HH 8233), 27 February 1974, wing: 98, tail: 63.

Comments. Meinertzhagen (1930) and Al-Hussaini (1959) listed this form as a resident in the Siwa Oasis. It has also been recorded in the Farafra Oasis between 29 March and 10 April (Abdel Rahim *et al.* 1980).

Riparia riparia **Sand Martin**

Material. El Moghra – one male (FMNH 297028, HH 8286), 17 May 1975, fat: medium, skull ossified.

Observation. Bir Nahid, 4.5 km. E. of El Moghra, 14 April 1977, scarce.

Comments. This species is a not uncommon migrant through the Western Desert. Moreau (1928) observed a "small flock" on 25 March in the Siwa Oasis. It has been recorded in the Dakhla, Kharga and Bahariya Oases on spring passage (Moreau 1927).

Hirundo rustica **Swallow**

Material. El Moghra – one female (FMNH 297030, HH 8288), 18 May 1975, fat: light, skull: ossified. 1 km. S. of Moghra – one female (FMNH 291543, PLA 178), 14 April 1977, ovary: not enlarged.

Observations. Bir Nahid, 4.5 km. E. of El Moghra, 14 April 1977, numerous. Acacia groves, in area E. of Cicely Hill, 19 April 1977. El Moghra, 20 April 1977.

Comments. This species has been recorded on numerous occasions on spring passage in the Siwa Oasis (Almond 1937; Moreau 1928, 1941) and may at least on occasion winter in the area (Meinertzhagen 1922). It is also very common in the Kharga, Dakhla and Bahariya Oases in spring (Moreau 1927).

*Delichon urbica***House Martin**

Material. El Moghra – one male (FMNH 297031, HH 8281), 16 May 1975, fat: light, skull: ossified.

Observations. Bir Nahid, 4.5 km. E. of El Moghra, 14 April 1977, numerous. El Moghra, 20 April 1977.

Comments. This species has been recorded on spring passage in the Kharga, Dakhla, Bahriya (Moreau 1927), Siwa (Moreau 1941) and Farafra Oases (Meininger, Mullié and Goodman; *pers. obs.* 1981).

*Anthus trivialis***Tree Pipit**

Observation. 2 km. N. of Qara, 5 March 1976, one bird.

Comments. The Tree Pipit is a common migrant in Egypt and has been recorded in the Siwa Oasis during both the spring (Moreau 1941) and autumn (Kiepenheuer and Linsenmair 1965; Steinbacher 1965) passages.

*Anthus spinoletta***Water Pipit**

Material. 3 km. S. of Qara – one male (FMNH 291479, PLA 149), 7 March 1976, testes: not enlarged.

Comments. This species is a widely distributed migrant and winter visitor in Egypt. It has been recorded in the Bahariya Oasis between 20 and 24 March and in the Kharga Oasis during the first half of April (Moreau 1927). The Qara specimen was undergoing extensive moult of the crown, breast, back, flanks, central and outer pairs of rectrices, and upper and lower tail-coverts.

*Motacilla flava feldegg***Black-headed Wagtail**

Material. 30 km. N. of Qara – one male (FMNH 291473, PLA 144), 6 March 1976, testes: slightly enlarged. Qara – one male (FMNH 291474, PLA 145), 6 March 1976, testes: slightly enlarged. 3 km. S. of Qara – one male (FMNH 291475, PLA 158), 8 March 1976, testes: left – 3x2, right – 2x1. 1 km. S. of El Moghra – one female (FMNH 291536, PLA 183), 16 April 1977, ovary slightly enlarged (subspecies indeterminate).

Observations. Qaneitra Crossing, and between Qaneitra Crossing and Qara, 5 March 1976. 3 km. S. of Qara, 7 March 1976. Southern edge of El Moghra, 14 April 1977, five dead. El Moghra, 20 April 1977, flock of 20+ (subspecies unknown).

Comments. *M. f. feldegg* is a common spring migrant in the Western Desert. Almond (1937) found *feldegg* 'everywhere in the fields' during the middle of March in the Siwa Oasis. The Armstrong College Expedition also found this race abundant in the Siwa Oasis until the end of April with stragglers occurring until 22 May (Moreau 1941).

*Motacilla alba***White Wagtail**

Material. 30 km. N. of Qara – one male (FMNH 291476, PLA 143), 6 March 1976, testes: not enlarged. 3 km. of Qara – two males (FMNH 291477, PLA 156; FMNH 291478, PLA 157), 8 March 1976 (both), testes: not enlarged (both).

Observations. 2 km. of Qara, 4 March 1976, one bird. Near Qaneitra Crossing, and between Qaneitra Crossing and Qara, 5 March 1976. El Moghra, 20 April 1977, two-three birds.

Comments. PLA found this species to be extremely common throughout the Qattara Depression, especially around water sources and vegetation. One of the birds at El Moghra was so fearless that

it entered a tent on one occasion. According to Al-Hussaini (1959) this species is a common winter visitor in all of the Western Desert oases, as it is throughout most of the country (Meintzhagen 1930). In the Siwa Oasis spring movements have been noted in mid-March (Almond 1937) and from 24 to 28 March (Moreau 1928), with birds remaining until 17 May (Moreau 1941). All three specimens were undergoing extensive moult. PLA 143 had fresh tail feathers and tertials, while the upper tail-coverts, back, breast and head were in moult. PLA 156 had the tertials and upper tail-coverts in moult. PLA 157 had the inner pair of rectrices, upper tail-coverts, secondary number seven (descendant ordering), proximal greater secondary wing-coverts, crown and breast in moult.

*Luscinia megarhynchos***Nightingale**

Material. 1 km. S. of El Moghra – one female (FMNH 291542, PLA 179), 16 April 1977, ovary: not enlarged.

Observations. El Moghra, 13 April 1977. Acacia groves, in area E. of Cicely Hill, 19 April 1977, one bird.

Comments. Nightingales have been previously recorded on spring passage in the Western Desert in the Siwa Oasis on 18 April (Moreau 1941) and in the Dakhla Oasis on 10 and 11 April (Moreau 1927).

*Phoenicurus phoenicurus***Redstart**

Material. 1 km. S. of El Moghra – one male (FMNH 291546, PLA 180), 16 April 1977, testes: slightly enlarged.

Observation. El Moghra, 20 April 1977, one female.

Comments. Records of this species on spring migration in the Siwa Oasis include: birds collected on 18 and 29 April (Moreau 1941); and single birds at El Zeitun and Bir Hassunah between 24 and 28 March (Moreau 1928).

*Saxicola rubetra***Whinchat**

Material. El Moghra – one male (FMNH 291547, PLA 200), 17 April 1977, testes: not enlarged.

Comments. This species has been recorded on passage on a few occasions in the Western Desert oases. In the Siwa Oasis it has been collected between 18 and 19 April (Moreau 1941) and on 23 September (Steinbacher 1965). In the Dakhla Oasis one bird was observed on 3 October and 12 on 4 October (Scharlau 1963).

*Saxicola torquata***Stonechat**

Observation. 3 km. S. of Qara, 7 March 1976, two-three at well.

Comments. In the Siwa Oasis this species is both a passage and winter visitor. It has been recorded as common in January (Meintzhagen 1922) and between 24 and 28 March (Moreau 1928) and collected between 7 and 13 February (Al-Hussaini 1939).

*Oenanthe isabellina***Isabelline Wheatear**

Material. Qara – one male (FMNH 291480, PLA 146), 6 March 1976, testes: slightly enlarged.

Comments. This species has been previously collected in the Siwa Oasis on 25 March (Moreau 1941) and between 7 and 13 February (Al-Hussaini 1939). The Isabelline Wheatear is both a winter visitor and migrant in the Western Desert oases (Al-Hussaini 1959).

*Oenanthe oenanthe***Wheatear**

Observations. Area around El Moghra, 13 and 14 April 1977. Bir Nahid, 4.5 km. E. of El Moghra, 14 April 1977, one dead in well.

Comments. Moreau (1928) considered this species fairly common in the Siwa Oasis during spring passage. The Armstrong College Expedition found it there between 26 April and 15 May (Moreau 1941).

*Oenanthe deserti homochroa***Desert Wheatear**

Material. 3 km. S. of Qara – one male (FMNH 291481, PLA 159), 8 March 1976, wing: 89, tail: 61 testes: not enlarged.

Comments. This sub-species is an “abundant” winter visitor in the desert around the Siwa Oasis (Meinertzhagen 1930).

*Oenanthe finschii finschii***Finsch's Wheatear**

Material. El Moghra – one female [= male by plumage] (FMNH 297038, HH 8261), 11 May 1975, fat: light, skull: ossified.

Comments. This sub-species is a winter visitor in the Nile Delta and northern Valley eastwards to the Sinai Peninsula (Meinertzhagen 1930). It has not been previously recorded from the Western Desert. The completely white upper-parts, belly and under tail-coverts distinguish this specimen from other *Oenanthe* species.

Oenanthe leucopyga leucopyga **White-crowned Black Wheatear**

Material. Siwa Oasis – one female (FMNH 296936, HH 8231), 1 February 1974, wing: 92, tail: 59. Qara – one male (FMNH 291482, PLA 147), 6 March 1976, wing: 101, tail: 67, testes: left – 4x3, right – 2x1. 3 km. S. of Qara – 2 males (291483, PLA 153; FMNH 291484, PLA 154), 6 March 1976, wing: 103, 99, tail: 68, 69, testes: left – 6x4, 4x3, right – 3x2, 2x1 (respectively).

Observations. 2 km. N. of Qara, 4 March 1976, 5 March 1976, one individual each day.

Comments. This sub-species is a widely distributed breeding resident throughout most of Egypt. In the Siwa Oasis it has been described as the “commonest resident” (Almond 1937), “characteristic bird” (Moreau 1928), and “very common resident. . . , where it is most confiding, breeding in houses and mud walls” (Meinertzhagen 1922). The specimens PLA 153 and 154 have black crowns, indicative of first year birds (Heim de Balsac & Mayaud 1962). However, based on gonad size these two birds were in or approaching breeding condition. Enlarged gonads of birds in sub-adult plumage has been previously reported for this species (e.g. Bannerman 1927), and a male with a black crown and greatly enlarged gonads, collected on 21 February 1951 at Beni Abbes, Algeria (FMNH 209588), is another example.

*Turdus merula***Blackbird**

Material. El Moghra – one female (FMNH 296938, HH 8232), 10 February 1974.

Observation. 10 km. E. of El Zeitun, 9 March 1976, one bird.

Comments. These records appear to be the first of this species in the Western Desert. The Blackbird is a migrant and winter visitor in Egypt, predominantly in the north.

*Acrocephalus scirpaceus***Reed Warbler**

Observation. S. edge of El Moghra, 14 April 1977, one dead.

Comments. The only other published record that we are aware of for this species in the Western Desert is a male obtained by Al-Hussaini (1938) in February at El Qasr, Bahariya Oasis. Unidentified *Acrocephalus* sp. were observed by PLA 2 km. N. of Qara on 4 March 1976.

*Sylvia cantillans***Subalpine Warbler**

Material. Qaneitra Crossing, 100 km. N.E. of Qara, in acacia grove – one male (FMNH 291486, PLA 151), 7 March 1976, testes: slightly enlarged. 1 km. S. of El Moghra – one female (FMNH 291549, PLA 181), 16 April 1977, ovary: slightly enlarged.

Comments. Other records of this species on spring migration in the Western Desert include: one male taken on 25 March at Bir Hassunah, Siwa Oasis (Moreau 1928); and another on 24 March in the Bahariya Oasis (Moreau 1927).

*Sylvia rueppelli***Rüppell's Warbler**

Material. Qaneitra Crossing, 100 km NE of Qara, in acacia grove – one male (FMNH 291485, PLA 152), 7 March 1976, testes: slightly enlarged.

Comments. This species is strictly a passage migrant in Egypt. Moreau (1927, 1928) observed three Rüppell's Warblers between 20 and 24 March in the Bahariya Oasis and one each day on 25 and 27 March at Bir Hassunah, Siwa Oasis. The only other record of which we are aware from the Western Desert is one bird observed by Scharlau (1963) in the Dakhla Oasis between 2 and 4 October.

*Sylvia communis***Whitethroat**

Material. 1 km. S. of El Moghra – one male (FMNH 291550, PLA 182), 16 April 1977, testes: slightly enlarged. El Moghra – one male, one female (FMNH 291551, PLA 194; FMNH 291552, PLA 203), 17 April 1977, 18 April 1977, testes: slightly enlarged, ovary: not enlarged (respectively).

Comments. Hitherto the only records of this species from the Western Desert are from 80 km. N.E. of Kharga in mid-August and in the Siwa Oasis in mid-late September (Kiepenheuer and Linsenmair 1965); in the Farafra Oasis on 27 April (Meininger, Mullié & Goodman; *pers. obs.*, 1981); and a partially decomposed specimen was picked up at the resthouse approximately halfway between the Bahariya Oasis and Cairo on 29 April 1981 (UMMZ 204, 282). All of these records are of migrants.

*Phylloscopus collybita***Chiffchaff**

Material. El Zeitun – one female (FMNH 291487, PLA 160), 9 March 1976, ovary: not enlarged.

Comments. Al-Hussaini (1959) considered this species a common winter visitor to all of the Western Desert oases. Both nominate *collybita* and *abietinus* have been found in Egypt (Vaurie 1959). Meinertzhagen (1922) and Al-Hussaini (1939) listed the winter visitors to the Siwa Oasis as nominate *collybita*. On the basis of vocalization, Moreau (1928) identified *abietinus* in late March in the Siwa Oasis. The specimen cannot be confidently assigned to either form.

*Muscicapa striata***Spotted Flycatcher**

Material. El Moghra – one male (FMNH 297045, HH 8262), 11 May 1975, fat: none, skull ossified.

Observations. 1 km.S. of El Moghra, 13 April 1977, one bird. El Moghra, 20 April 1977, several.

Comments. This species has been noted several times during spring migration near the Siwa Oasis. The Armstrong College Expedition collected birds on 27 April and 11 May (Moreau 1941), and Kiepenheuer and Linsenmair (1965) observed many there between 14 and 15 May.

*Ficedula hypoleuca***Pied Flycatcher**

Material. El Moghra – 1 male, 2 females (FMNH 297044, HH 8282; FMNH 291555, PLA 195; FMNH 291556, PLA 201), 16 May 1975, 17 April 1977 (both females), ovary: not enlarged (both female), fat: medium (male). 1 km. S. of El Moghra – 1 male (FMNH 291554, PLA 179), 14 April 1977, testes: not enlarged.

Observations. Qaret Nanous, 8 km. E. of El Moghra, 13 April 1977, one dying in acacia grove. N.W. of Cicely Hill, 19 April 1977.

Comments. The only other published record that we know of for the Pied Flycatcher on spring migration in the Western Desert is a male found between 10 and 13 April in the Dakhla Oasis (Moreau 1927).

*Oriolus oriolus***Golden Oriole**

Material. El Moghra – one female, one male (FMNH 297032, HH 8269; FMNH 297033, HH 8279), 13 May 1975, 15 May 1975, fat: medium, heavy (respectively), skull: ossified (both).

Observations. Acacia grove, near Qaret Nanous, 8 km. E. of El Moghra, 13 April 1977, four birds. El Moghra, 17 April 1977, four birds.

Comments. Meinertzhagen (1930) knew of no spring passage records from the Western Desert excluding the Faiyum and Wadi Natroun. Since then it has been recorded on several occasions: on 14 and 15 May in the Siwa Oasis (Kiepenheuer & Linsenmair 1965); and in the Bahariya Oasis on 28 April where it was a pest to the ripening mulberry *Morus* sp. crop and consequently was hunted (Meininger, Mullié & Goodman, *pers. obs.*, 1981).

*Lanius senator***Woodchat Shrike**

Material. El Moghra – one female (FMNH 297047, HH 8280), 16 May 1975, fat: medium, skull: ossified.

Observations: Bir Nahid, 4.5 km. E. of El Moghra, 14 April 1977, one in marsh. El Moghra, 15 April 1977, one perched in tamarisk. El Moghra, 17 April 1977, one bird. Minqar Abu Dweiss, 20 April 1977, one bird. El Moghra, 20 April 1977.

Comments. This species has been recorded on spring passage throughout the Western Desert oases. Specimens were collected by the Armstrong College Expedition in the Siwa Oasis on 17 and 18 April (Moreau 1941).

*Corvus ruficollis***Brown-necked Raven**

Observations. 3 km. S. of Qara, 7 March 1976, several at well. Ras el Qattara, 2 April 1977, several along base of cliffs. Minqar Abu Dweiss, 14 April 1977, two in acacia grove. El Moghra, 14 April 1977, pair attending nest in acacia tree.

Comments. According to Al-Hussaini (1959) this species is a resident in all of the Western Desert oases. In the Siwa Oasis, Almond (1937) saw flocks of 10-20 individuals in mid-March and Meinertzhagen (1930) found them nesting in palm trees and on cliffs.

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SUMMARY

This paper is a summation of bird collections and observations obtained in the Siwa Oasis and Qattara Depression, Western Desert, Egypt. A total of 69 species is reported, of which 45 have specimen documentation. The majority of the material was obtained during spring migration. Of the 69 species, about 12 (17.4%) are possible or known breeding residents and 57 (82.6%) are strictly Palearctic migrants and/or winter visitors. Information is also summarized for spring migration in some of the other Western Desert oases for species reported herein. Species that hitherto had not been recorded from the area include: *Pandion haliaetus*, *Milvus m. migrans*, *Charadrius alexandrinus*, *Otus scops*, *Oenanthe finschii finschii* and *Turdus merula*.

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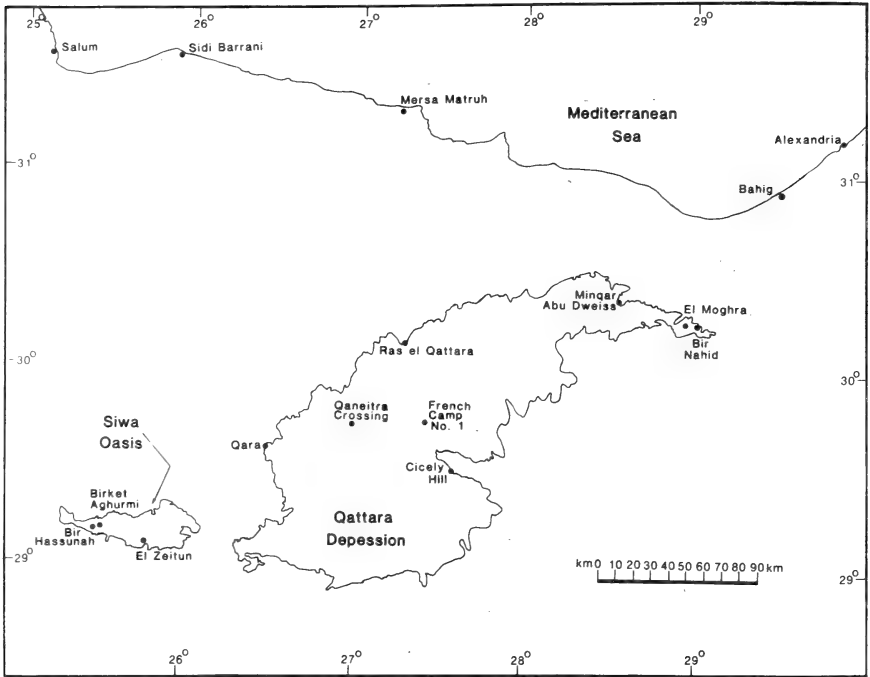


Figure 1. Map of the Siwa Oasis and Qattara Depression, Western Desert, Egypt.
(N.B. the contour line represents sea level)

COORDINATES OF THE SIWA OASIS
AND QATTARA DEPRESSION LOCALITIES MENTIONED IN THE TEXT.¹

Locality	N. Latitude		E. Longitude	
	(°)	(')	(°)	(')
Bir Hassunah, Siwa Oasis	29	11	25	30
Bir Nahid, Qattara Depression	30	14	28	58
Cicely Hill, Qattara Depression	29	31	27	34
El Moghra ² , Qattara Depression	30	14	28	56
El Zeitun, Siwa Oasis	29	11	25	43
Lake (Birket) Aghurmi, Siwa Oasis	29	12	25	33
Minqar Abu Dweiss ³ , Qattara Depression	30	24	28	32
Qaneitra Crossing, Qattara Depression	29	42	27	01
Qara, Qattara Depression	29	36	26	31
Ras el Qattara, Qattara Depression	30	10	27	17

¹All localities in Matruh Governorate

²Also spelt El Magrha, El Maghrah, El Magrah and El Maghara

³Also spelt Minqar Abu Duways

COURTSHIP BEHAVIOUR BETWEEN TREE SPARROW AND HOUSE SPARROW IN THE WILD – A POSSIBLE CASE OF HYBRIDIZATION

by

J. S. M. Albrecht

INTRODUCTION

There are a number of reports of House Sparrow *Passer domesticus* x Tree Sparrow *P. montanus* hybrids in the literature (e.g. Nichols (1919); Meise (1934 and 1951); Richardson (1957); Rooke (1957) and Arnott (1981)) but little information as to how these might have arisen. Cheke (1969) reported a cross-fostering experiment he performed in which House Sparrows were induced to rear young Tree Sparrows and vice versa. In the following season he found hybrids produced which appeared to have been fathered by a cross-fostered House Sparrow. He suggested that the House Sparrow had learnt from its foster parents and had thus mated with a female Tree Sparrow. Cheke further suggested that this could provide a mechanism for the production of hybrids in the wild. If one species usurped the other from its nest after it had laid, then natural egg transfer could occur and Tree Sparrows rear House Sparrows or vice versa. When the fostered nestlings bred the following season natural hybrids could result. However, although both species apparently do usurp each other's nests, there are no records of cross-fostering or hybrids resulting in nature. The observation described here suggests an alternative and simpler mechanism for the production of hybrids in the wild.

OBSERVATION

The observation took place between 0750 hrs. and 0900 hrs. on 22 June 1978 at Ereğli in Zonguldak province on the Black Sea Coast of Turkey. The Tree sparrow was first noticed displaying on a building next to a road with fields on one side and a steep, bush-covered hill on the other. After about 15 minutes a female House Sparrow appeared carrying food (possibly a small grasshopper). There was extensive display between the two for about 4 minutes, after which the female left the food in a possible nest site (under the eaves by a gutter pipe) and departed almost at once. The male (Tree Sparrow) then went to the site, and appeared to eat the food. He remained by the site, alert and looking round as if expecting something else to happen. About 7 minutes later, the female House Sparrow returned and the Tree Sparrow immediately attempted to mount and copulate with her. There was much 'flying in a ball in the air', but mounting was not achieved. About 5 minutes later, however, there was more display and this was concluded by apparently successful mounting and copulation. That these two sparrows were paired was further suggested by their response to other sparrows. When other House Sparrows (male or female) approached the pair the Tree Sparrow gave extensive alarm calls and threat display (he cocked his tail and stretched his neck up).

Unfortunately I had to leave Turkey within a few days of the observation and so was unable to follow the outcome. Twelve months later I visited the site again but saw only House Sparrows with no sign of Tree Sparrows or hybrids.

DISCUSSION

The Tree Sparrow is very rare in this part of Turkey. What was probably the same bird was seen in the same place on 30 May 1978 and this had been the first sighting of the species at the locality in 18 months. It seems likely, therefore, that this particular Tree Sparrow had arrived in the area in May and then paired with a female House Sparrow and it is unlikely that either of the sparrows had been fostered by the other species. (Similarly the hybridization reported by Meise (1951)

occurred in an aviary where there was no report of cross-fostering. A male House Sparrow paired with a female Tree Sparrow and produced 31 eggs and 7 young over 2 years.)

While it is impossible to know how this Turkish pair became established, it seems likely that the presence of a single Tree Sparrow in a flock of House Sparrows combined with the similarity of the two species' plumage may have been sufficient for pairing. It is well known that, at least in Britain, the range and density of Tree Sparrows can fluctuate markedly over short periods of time (Sharrock 1976) and that even after years of expansion the species can still be only local (Hughes & Dougharty 1975). The combination of fluctuations and local distribution could well produce a single Tree Sparrow amongst House Sparrows and this may well have been responsible for the production of the various wild hybrids reported. The situation on Fair Isle, an island midway between the Orkney Isles and the Shetland Isles to the north of Scotland, is of relevance in this respect. On Fair Isle Tree Sparrows occur most frequently on spring migration in May and early June. Sometimes up to six Tree Sparrows remain on the island throughout the summer and these occasionally breed. There is a resident population of House Sparrows on Fair Isle of 50-100 pairs and these therefore greatly outnumber any Tree Sparrows that occur. Consequently, the same situation occurs as that observed at Ereğli in 1978; namely an odd Tree Sparrow amongst a colony of House Sparrows. Furthermore, hybrid House x Tree Sparrows have been reported in three of the last 20 years: a probably hybrid in 1962 (Davis 1963), a hybrid in 1977 (Waterston 1978) and up to five in 1980 (Arnott 1981). Again, it seems highly improbable that either parent had been cross-fostered. Instead, a mechanism involving the presence of a single Tree Sparrow in a colony of House Sparrows seems more likely to have produced the observed hybrids.

In conclusion, it seems that the presence of a single member of one species in a flock of a related species may be responsible for many of the wild hybrids reported e.g. Cox & Inskipp (1978) for wagtails and Taverner (1970 a, 1970 b) for gulls. Further field observations of inter-specific behaviour would not only help our understanding of the mechanism of hybridization but might also elucidate the problem of speciation. The author would be pleased to hear from anyone with relevant information.

SUMMARY

1. Courtship behaviour leading to copulation between a male Tree Sparrow and a female House Sparrow is described.
2. It is unlikely that either bird had been fostered by the other species.
3. Similarity in plumage together with the lack of other Tree Sparrows is thought to have led to pairing.
4. This observation may be relevant to the production of many of the wild hybrids that have been reported.

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THE OCCURRENCE OF SAUNDER'S LITTLE TERN IN THE UPPER ARABIAN GULF

by

C. J. O. Harrison

I recently examined the specimens of small terns in the collection of the British Museum (Natural History), to determine the likelihood of the occurrence of Saunder's Little Tern *Sterna saundersi* in the upper part of the Arabian Gulf, and also to check the plumage characters used for identification.

The Little Tern *S. albifrons*, with which the previous species can be confused, often has a pale grey rump in newly-moulted plumage. This is a little paler than the grey of the back, and fades to white. Saunder's Little Tern has a more definite grey rump and a pale grey back. In good plumage in good light a bird which has a grey rump apparently concolorous with the back would be more likely to be Saunder's Little Tern than a Little Tern, but the variability of this character in the latter should be taken into account. The so-called intermediate form from the head of the Gulf, *praetermissa* Baker 1928, is based on grey-rumped Little Terns.

Examining the bird in the hand or in the museum, Saunder's Little Tern has the upper surface of the *three* outermost primaries black or dark blackish-grey. In the Little Tern the upper surface of the *two* outermost primaries is blackish, often but not invariably suffused with grey. The white forehead patch in Saunder's Little Tern has lateral extensions that tend to terminate abruptly, level with the anterior edge of the orbit; whereas in the Little Tern these taper away over the eyes as narrow wedges. There is some variation in this character in museum skins but this may be due to distortion of the skin during preparation. The head patterns of the two terns are illustrated in *Figure 1*.

Leg colour is not a good character in museum specimens. In the field the Little Terns of the Gulf have orange legs and feet, although those of European birds are yellow. Saunder's Little Tern has the legs and feet darker, more variable and often reddish-brown.

Using the above plumage characters it is possible to separate museum specimens from the upper part of the Arabian Gulf into the two species. Ticehurst *et al.* (1922) were in error in stating that these were all referable to the Little Tern. Both species were present at Fao when W. D. Cummings collected specimens there in 1886. Of his specimens, No. 1886.12.6.114 collected 20 August 1886, No. 1886.12.6.115 collected 22 August 1886, and No. 1895.21.15.33 are all Saunder's Little Tern; as are also No. 1886.7.1.38 collected by A. J. V. Palmer in February 1885 at Bushire on the south-west coast of Iran, and No. 1853.1.6.74 collected by K. Loftus at Mohammerah (now Khoramshahr), south-west Iran. Two come from well inland. No. 1933.2.16.669 was collected by P. A. Buxton on 2 September 1918 at Amara, Iraq about 150 miles up the Tigris. A bird collected by A. C. Trott on 5 May 1946 five miles north of Ahwaz, south-west Iran, No. 1947.59.36, is also Saunder's Little Tern, although the rump is distinctly white. The locality is about 100 miles up the Karun River. It has the testes enlarged and a note on the label states "common on islands in temporary lagoons - preparing to lay."

The specimens indicate that at a period when birds were being collected Saunder's Little Tern was present and possibly breeding in the upper part of the Arabian Gulf, but was confused with Little Terns that were also present. The lack of subsequent information coincides with the cessation of collecting as a means of identification.

Unless diagnostic characters can be clearly studied it is difficult to be certain of the specific identity of individual birds of these two species seen in the field. Increasing knowledge of the characters of the species should enable us to clarify the present situation to some degree, although in many instances observers in the field may have to satisfy themselves with the knowledge that what they have seen was a small tern that might have been referable to either species.

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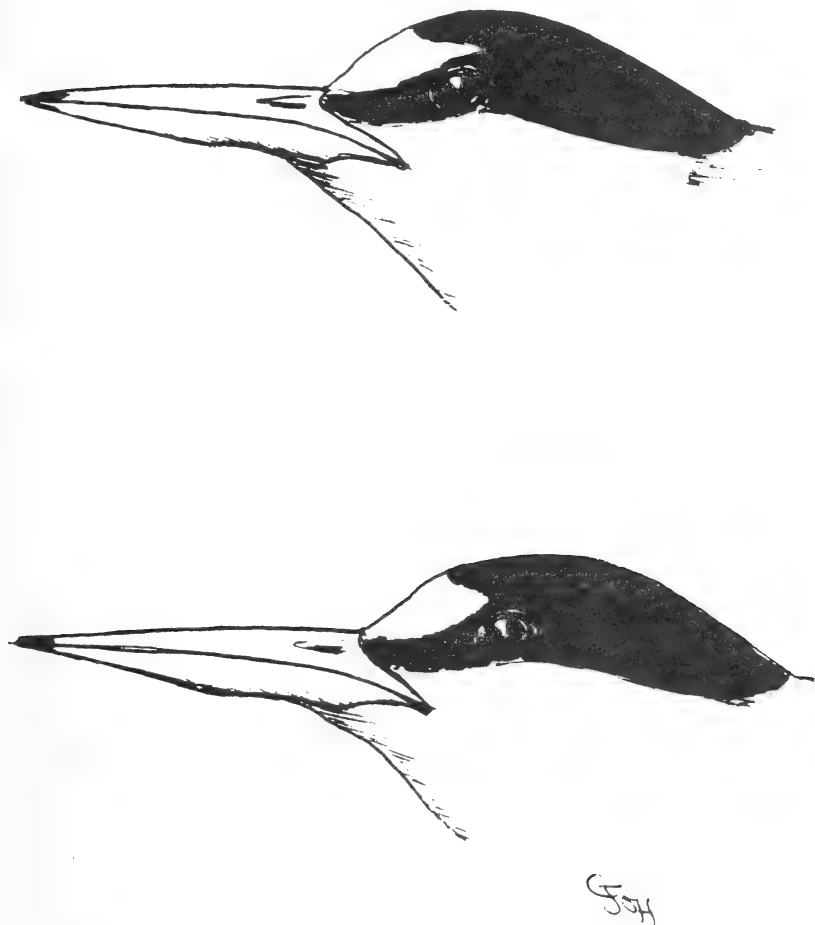


Figure 1 Head patterns of (top) Little Tern and (bottom) Saunder's Little Tern.

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THE FIRST IDENTIFICATION OF THE EASTERN PIED WHEATEAR IN JORDAN

by

D. I. M. Wallace

INTRODUCTION

On 29 April 1965, I. J. Ferguson-Lees and I travelled along the pipeline highway which crosses the basalt shield from north-west of Azraq to the H4 pumping station, Jordan. At the point where the road crossed Wadi Rajil and to the east of there, we saw seven 'black wheatears' which fitted neither the Black *Oenanthe leucura* nor the White-crowned Black *Oenanthe leucopyga*. Very puzzled, we watched at least five birds (four in pairs) closely on foot and ascertained that the other two were clearly of the same species. On 30 April, a more hurried return journey took us back through the same community and we saw three birds. Notes and sketches made of the birds on the 29th were fully confirmed. This material was taken to the British Museum of Natural History and compared to the *Oenanthe* skins there on 12 May and 8 June. Our conviction that the birds were not of any species of 'black wheatear' then known to us (the two named above and the southern Arabian and northeast African forms of *Oenanthe lugens*) was confirmed and eventually we identified them as belonging to the black phase *opistholeuca* of the Eastern Pied (Strickland's) Wheatear *Oenanthe picata*. The reasons why we did so are given below in an account of the observations.

CIRCUMSTANCES OF OBSERVATIONS

Unhurried on 29 April, with the birds clearly on territory in the natural defile of Wadi Rajil and along the artificial one of the pipeline highway; range from 150 down to 30 metres; watched in full sunlight through 9 × 35 and 12 × 50 binoculars. Hurried on 30th, with observations made merely to confirm description taken on 29th.

HABITAT AND AVIAN COMMUNITY

Higher levels of basalt shield, particularly in defiles and along cleared boulders beside road, with birds perched on both boulders and telegraph wires, on ground between boulders, and flying over both sloping and level shield. Occurring in such habitat with Desert Lark *Ammomanes deserti (annae)* and, where silt pans exist, occasional pairs or groups of Dunn's Lark *Eremalauda dunnii*, Bar-tailed Desert Lark *Ammonanes cincturus*, Lesser Short-toed Lark *Calandrella rufescens*, Crested Lark *Galerida cristata*, Temminck's Horned Lark *Eremophila bilopha*, Desert Wheatear *Oenanthe deserti* and Trumpeter Finch *Bucanetes githaginea*.

DESCRIPTION

Size: no direct comparison with other *Oenanthe* possible; noticeably smaller and more slightly built than *Oenanthe leucura* (absent from Jordan but well known to both observers) and *Oenanthe leucopyga* (present in southern Jordan and fully observed by both observers in April 1963). Structure: smaller-headed, shorter-billed and shorter-tailed than *Oenanthe leucopyga*; head quite rounded in shape, bill quite small and not long, as in *Oenanthe oenanthe*. Bare part colours: bill and legs black. Plumage colours: black except for blackish (folded) primaries and sharply contrasting white rump, upper tail coverts, vent, under tail coverts and basal outer sections of tail; plumage of males slightly glossed; in flight primaries appeared pale grey, particularly from below, and contrasted markedly with black under and upper wing coverts (in same way as those of Mourning Wheatear *Oenanthe lugens* and Hooded Wheatear *Oenanthe monacha* but not as sharply); tail showed broad terminal band of black with short central extension towards rump, this pattern recalling that of *Oenanthe oenanthe* (not that of *Oenanthe leucopyga*) and creating prominent inverted T.

BEHAVIOUR AND VOICE

All birds quite shy (and difficult to approach); when undisturbed, males very active and behaving territorially, performing hovering flights, and noisy (but unfortunately no notation of calls or song made).

IDENTIFICATION

Although size and structure were against both *Oenanthe leucura* and black-crowned *Oenanthe leucopyga* and known distribution and habitat data virtually excluded both, the birds were not identified in the field. Their final separation rested on underwing pattern, which excluded both *Oenanthe leucura* and *Oenanthe leucopyga* and tail pattern, which further excluded *Oenanthe leucopyga*. The patterns were matched in skins of *Oenanthe picata* and all other characters fitted that species, in its black phase *opistholeuca*. Habitat within range of that described by Ali and Ripley (1973). Field sketches are reproduced in *Figure 1*.

It was intended to collect a specimen of the species in April 1966 but this proved impossible. In the spring of 1972, however, I was able to watch many *Oenanthe picata*, in the white phase *picata*, in south-eastern Iran. Although very different in general appearance, with their underpart pattern making them close in looks to Hume's Wheatear *Oenanthe alboniger*, their size, structure and behaviour seemed identical to those of the Jordan birds.

DISCUSSION

It is surprising that *Oenanthe picata* could exist in the Jebel Druz's southern shield without discovery until 1965. Meinertzhagen's classic journey east from Amman in October 1922 did, however, pass well south of the pipeline and I can find no reference elsewhere to even a suspicion of the bird. Clarke (1981) has confirmed its presence between H5 and the eastern edge of the basalt shield in November 1976 and February and June 1979 and added records of birds to the south of the presumed breeding area in June and September and to the south west in February. I have also examined a description of a 'black wheatear' at Eilat, Israel in December 1982 which strongly recalled *O. picata*. It looks as if the bird's population in Jordan is mainly resident or subject only to local movement, as is that in southern Iran, and Pakistan (Ali & Ripley 1973; Harrison 1981).

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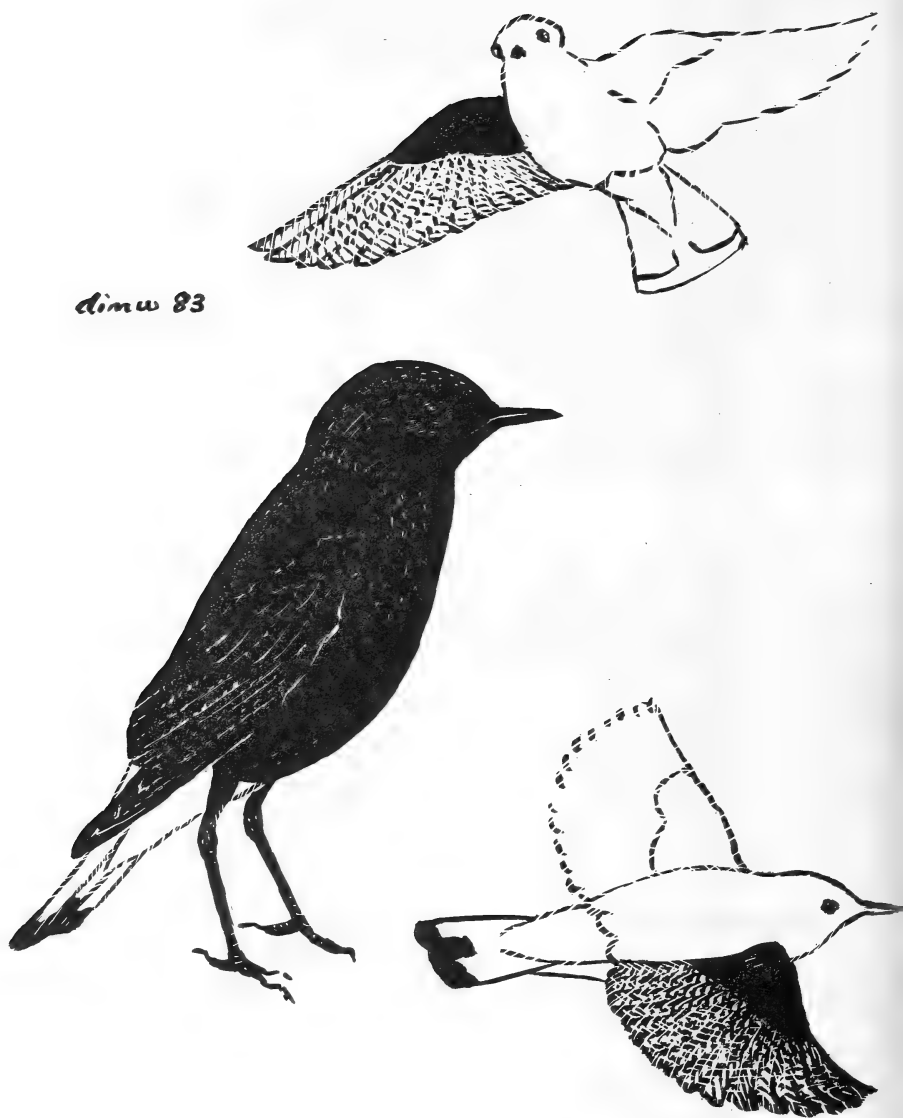


Figure 1. Copies of field sketches of Strickland's Wheatear, made at Wadi Rajil on 29 April 1965.
Left: perched; right: under and upper wing patterns.

AN ANALYSIS OF SOME EAGLE OWL PELLETS FROM TURKEY

by

David Morgan

INTRODUCTION

On 15 April 1981, whilst on the ICBP Middle East Bustard Survey (Part 1), Don Parr and Paul Goriup collected a number of Eagle Owl *Bubo bubo* pellets from a roost on a rocky hillock on the northern shores of Lake Van (Eastern Turkey). The surrounding habitat was fairly open with many rocky outcrops, some fallow pasture and some cereal cultivation; the altitude was 1,700 metres above sea level. The owl had been heard during the previous evening and the roost was discovered shortly after dawn when the bird was flushed from a rocky cleft. At Don Parr's request I have analysed the pellets with the following results.

METHODS

The pellets were dissected dry and the skeletal contents identified with assistance from several sources. The results are shown in TABLE I. The number of individuals of each species present was determined by taking the maximum figure from a count of the skulls, lower right and lower left mandibles. Thus the figure shown is the minimum number of individuals taken. The weights of two of the birds were estimated by a calculation given by Morris in Yalden (1977) using the length of the humerus. The other bird had no humeri present but from bill shape was adjudged to be a small finch or sparrow. In order to prevent distortion being caused by the weight difference of the prey species, the percentage of the diet was calculated for each species by multiplying the number of individuals caught by their average weight and expressing this as a percentage of the total weight of victims caught.

TABLE I. CONTENTS OF CIRCA 20 EAGLE OWL *Bubo bubo* PELLETS COLLECTED FROM A ROOST ON THE NORTHERN SHORE OF LAKE VAN, TURKEY ON 15 APRIL 1981

Species	No. of individuals	Average weight	Percentage by weight
Golden Hamster <i>Mesocricetus auratus</i>	19	115 gm.	73.0
Common Vole <i>Microtus arvalis</i>	7	20 gm.	4.7
Grey Hamster <i>Cricetulus migratorius</i>	2	35 gm.	2.3
House Mouse <i>Mus musculus</i>	3	20 gm.	2.0
Wood Mouse <i>Apodemus sylvaticus</i>	2	20 gm.	1.3
Birds (unidentified) (228 + 250 + 20gm)	3	total 498 gm.	16.7
	36		100.0

DISCUSSION

The number of pellets present at the roost was unfortunately not sufficient for a very accurate assessment of the bird's diet, especially in view of the large size of some of the items taken. The dominance of the Golden Hamster *Mesocricetus auratus* was considerable and it seems unlikely that this was entirely due to chance; however these pellets are likely to represent only a short period of time and the diets of Eagle Owls *Bubo bubo* can vary seasonally as shown by Förstel (1977). With large prey items being taken there is no guarantee that the whole of each victim has been eaten and

this should be borne in mind when considering the percentage by weight figures. No previous published analysis of Turkish Eagle Owl diets could be found but there are published studies from other areas. The Eagle Owl has a wide geographical distribution and is found in a great variety of habitats (Harrison 1982). The diet can vary considerably, both from year to year in the same territory and between territories in the same habitat in the same year (Bezzel *et al* 1976). The general impression from the available literature was that the Eagle Owl is a very adaptable species and its diet can be extremely variable. The only paper consulted that showed Golden Hamsters *M. auratus* to be taken was Baumgart (1975). He showed that at various sites in Bulgaria where this prey species did occur, it always formed an important part of the diet. Birds are often taken by Eagle Owls and a very wide variety has been recorded as shown by Baumgart (1975), Bezzel *et al* (1976), Förstel (1977), Piechocki *et al* (1977) and Schumacher *et al* (1975). Two of the birds taken in this study were quite large and even though small in number, birds accounted for 16.7 per cent of the diet by weight, this again emphasizing the problem of a small pellet sample size. It is also not clear whether both of the large birds were eaten completely. The results shown here give some idea of the sort of food that may be taken by the Eagle Owl in Turkey but further sampling would be needed to obtain an accurate picture of the diet.

ACKNOWLEDGEMENTS

I would like to thank David L. Harrison of the Harrison Zoological Museum and P. D. Jenkins of the British Museum (Natural History) for their invaluable help in identifying some of the skeletal remains.

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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 Palearctic fringe of Pakistan in the east, the southern shores of the Black and Caspian Seas in the north to the Arabian peninsula and the Palearctic limits in the Sudan and Ethiopia in the south.

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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 *Sandgrouse* 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.

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CORRIGENDA

Sandgrouse 4, 1982

Observations on migrant birds at Azraq and North-East Jordan, up to April 1967 by D. I. M. Wallace. pp 77-113:

p.94 line 29 *amend* species names to "*Ficedula hypoleuca* Pied Flycatcher"

Contents (second page):

Amend page numbers as follows:

107	The Autumn Migration of Steppe Eagles	to 108
109	The Houbara Bustard in Jordan	to 111
111	A Breeding Record of the Lappet-faced Vulture	to 114
113	A Small Ostrich Egg from Egypt	to 116





