

## **Report on two small bird collections from the Gebel Elba region, southeastern Egypt**

by

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### **Introduction**

The specimens that are the subject of this paper are from two separate collections and were obtained in southeastern Egypt, predominantly in the Gebel Elba region. This area is defined here for convenience rather than by distinct geographical boundaries as 25° N. to the north, the Sudanese political border to the south, the Red Sea coast to the east and 33° E. to the west. In a few cases material collected outside of this area is presented to further document new or unusual distributional information.

In 1954, 1964 and 1967 expeditions under the direction of Dr. Harry Hoogstraal, Medical Zoology Department, U.S. Naval Medical Research Unit No. 3 (NAMRU-3) visited the area to make collections of vertebrates and their ectoparasites. Many of the results of the 1954 expedition have been previously published; the introduction and itinerary by Hoogstraal et al. (1957 a), the ectoparasites by Hoogstraal et al. (1957 b), the reptiles and amphibians by Schmidt & Marx (1957), and the mammals by Hoogstraal et al. (1957 b). The birds collected remain hitherto unpublished. Although Vaurie examined some of these specimens for his reviews of Palearctic birds (1959, 1965 and earlier papers in "Systematic Notes on Palearctic Birds" 1954-1964, published as a 53-part series in *American Museum Novitates*), he seldom made reference to a specific specimen. On the 1964 and 1967 expeditions birds were collected by Mr. Ibrahim Helmy and Dr. Dale Osborn. The vertebrate specimens from these collections are housed in the Field Museum of Natural History (FMNH), Chicago and a portion are part of the Conover Collection (CC) in the FMNH, except for one specimen which is in the American Museum of Natural History (AMNH), New York.

The second collection was secured in 1938 and early 1939 by Lewa Abdallah El Negumi and party on an expedition to the area that was affiliated with the Zoological Society of Egypt (Greaves, 1939). I have not been able to determine if the party was in the region continuously during this period or on separate expeditions. All of the specimens reported from this collection are housed in the

Giza Zoological Museum (GZM), Cairo. I was not able to examine some specimens which were prepared as life-like mounts and are currently on exhibition in the public portion of the museum. Several of the birds obtained on this expedition were reported by El Negumi (1949) and El Negumi et al. (1950). Neither of these works critically evaluated nor summarized the specimens.

The only other major bird collection from the area appears to be that obtained by Schrader for Meinertzhagen in 1928 and cursorily referred to in Meinertzhagen (1930). Most of this collection is housed in the British Museum (Natural History) (BMNH), Tring and a small portion is in the AMNH. Although not presented in the annotated list below, many of the Meinertzhagen specimens have been examined and in a few cases compared to birds from the Hoogstraal collection.

Wherever possible the gazetteers of Osborn & Helmy (1980) and United States Board on Geographic Names (1959) have been followed for Egyptian locality spellings and coordinates. Specimen collection localities mentioned in the text (locality, governorate<sup>1</sup>, coordinates) include:

Bir Abraq, RSG, 23°25'N, 34°48'E  
 Bir Kansisrob, SGAA, 22°15'N, 36°22'E  
 Gebel Abraq, RSG, 23°23'N, 34°45'E  
 Gebel Elba, SGAA, 22°11'N, 36°21'E  
 Gebel Kansathrope, not located  
 Gebel Shallal (Shellal), SGAA, 22°01'N, 36°30'E  
 Mersa Halaib, SGAA, 22°13'N, 36°38'E  
 Wadi Akwamtra, SGAA, 22°13'N, 36°18'E  
 Wadi Darawena, SGAA, 22°11'N, 36°22'E  
 Wadi Hareitra, SGAA, 22°05'N, 36°07'E  
 Wadi Hodein, RSG, 23°04'N, 35°30'E  
 Wadi Jahliyah (Gaela of El Negumi), RSG, 23°31'N, 35°08'E  
 Wadi Kansathrope, not located  
 Wadi Kansisrob, SGAA, 22°15'N, 36°22'E  
 Wadi Naam, RSG, 23°18'N, 34°59'E  
 Wadi Rabdate (Rabdeit), SGAA, 22°11'N, 36°24'E  
 Wadi Shaab, SGAA, 22°48'N, 35°33'E  
 Wadi Shallal (Shellal), SGAA, 22°12'N, 36°40'E  
 Wadi Sid Abgouab, not located  
 Wadi Sukkari, RSG, 25°03'N, 34°49'E  
 Wadi Umm Taghir, RSG, 26°41'N, 33°46'E  
 Wadi Yoider, SGAA, 22°17'N, 36°18'E

Unless otherwise noted all specimens are skins and in adult plumage. Dr. Hoogstraal's (HH) original field numbers have been included after the museum number. All measurements are in mm and when ranges are given, these are generally followed (in parentheses) by the mean measurement and the number

<sup>1</sup> RSG = Red Sea Governorate; SGAA — Sudan Government Administration Area, which is within the political boundaries of Egypt, but under the legal jurisdiction of the Sudanese Government.

of individuals measured (n). The wing measurement given is the arc (flattened wing). The tarsus and tail were measured in the standard manner. The systematic order and English names generally follow Vaurie (1959, 1965), and Hall & Moreau (1970) and Snow (1978) for non-Palaearctic forms. General distributional information was obtained from these four works, Mackworth-Praed & Grant (1957) and other sources cited herein.

### Description of area

Gebel Elba and nearby mountains are part of the southern Egyptian Red Sea Mountains and the northern Etbai Range. They are primarily granitic in nature. The principal mountains mentioned in this paper are Gebel Elba (1465 m) and Gebel Shallal (1409 m). These mountains are intersected by a series of deeply cut wadis that serve as drainage systems communicating water westwards towards the Nile Valley and eastwards to the Red Sea. East of the mountains are gently sloping plains that meet the Red Sea, and west are the vast, virtually barren sand sheets of the Eastern Desert.

This area is exceptional for Egypt, in that it periodically receives considerable amounts of rain. Schweinfurth (1865) reported continuous rain for 14 days starting in the middle of May. Ball (1912) describes the mountains as often being shrouded in mist and during a stay of 10 days in April and May only 3 days were clear. During the NAMRU-3 1954 expedition (23.II to 14.III) dew fell nightly (Hoogstraal et al., 1957 a). North of the Elba group near Bir Abraç the climate is more typical of the Egyptian Red Sea coast, being hot and dry (Hoogstraal et al., 1957 a).

The region is a transitional zone between the Palaearctic and Afrotropical (= Ethiopian Region, see Benson et al., 1979) biogeographical regions. A total of 458 species of plants have been recorded from the area (Kassas & Zahran, 1971), making it the richest in species diversity in Egypt. The phytogeographical affinities are distinctly those of the Afrotropical Region (Schweinfurth, 1868; Fahmy, 1936). See the following works for more information on the geology and geography (Ball, 1912), the plant communities (Kassas & Zahran, 1971), the reptiles and amphibians (Schmidt & Marx, 1957), the mammals (Hoogstraal et al., 1957 b; Osborn & Helmy, 1980) and the human inhabitants (Clark, 1938) of the area.

### Annotated list

*Struthio camelus camelus*. — Tributary of Wadi Hareitra: 1 ♂ (FMNH 279307, HH 8185), 20. II. 1967, wing 460 (approximately), tail 510, tarsus 485 (approximately); 1 unsexed immature (FMNH 279306, HH 8186), 20. II. 1967, tail 31, tarsus 90. Wadi Yoider: 2 fresh whole eggs (FMNH egg collection 3480, HH

8187, 8188), 14. II. 1967, greatest length X greatest breadth 165 X 142, 167 X 143. — According to Cramp & Simmons (1977) and many others the Ostrich was thought to be extinct in Egypt for about 100 years. However, it was recorded in the Western Desert in 1935 (Al-Hussaini, 1959) and is now a breeding resident in the Gebel Elba region. See Goodman et al. (1984) for a review of the Ostrich in Egypt and further descriptions of the above collected material.

*Ardea purpurea purpurea*. — Gebel Elba: 1 ♂ (GZM A2178), 10. III. 1938. Mersa Halaib: 1 ♂ (GZM A2177), 6. III. 1938. — This species is a common spring migrant in most of Egypt from early March to early May (Meinertzhagen, 1930), and has been recorded along the Red Sea coast of Egypt during this period (Borman, 1929; Marchant, 1941).

*Egretta gularis schistacea*. — Wadi Jahliyah: 2 ♂ (GZM A2401, A2402), 20. XII. 1938, colour phase dark, white with some black on neck. Coastal plain, 2 mi N of Bir Kansisrob: 1 ♂ (FMNH 222417, HH 4200), 10. III. 1954, wing 309, tail 102, colour phase dark with some white on throat. — This species has been recorded all along the Red Sea coast of Egypt (Cramp & Simmons, 1977); although there are no breeding records for the northern portions.

*Neophron percnopterus percnopterus*. — Bir Abraq: 1 ♀ (FMNH 222419, HH 4173), 23. II. 1954, wing in molt, tail 236. — An inscription on the data tag reads, "nesting on rock ledge in small, deep valley with spring." Other winter records from the area include those of Cholmley (1897) during early January at Berenice, and Amer et al. (1980) from middle January to early February in the Gebel Elba area.

*Gypaetus barbatus meridionalis*. — Wadi Akwamtra: 1 ♂ immature (FMNH 312438, HH 8190), 27. II. 1964, wing 735, tail 441. — Tregenza (1951) observed this species on numerous occasions during the summer months in the central Red Sea Mountains and was "reasonably certain" that it bred there. Meinertzhagen (1930) also mentioned several records from the country but knew of no specimen material except some heads collected in the desert between the Nile Valley and the Red Sea coast. The only documentation of this species breeding in Egypt is a clutch of eggs taken from a nest on 2. II. 1860 at Damietta (Jourdain, 1934); however, this locality seems an unlikely place for Lammergeyers to breed. Hitherto, the subspecific identity of Egyptian Lammergeyers was unknown (Meinertzhagen, 1930; Vaurie, 1965). Based on its size this specimen is assigned to *meridionalis* (see comparison below).

a) Wing lengths after Vaurie (1965):

ssp. *meridionalis* (ad.): 720–790 (755, n = 26)

ssp. *barbatus* (ad.): 750–805 (780, n = 6)

ssp. *aureus* (ad.) from Europe eastwards to Iran: 760–845 (805, n = 30)

ssp. *aureus* (ad.) from Asia: 750–915 (845, n = 44)

- b) Wing and tail lengths of specimens measured by the author (in the same manner as Vaurie, 1965):  
ssp. *meridionalis* (ad.): 725-740 (733, n = 2); 425-445 (435, n = 2)  
ssp. *meridionalis* (imm. ♂): 745; 440  
ssp. *barbatus* (ad.): 790-830 (811, n = 7); 470-525 (495, n = 7)  
ssp. *barbatus* (imm. ♂): 810; 510  
Wadi Akwamtra specimen (imm. ♂): 735; 440

*Aegyptius tracheliotus*. — Wadi Shallal: 1 ♂ (GZM A2468), 30. XII. 1938. Wadi Yoider: 1 ♀ (FMNH 299495, HH 8189), 14. II. 1967, wing 770, tail 336 (worn). — This species is a local breeding resident in the Gebel Elba region (Bruun et al., 1981).

*Falco naumanni*. — Coastal plain, 2 mi N of Bir Kansisrob: 1 ♀ (FMNH 222420, HH 4202), 11. III. 1954, wing 245, tail 145. — This specimen appears to be the first record of this species from the Gebel Elba region. Although large spring migrational movements have been noted across the Red Sea (Meinertzhagen, 1949) and along the Nile Valley (Meinertzhagen, 1930).

*Falco tinnunculus tinnunculus*. — Coastal plain, 2 mi N of Bir Kansisrob: 1 ♂ (FMNH 222422, HH 4238), 11. III. 1954, wing 235, tail 134. Bir Kansisrob, ± 500 ft alt: 1 ♀ (FMNH 222421, HH 4239), 11. III. 1954, wing 265, tail 155. — This species is a regular spring migrant along the Red Sea coast of Egypt (Borman, 1929; Marchant, 1941). It has been previously collected on 30. III. 1928 at Gebel Elba (Meinertzhagen, 1930).

Vaurie (1965) gave the wing measurement of male *F. t. rupicolaeformis* as 223-247 (mean = 235, n = 17) and female as 230-250 (mean = 240.8, n = 21), and Cramp & Simmons (1980) for male *F. t. tinnunculus* as 233-258 (mean = 246, n = 37) and female as 229-272 (mean = 256, n = 45). The wing measurement of the male specimen falls within the overlap of these two subspecies. Vaurie (1965) described the back colour of male *rupicolaeformis* as being "more vinaceous, less bright pink than in male nominate *tinnunculus*?" The male specimen was compared to a series of *tinnunculus* and *rupicolaeformis* in similar plumage, and based on the plumage characters described by Vaurie the specimen is assigned to the nominate subspecies.

Female *tinnunculus* are also less richly coloured than female *rupicolaeformis* (Vaurie, 1965). A comparison of the second specimen to a series of females of both subspecies taken during the spring, in combination with the wing measurement, clearly indicates that this specimen is also referable to nominate *tinnunculus*.

Several authors, including Meinertzhagen (1954), have questioned the validity of *rupicolaeformis*. After examining a total of 60 specimens from Egypt including both forms, I concur with Vaurie (1965) that they are indeed distinct subspecies. Some confusion may have arisen for earlier workers in distinguishing

between these subspecies because individuals of migratory *tinnunculus* have been collected in Egypt in the late spring when theoretically only the breeding *rupicolaeformis* should be present.

*Ammoperdix heyi cholmleyi*. — Gebel Elba: 1 ♂, 1 ♀ (GZM A2211, A2212), 8. III. 1938, wing 128 (♂), tail 65 (♂). Wadi Sukkari: 1 ♂ (GZM A2395), 19. XII. 1938, wing 123, tail 63. Gebel Kansathrope: 1 ♀ (GZM 2467), 28. XII. 1938, wing 124, tail 62. Bir Kansisrob, ± 500 ft alt: 1 ♂, 1 ♀ (FMNH CC 18927, HH 4187; FMNH CC 18925, HH 4196), 3. III. 1954, 8. III. 1954, wing 129, 127, tail 52, 54. Wadi Hodein: 1 ♀ (AMNH 776764, formerly FMNH CC 18924, HH 4179), 24. II. 1954, wing 129, tail 59. — This species is a breeding resident in the area (Vaurie, 1965). All of the male specimens examined lack the white frontal band and loreal spot which characterizes *A. h. heyi* and *A. h. intermedia* of the Arabian Peninsula. Further, all but one of the males examined are darker than these two forms. The exception is the male from Wadi Sukkari which has a distinctly lighter head and upperparts and less finely vermiculated rump. It closely resembles in plumage colouration specimens of *A. h. nicolli* taken near Wadi Hof (type locality of *nicolli*). All the females are more heavily and darkly barred than a series of female *nicolli* from Wadi Hof; but the differences between the females of these two races are subtle.

Meinertzhagen (1930) defined the range of *nicolli* as the region along the Cairo—Suez road south to approximately 27° N. and *cholmleyi* as south of 26° N. between the Nile Valley and the Red Sea to at least Suakin, Sudan. However, the presence of the "nicolli-like" male specimen mentioned above from Wadi Sukkari (25°03' N.), indicates that some birds from southeastern Egypt are intermediate between these two subspecies and that they intergrade further south or along a broader zone.

*Coturnix coturnix coturnix*. — Wadi Kansisrob: 1 ♀ (FMNH CC 18929, HH 4197), 8. III. 1954, wing 110, tail 32. — The specimen label has the following note, "common singly or in pairs among rocks, shrubs, or grasses in wadi on ground." This species is not an uncommon migrant along the Red Sea coast. Marchant (1941) found them on spring migration between 3. III to 8. IV at Hurghada, and Moreau (1927—28) described them as abundant on spring migration at Port Sudan, Sudan. Madden (1930) found it in February northwest of Mersa Halaib. There is no evidence that they breed in the Gebel Elba area.

*Arenaria interpres interpres*. — Mersa Halaib, seashore: 1 ♂ immature (FMNH 222442, HH 4198), 8. III. 1954, wing 143, tail 52. — This species has been recorded both as a migrant and winter visitor along the Red Sea coast (Cholmley, 1897; Borman, 1929; Marchant, 1941). The specimen is in immature plumage, having retained a few juvenile inner median coverts (Prater et al., 1977); but the primaries are not heavily worn.



*Burhinus oedicnemus oedicnemus*. — Gebel Elba: 2 ♂ (GZM A2192, A2193), 25. II. 1938, wing 245, 251, tail 117, 116. Coastal plain, 2 mi N of Bir Kansisrob: 1 ♀ (FMNH CC 18935, HH 4199), 10. III. 1954, wing 243, tail 110. — According to Vaurie (1965) nominate *oedicnemus* winters chiefly in "eastern Africa from Egypt and Sudan south . . ." Cholmley (1897) collected three Common Thick-knees on 18. II. 1896 north of Mersa Halaib, and on spring passage it has been recorded at Hurghada from 22. III to 10. IV (Marchant, 1941).

*Pterocles lichtensteinii lichtensteinii*. — Wadi Kansathrope: 3 ♂, 2 ♀ (GZM A2458—A2462), 27. XII. 1938, wing 186, 184, 184, 175, 171, tail 66, 64, 67, 62, 61. Wadi Hodein: 2 ♂ (FMNH CC 18933, HH 7174; FMNH CC 18934, HH 4175), 23. II. 1964, wing 178, 186, tail 63, 60. — This species is a breeding resident in the Gebel Elba area (Meinertzhagen, 1930). The two Hoogstraal specimens were taken, "from flock of eight walking among rocks on hillside above valley with widely scattered acacia trees"

*Pterocles coronatus coronatus*. — Wadi Kansathrope: 1 ♂ (GZM A2469), 30. XII. 1938, wing 197, tail 71. Mersa Halaib: 2 ♀ (GZM A2018, A2019), 22. XII. 1938, wing 196, 197, tail 69, 66. Wadi Umm Taghir, 35 kms W of Safaga: 1 ♂ (FMNH CC 25103, HH 8213), 16. V. 1968, wing 196, tail 72 (worn). — As reported by Goodman & Watson (1983) these are the first records of this species from the Egyptian Eastern Desert. In Egypt it was previously known only from the Nile Delta, Wadi el Natroun and other areas west of the Nile Valley (Vaurie, 1965). It is possible that this species may breed in the Gebel Elba region.

*Streptopelia roseogrisea arabica*. — Gebel Elba: 2 ♂ (GZM A2187, A2186), 25. II. 1938, 26. II. 1938. Bir Kansisrob, ± 500 ft alt: 1 unsexed (FMNH CC 18936, HH 4188), 3. III. 1954, wing 160, tail 99. — El Negumi et al. (1950) considered this species a resident at Gebel Elba. It was previously collected at Gebel Shallal on 29. I. 1896 (Cholmley, 1897) and at Gebel Elba on 9. IV. 1928 (BMNH 1965 M. 4704) (Meinertzhagen, 1930).

*Streptopelia senegalensis senegalensis*. — Bir Kansisrob, ± 500 ft alt: 1 ♂ immature (FMNH CC 18937, HH 4193), 7. III. 1954, wing 134, tail 104. — According to the breeding distribution given by Vaurie (1965), this subspecies may be a breeding resident in the Gebel Elba region. The bird had started to molt into adult plumage, having obtained a few breast-band feathers but still retaining white-edged wing-coverts and breast-feathers. Vaurie (1965) gave the wing measurements of male *S. s. aegyptiacus* as 138—148 (mean = 143.3, n = 10) and male nominate *senegalensis* as 132—146 (mean = 138.3, n = 20). Since the specimen is predominantly in immature plumage and somewhat ill-prepared, it is impossible to use plumage characters to determine the subspecies, and its assignment to *senegalensis* is based on wing measurement.

*Oena capensis capensis*. — Gebel Elba: 1 ♂, 1 ♀ (GZM A2190, uncatalogued), 4. III. 1938. Wadi Akwamtra: 1 [♂] (sexed by plumage) (FMNH CC 25104, HH 8183), 16. II. 1967, wing 118, tail 122 (formalin injected mummy). — This species may be a resident in the Gebel Elba area, but breeding has yet to be documented. The only other locality in Egypt at which it has been recorded is near Kom Ombo, where two females were collected on 27. II. 1971 (Goodman & Watson, 1983).

*Bubo bubo ascalaphus*. — Bir Kansisrob, ± 500 ft alt: 1 ♂ (FMNH 222427, HH 4194), 8. III. 1954, wing 321, tail 185. — According to the distribution given by Vaurie (1965), this subspecies is most likely a breeding resident in the Gebel Elba region. The specimen is extremely pale in plumage colouration, having a white throat, white breast with light-brown barring and tawny upperparts with some black edging and conspicuous white spotting. The legs and toes are not heavily feathered. This specimen fits the description of *Bubo (bubo) ascalaphus desertorum* (Mackworth-Praed & Grant, 1957); but Vaurie (1960b) has shown that *ascalaphus* is best considered conspecific with *bubo* and that *desertorum* is synonymous with *ascalaphus*. The breast-feather pattern of this specimen is different from that illustrated for *ascalaphus* by Vaurie (1960b, fig. 1) in being truly barred and not having dark pigment along the length of the midshaft.

*Asio flammeus flammeus*. — Coastal plain, 2 mi N of Bir Kansisrob: 1 ♀ (FMNH 222429, HH 4189), 6. III. 1954, wing 309, tail 133. — This species is a winter visitor to Egypt and is occasionally found on the Red Sea coast (Al-Hussaini, 1939; Marchant, 1941).

*Athene noctua glaux*. — Bir Kansisrob, ± 500 ft alt: 1 ♂ (FMNH 222428, HH 4195), 8. III. 1954, wing 150, tail 65. — According to Vaurie (1960c), this form is most likely a breeding resident in the Gebel Elba region. The upperparts of the specimen are pale chocolate-brown and distinctly darker than those of a series of *A. n. saharae* collected along the Mediterranean coast of Egypt, west of Alexandria. *A. n. spilogaster*, which inhabits the Red Sea coast north of Port Sudan south to northern Eritrea, is distinctly lighter in colour than *glaux*, approaching *saharae*, and smaller (Vaurie, 1960c). The wing measures 146–147 (n = ?, sex = ?) in *spilogaster* (Mackworth-Praed & Grant, 1957), compared to 149–166 (mean = 156.8, n = 30) in male *glaux* (Vaurie, 1965).

*Caprimulgus aegyptius aegyptius*. — Gebel Elba: 1 ♀ (GZM A2170), 23. II. 1938. — The range and status of this subspecies in Egypt are not particularly clear. Vaurie (1960a) stated that this form breeds in the Nile Delta south to Abu Zabal near Cairo and winters in the northern Sudan. Cholmley (1897) found this species in I. 1896 near Mersa Halaib and collected a male. It is impossible to say if this specimen was wintering in the Gebel Elba region, or a migrant returning to the breeding grounds. Mackworth-Praed & Grant (1957) proposed that



this species "may be found breeding in the extreme north of our area" [= northern Sudan and perhaps southern Egypt], but until further evidence is available it is best considered a winter visitor to the Gebel Elba region.

*Eremopterix nigriceps melanauchen*. — Gebel Elba: 2 ♂ (GZM A2080, A2081), 27. II. 1938. Wadi Sid Abgouab: 1 ♂ (GZM A2455), 27. XII. 1938. Eastern Desert: 2 ♂ (GZM A2429, A2456), 23. XII. 1938, 27. XII. 1938. — This species' range and movements in Egypt are poorly known. Cholmley (1897) collected two males at Berenice on 6. I. 1896; Nicoll (1919) obtained a male at Wadi el Natroun on 10. IX. 1911 (GZM 4457) and observed three more birds at the same locality during the winter of 1912-1913; Moreau (1934) reported it from the desert between Dakhla Oasis and Gebel Uweinat at 23°50' N, 27°40' E; and Meinertzhagen (1954) considered it a straggler to western Egypt. Vaurie (1959) gave the range of this subspecies as, "Wadi Natrun in western Egypt, Red Sea Province of the Sudan south . . ." As suggested by El Negumi et al. (1950), it is possible that this species may breed in the general Gebel Elba area, considering the number of specimens taken there during the appropriate season and its close proximity to the Red Sea Province of the Sudan. El Negumi (1949) reported taking four females at "W.[adi] Sydangaep" [probably = Wadi Sid Abgouab] between XII. 1938 and I. 1939, but I have only examined one specimen from this precise locality.

*Ammomanes deserti isabellinus*. — Bir Abraç: 1 ♂, 1 ♀ immature (FMNH 222464, HH 4182; FMNH 222465, HH 4183), 26. II. 1954, wing 101, 94, tail 63, 61. — Both specimens are pale reddish-sandy, and appear to be typical of *isabellinus*. I have not been able to compare them to specimens of *A. d. borosi* which was described from a single female specimen taken at Bir Abbad in the Eastern Desert. Horváth's (1958) plumage description of the *borosi* type specimen indicated that it was a grey-backed form and apparently distinct from *isabellinus*. Meinertzhagen (1930) described the range of *isabellinus* in Egypt as the Dakhla Oasis, the area around Cairo and along the Cairo-Suez road. Vaurie (1959) recognized it from these areas, plus the Nile Valley from Cairo to Qena and along the Red Sea coast at Quseir. These specimens extend its range further south along the Red Sea coast. Marchant (1941) found it near Hurghada in early February and "evidently about to breed."

*Calandrella cinerea hermonensis*. — Wadi Shaab: 2 ♂ (GZM A2082, A2083), 23. II. 1938. — According to Vaurie (1959), this subspecies breeds in Syria and Palestine and winters in the Red Sea districts of the Sudan south to Somaliland. Perhaps some birds undershoot their target while crossing the Red Sea from the Arabian Peninsula to the wintering grounds, or some migrate from the Middle East through the Sinai Peninsula, south along the eastern coast of Egypt and into the wintering grounds. Until ringing recoveries are available these routes are

speculative. Either way this subspecies may at least on occasion winter along the Red Sea coast of southeastern Egypt and/or pass through it on migration.

*Lanius excubitor aucheri*. — Gebel Elba: 1 ♂, 1 ♀ (GZM uncatalogued, A2094), 25. I. 1938, 26. I. 1938. Wadi Shallal: 1 unsexed (GZM A2463), 27. XII. 1938. Bir Kansisrob, ± 500 ft alt: 1 ♂ (FMNH 222431, HH 4192), 7. III. 1954, wing 107, tail 93; 1 unsexed immature (FMNH 222433, HH 4201), 10. III. 1954, wing 103, tail 99 (subspecies of this specimen indeterminable). — All of the above specimens (excluding the immature) have white at the base of the secondaries, a black frontal band at the base of the bill and a white underside washed with grey. They are therefore referable to the subspecies *aucheri* (Vaurie, 1959). The only exception is the bird from Wadi Shallal in which the frontal band is narrow and indistinct, tending towards *L. e. elegans*.

Vaurie (1959) gave the range of *aucheri* as the "West coast of the Red Sea from Port Sudan (where specimens are intermediate between this race and *elegans*) southward . . ." Horváth (1959) collected two specimens at Bir Abbad on 29. X. 1957 and assigned them to *aucheri*. The specimens listed above indicate that the range of *aucheri* may actually extend further north into southeastern Egypt. Further, a male specimen (BMNH 1929.1.3.7) referable to *elegans*, collected on 7. IV. 1928 at Gebel Elba, in combination with the intermediate *aucheri* X *elegans* specimen mentioned above, would seem to indicate that the zone of intergradation between these two subspecies extends north of Port Sudan, at least to the Gebel Elba area.

*Tchagra cruenta cruenta*. — Gebel Elba: 1 ♂ (GZM A2098), 4. III. 1938. Wadi Kansathrope: 2 ♀ (GZM A2751, A2752), 26. XII. 1938. Bir Kansisrob, ± 500 ft alt: 1 ♀ (FMNH 222436, HH 4191), 7. III. 1954, wing 96, tail 114. — According to Meinertzhagen (1930) and El Negumi et al. (1950) this species is a breeding resident at Gebel Elba. Few measurements have been published of Rosy-patched Shrikes collected at Gebel Elba (Meinertzhagen, 1930). Including the material in the BMNH collected by Schrader for Meinertzhagen, 11 aged and sexed specimens have been examined and measured from the Gebel Elba region: wing — female immature 92 (n = 1), male immature 95–97 (mean = 96.0, n = 3), female adult 96–97 (mean = 96.3, n = 3), male adult 96–97 (mean = 96.7, n = 4); tail — female immature 101 (n = 1), male immature 104–115 (mean = 114.2, n = 3), female adult 109–114 (mean = 111.6, n = 3), male adult 101–110 (mean = 107.5, n = 4).

*Corvus ruficollis ruficollis*. — Bir Abraq: 1 ♂ (FMNH 222467, HH 4176), 24. II. 1954, wing 393, tail 185. — This species has been described as common throughout the Eastern Desert in the winter (Tregenza, 1951). It has been recorded at Berenice in early January (Cholmley, 1897), and recently on several occasions in the general Gebel Elba region between January and early February

(Amer et al., 1980). The Brown-necked Raven may be a breeding resident in the area for the specimen's gonads were noted as enlarged. The specimen's label reads, "from flock of four in Acacia tree in desert valley."

*Hypocolius ampelinus*. — Wadi Shallal: 1 ♀ (GZM A2424), 22. XII. 1938, wing 100, tail 101. — As previously stated by El Negumi (1949) this specimen appears to be the first of this species taken in Egypt. Mackworth-Praed & Grant (1957) reported another individual taken in 1943 at Gebel Elba. *Hypocolius* have been reported on several occasions along the Red Sea coast south of Egypt, but there is no evidence that it breeds on the African continent (Meinertzhagen, 1954). These birds are most likely migrants from the Middle East.

*Pycnonotus barbatus arsinoe*. — Bir Kansisrob, ± 500 ft alt: 1 unsexed (FMNH 222459, HH 4203), 11. III. 1954, wing 85, tail 71. — Meinertzhagen (1930) described this subspecies as "abundant on the coast near Gebel Elba" where it is likely a breeding resident. A note on the data tag reads, "caught in bat net over well!"

*Oenanthe deserti deserti*. — Wadi Naam: 1 ♂, 1 unsexed (FMNH 222448, HH 4184; FMNH 222449, HH 4185), 26. II. 1954, 27. II. 1954, wing 94, 91, tail 59, 64. — Vaurie (1959) listed this subspecies as a resident throughout much of Egypt. Desert Wheatears have been recorded near Berenice and Mersa Halaib in January (Cholmley, 1897) and at Hurghada on 23. II. (Jourdain & Lynes, 1936) and at the end of January (Marchant, 1941). Both Hoogstraal specimens were collected while "feeding around base of small shrubs on hillocks of sand." This species is most likely a breeding resident in the Gebel Elba area, but this needs further documentation.

*Oenanthe leucopyga leucopyga*. — Bir Abraq: 1 ♂, 1 ♀ immature (FMNH 222466, HH 4180; FMNH 222447, HH 4181), 25. II. 1954, wing 104, 99, tail 56, 60. — Schrader obtained a female (BMNH 1965 M.12250) on 17. III. 1928 and a male (BMNH 1965 M.12251) on 8. IV. 1928 at Gebel Elba that Meinertzhagen (1930) identified as *O. l. ernesti*. After examining these two birds I am of the opinion they are closer to specimens of the nominate race as are the Bir Abraq specimens.

This species may breed in the area, for a note on the male specimen's data tag states that it had "enlarged testes." The female specimen lacks the white crown.

*Turdoides fulvus acaciae*. — Gebel Elba: 4 ♀ (GZM A2420, A1073—A1075), 22. XII. 1938, 26. XII. 1938 (2), 25. II. 1939. Wadi Darawena, ± 500 ft alt: 1 unsexed (FMNH 222461, HH 4204), 11. III. 1954, wing 95, tail 126. Bir Kansisrob, ± 500 ft alt: 1 unsexed (FMNH 222462, HH 4240), 11. III. 1954, wing 97, tail 124. — Meinertzhagen (1930) described this subspecies as a common breeding

resident at Gebel Elba. An inscription on the data tag of the Wadi Darawena specimen reads, "caught in foxtrap in parkland"

*Nectarinia habessinica habessinica*. — Gebel Elba: 3 ♂ (GZM A2092, A2089, A2444), 26. II. 1938, 28. II. 1938, 25. XII. 1938, wing 67, 69, 71, tail 42, 39, 42. Bir Kansisrob, ± 500 ft alt: 1 ♂, 1 ♀ [= ♂ by plumage] (FMNH 222865, HH 4186; FMNH 222466, HH 4190), 3. III. 1954, 7. III. 1954, wing 64, 64, tail 42, 42. Wadi Yoider: 1 [♂] (sexed by plumage) (FMNH 107786, HH 8184), 16. II. 1964, wing 65, tail 42 (pickled). — El Negumi (1949) reported taking one male and two females at "W.[adi] Cansathrope" [= Wadi Kansathrope] between XII. 1938 and I. 1939 and finding a nest with two six-day old nestlings in an "*Acasia Orientalis*." Cholmley (1897) observed this species during January at Gebel Shallal. Eight specimens from the area (including two of Meinertzhagen's in the BMNH) have been examined and measured. All are referable to nominate *habessinica* (see also Williams, 1955) rather than *N. h. hellmayri* as previously identified by Meinertzhagen (1930) and El Negumi (1949).

*Passer luteus*. — Wadi Akwamtra: 2 [♂] (sexed by plumage) (FMNH 107784, HH 8181; FMNH 107785, HH 8182), 16. II. 1964, wing 65, 65, tail 49, 49 (both pickled). — As reported by Goodman & Watson (1983) these are the first records of this species from Egypt. The bird is generally found in portions of the Sudan, west through Libya to west Africa (Simon, 1965) along desert edges, in grassy scrub, bushes and acacias (Vaurie, 1959). It is plausible that this species' Sudanese breeding range could extend further north into southeastern Egypt.

*Lonchura malabarica cantans*. — Wadi Rabdate: 1 ♂, 1 ♀ (GZM A2074, A2075), 6. III. 1938. Gebel Shallal: 4 ♂ (GZM A2474—A2477), 1. I. 1939. — This series of specimens represents the first records of this species in Egypt other than a single bird caught on 24. VIII. 1911 at Giza, that was likely an escaped cage bird (Nicoll, 1912). El Negumi (1949) previously reported the four males from Wadi Shallal, but did not mention those from Wadi Rabdate. When these birds were examined at the GZM no comparative material of *L. m. cantans* or *L. m. orientalis* was available. My notes taken at the time on the back colour of these specimens, indicate they are probably referable to *cantans*, but this is tentative. In east Africa *cantans* inhabits portions of western and southern Sudan, intergrading with *orientalis* along the Red Sea coast of Sudan and Eritrea (Mayr et al., 1968). Thus it is possible that either form could be found in southeastern Egypt.

*Emberiza caesia*. — Gebel Elba: 3 ♂, 1 ♀ (GZM A2069, A2070, uncatalogued, A2071), 25. II. 1938 (first two ♂), 7. III. 1938, 4. III. 1938. — This species generally winters along the Red Sea coast of the Sudan and Eritrea north of 14° N., east of the Nile in the Sudan (Moreau, 1972), and occasionally in Egypt (Vaurie, 1959). According to Meinertzhagen (1930) this species is abundant in

Egypt on migration between 12. III. and 9. IV. It has been recorded in February on the northern slopes of Gebel Elba (Madden, 1930) and may be a regular winter visitor to the area.

*Emberiza striolata striolata*. — Gebel Shallal: 1 ♀ (GZM A2473), 1. I. 1939. Gebel Abraq: 1 ♂ (GZM A2073), 22. II. 1938. — These specimens appear to be the first of the nominate form to be collected in Egypt (excluding the Sinai). *E. s. striolata* inhabits the Sudan north of 14° N. (Vaurie, 1959). It is possible that this form may breed at least on occasion in southeastern Egypt.

### The zoogeographic affinities of the Gebel Elba avifauna

Of the 37 forms reported from these two collections, 26 are known or suspected breeding residents in the region about Gebel Elba (Tab. 1). Although the descriptive approach to zoogeography (sensu Darlington, 1957) has been criticized in recent years, it serves a useful function here in postulating the historical and geographical origin of these species. The basic assumption is that animals which have an extensive distribution within a geographical region and show more pronounced variation than in another region in which they occur, most likely have been in the former area longer and may have originated there. The number of subspecies in an area is used as an approximation of geographical differentiation. Thus by compiling and comparing the extralimital distribution and concentration of these 26 species for large geographical areas, some generalizations can be made as to their zoogeographical affinities (Tab. 1). It must be emphasized that the conclusions given below should not be construed as statements pinpointing the geographic origin of a particular form, but rather only as an exercise to help postulate from which general areas the Gebel Elba region birds may have arisen and/or dispersed.

Of the 26 species listed, only 3 can be thought of as truly Palearctic forms that have invaded North Africa: *Bubo bubo*, *Athene noctua* and *Lanius excubitor*. None of these species deeply penetrates sub-Saharan Africa, although *Athene noctua* occurs in east Africa south of 5° N. (Snow, 1978). It is interesting to note that all three species have extensive Middle Eastern and Asian distributions which perhaps attests to their dispersal and adaptive ability. Further, the breeding Gebel Elba region avifauna differs markedly from that of northern or nilotic Egypt, which has a preponderance of breeding Palearctic forms (Moreau, 1966).

The forms that can be thought of as sub-Saharan (of the Afrotropical region) and that have invaded North Africa include (those marked with an asterisk [\*] have invaded the Middle East and those with a plus [+] have moved into portions of southern Asia): *Struthio camelus*\*, *Aegyptius tracheliotus*\*, *Streptopelia roseogrisea*\*\*+, *S. senegalensis*\*\*+ (allocated to this region by Moreau, 1966), *Oena*

Table 1. The extralimital distribution of birds known or suspected of breeding near Gebel Elba.<sup>1)</sup>

species (subspecies)	sub-Saharan <sup>2)</sup>	North Africa	Middle East	Europe	Asia
<i>Struthio c. (camelus)</i>	(+3)	X <sup>3)</sup>	(*1)		
<i>Egretta gularis (schistacea)</i>	(*1)	(+1)	X		X
<i>Neophron p. (percnopterus)</i>	X	X	X	X	(+1)
<i>Gypaetus barbatus (meridionalis)</i>	X	(+1)	(+1)	(*1)	(*1)
<i>Aegypius tracheliotus<sup>4)</sup></i>	X	X	X		
<i>Ammodramus heyi (cholmleyi)</i>		(+1)	(*2)		X
<i>Pterocles l. (lichtensteinii)</i>	(+1)	(+1)	(+1)		(*2)
<i>Pterocles c. (coronatus)</i>		X	(*3)		
<i>Streptopelia roseogrisea (arabica)</i>	(+1)	(+1)	X		(*2)
<i>Streptopelia s. (senegalensis)</i>	X	(+2)	(+1)		
<i>Oena c. (capensis)</i>	X	X	X		
<i>Bubo bubo (ascalaphus)</i>	X <sup>5)</sup>	(+1)	(+2)	(*13)	(*6)
<i>Athene noctua (glauca)</i>	(*2)	(+1)	(+2)	(*4)	(*3)
<i>Eremopterix nigriceps (melanauchen)</i>	(+1) <sup>5)</sup>	(+1)	(+2)		X
<i>Ammonomanes deserti (isabellina)</i>	(*2)	(+8)	(+8)	(*1)	(*2)
<i>Lanius excubitor (aucheri)</i>	(+2) <sup>5)</sup>	(+3)	(+2)	(*9)	(*3)
<i>Tchagra c. (ruenta)</i>	(+2)	X	X		X
<i>Corvus r. (ruficollis)</i>	(*1)	X	X		
<i>Pycnonotus b. (arsinoe)<sup>6)</sup></i>	(+14)	(+1)	(*1)		(*2)
<i>Oenanthe d. (deserti)</i>	X <sup>5)</sup>	(+1)	X		
<i>Turdoides fulvus (acaciae)</i>	X <sup>5)</sup>	(+1)	X		
<i>Nectarinia h. (habessinica)</i>	(+2)	X	(*1)		
<i>Passer luteus</i>	X <sup>5)</sup>	X	(+2)		
<i>Lonchura malabarica (cantans?)<sup>7)</sup></i>	(+1)	X	(*2)		(*1)
<i>Emberiza s. (striolata)</i>	(+2)	(+1)	X		X

Symbols: (\*) = This subspecies does not breed in this area but at least one other does; followed by the number of subspecies fitting this category.

(+) = This subspecies and at least one other breeds in the area; followed by number of subspecies fitting this category excluding the one listed.

(X) = Only this subspecies breeds in this area.

1) Includes only the breeding ranges and excludes endemic insular forms.

2) Defined as Africa south of 15° N.

3) *S. c. spatzii* as synonym of *S. c. camelus*.

4) Bein et al (1981) consider this species polytypic and have described a new subspecies from the Negev Desert.

5) This species' southern limit is at 10°–15° N, and is not considered a truly sub-Saharan form.

6) With *P. xanthopygus* conspecific with *P. barbatus*.

7) Designations based on the specimens being referable to *cantans* and *L. malabarica* and *L. cantans* being conspecific.



*capensis*\*, *Tchagra cruenta* and *Pycnonotus barbatus*\*. The multi-regional distribution of these forms may be indicative of their effective dispersal ability. *Nectarinia habessinica* should most likely be included in this group, for it appears to be a sub-Saharan form or part of a radiation that established itself in east Africa and later invaded the Arabian Peninsula. Of these eight Afrotropical birds, six are found breeding in Egypt only in the Gebel Elba region.

The following species can be thought of as typical Saharan Desert birds (see Moreau, 1966), (those marked with an asterisk [\*] also occur in the Middle East): *Ammoperdix heyi*\*, *Pterocles coronatus*\*, *Eremopterix nigriceps*\*, *Ammomanes deserti*\*, *Corvus ruficollis*\*, *Oenanthe deserti*\*, *O. leucopyga*\*, *Turdoides fulvus* and *Passer luteus*. Of these *Pterocles coronatus*, *Eremopterix nigriceps*, *Ammomanes deserti*, *Corvus ruficollis* and *Oenanthe deserti* have also spread to portions of southern Asia.

Six species, which occur in eastern Africa, the Middle East and east to southern Asia, are difficult to associate with any one region based on their present distribution. These include: *Egretta gularis*, *Gypaetus barbatus*, *Neophron percnopterus*, *Pterocles lichtensteinii*, *Lonchura malabarica* and *Emberiza striolata*; though this last species is most likely of sub-Saharan origin and which later spread into the Middle East and southern Asia.

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### Summary

Two collections of birds from southeastern Egypt are reported. Those of the Hoogstraal collection are composed of 44 individuals of 29 species and those from the El Negumi collection of 56 individuals of 20 species. In total 100 individuals of 37 species are included. Of these 37 species, 26 are known or presumed breeding residents in the area, of which 7-8 species (27-31 %) can be associated with the Afrotropical Region, 3 species (12 %) to the Palearctic Region, 9 species (35 %) as local Saharan birds and 6 species (23 %) cannot be associated with any particular zoogeographical region.

### Zusammenfassung

Über zwei Vogelausbeuten aus Südostägypten wird berichtet: die Ausbeute Hoogstraal enthält 29 Arten mit 44 Exemplaren, die Ausbeute El Negumi 20 Arten mit 56 Stücken. Im ganzen sind 37 Arten vertreten, von denen vermutlich 26 im Gebiet brüten. Unter diesen können 7–8 Arten (27–31 %) der afrotropischen Fauna, 3 (12 %) der paläarktischen Tierwelt und 9 (35 %) der engeren Fauna der Sahara zugerechnet werden, während sich 6 Arten (23 %) keiner bestimmten tiergeographischen Region zuordnen lassen.

### References

- Al-Hussaini, A.H. (1939): Further notes on the birds of Ghardaga (Hurghada), Red Sea. — *Ibis* (14) 3: 343–347.
- (1959): The avifauna of Al-Wadi Al-Gadid in the Libyan Desert. — *Bull. zool. Soc. Egypt* 14: 1–14.
- Amer, M., L. Boulous, A.M.A. Fadeel & A.K. Nagati (1980): Report on the wild life and endangered species of Elba Mountain, from 18/1/1979 to 7/2/1979. — *Egypt. J. Wildl. nat. Resources* 3: 161–172.
- Ball, J. (1912): The geography and geology of south-eastern Egypt. — Government Press, Cairo.
- Benson, C.W., P.A. Clancey, C.H. Fry, K. Newman, A. Prigogine & D.W. Snow (1979): Afrotropical Region: a substitute name for Sclater's Ethiopian Region. — *Ibis* 121: 518.
- Borman, F.W. (1929): An ornithological trip in the Gulf of Suez and Red Sea. — *Ibis* (12) 5: 639–650.
- Bruun, B., H. Mendelssohn & J. Bull (1981): A new subspecies of Lappet-faced Vulture *Torgos tracheliotus* from the Negev Desert, Israel. — *Bull. Brit. Ornith. Cl.* 101: 244–247.
- Cholmley, A.J. (1897): Notes on the birds of the western coast of the Red Sea. — *Ibis* (7) 3: 196–209.
- Clark, W.T. (1938): Manners, customs, and beliefs of the northern Bega. — *Sudan Notes and Records* 21: 1–29.
- Cramp, S., & K.E.L. Simmons (eds.) (1977–1980): The birds of the western Palearctic. Vol. 1 & 2. — Oxford University Press, Oxford.
- Darlington, P.L., Jr. (1957): Zoogeography: the geographical distribution of animals. — Wiley, New York.
- El Negumi, A. (1949): List of desert animals seen or collected during the periods shown. — *Bull. zool. Soc. Egypt* 8: 20–21.
- , H.F. Zain el Din, M.A. El Monery & M.K. Fayed (1950): Birds of Egypt. 2nd edition. — Daar el Fikr el Arabi, Cairo (in Arabic).
- Fahmy, I.R. (1936): Report on Gebel Elba. — Egyptian University, Cairo.
- Greaves, R.H. (1939): Notes from Egypt. — *Ool. Rec.* 19: 49–51.
- Goodman, S.M., P.F. Houlihan & I. Helmy (1984): Recent records of the Ostrich *Struthio camelus* in Egypt. — *Bull. Brit. Ornith. Cl.* 104: 39–44.
- & G.E. Watson (1983): Bird specimen records of some uncommon or previously unrecorded forms in Egypt. — *Bull. Brit. Ornith. Cl.* 103: 101–106.
- Hall, B.P., & R.E. Moreau (1970): An atlas of speciation in African passerine birds. — British Museum (Natural History), London.
- Hoogstraal, H., K. Wassif & M.N. Kaiser (1957a): Results of the NAMRU-3 southeastern Egypt expedition, 1954. 1. Introduction, itinerary, and environmental conditions. — *Bull. zool. Soc. Egypt* 13: 1–15.

- , — & — (1975b): Results of the NAMRU-3 southeastern Egypt expedition, 1954. 6. Observations on non-domesticated mammals and their ectoparasites. — *Bull. zool. Soc. Egypt* 13: 52–75.
- Horváth, L. (1958): A new race of the Desert Lark from Egypt. — *Bull. Brit. Ornith. Cl.* 78: 124–125.
- (1959): The results of the zoological collecting trip to Egypt in 1957, of the Natural History Museum, Budapest. — *Ann. hist.-nat. Mus. nat. Hung.* 51: 451–481.
- Jourdain, F.C.R. (1934): The Bearded Vulture (*Gypaetus barbatus*) in Egypt. — *Ool. Rec.* 14: 73.
- & H. Lynes (1936): Notes on Egyptian birds, 1935. — *Ibis* (13) 6: 39–47.
- Kassas, M., & M.A. Zahran (1971): Plant life on the coastal mountains of the Red Sea, Egypt. — *J. Ind. bot. Soc.* 50A: 571–589.
- Mackworth-Praed, C.W., & C.H.B. Grant (1957): *Birds of eastern and north eastern Africa*. 2nd edition. 2 Vols. — Longman, Green & Co., London.
- Madden, J.F. (1930): Bird migration in the Red Sea Province. — *Sudan Notes and Records* 13: 123–135.
- Marchant, S. (1941): Notes on the birds of the Gulf of Suez. — *Ibis* (14) 5: 265–295, 378–396.
- Mayr, E., R.A. Paynter, Jr., & M.A. Traylor (1968): Estrildidae. — In: Paynter, R.A., Jr. (ed.): *Check-list of birds of the world*, Vol. XIV, 306–390. — Museum of Comparative Zoology, Cambridge, Massachusetts.
- Meinertzhagen, R. (1930): *Nicoll's birds of Egypt*. 2 Vols. — Rees, London.
- (1949): Notes on Saudi Arabian birds. — *Ibis* 91: 465–482.
- (1954): *Birds of Arabia*. — Oliver & Boyd, Edinburgh.
- Moreau, R.E. (1927–1928): Quail. — *Bull. zool. Soc. Egypt* 1: 6–13.
- (1934): A contribution to the ornithology of the Libyan Desert. — *Ibis* (13) 4: 595–632.
- (1966): *The bird faunas of Africa and its islands*. — Academic Press, New York.
- (1972): *The Palaearctic–African bird migration systems*. — Academic Press, London.
- Nicoll, M.J. (1912): *Wild birds of the Giza Gardens. 1898–1911*. — Government Press, Cairo.
- (1919): *Handlist of the birds of Egypt*. — Government Press, Cairo.
- Osborn, D.J., & I. Helmy (1980): *The contemporary land mammals of Egypt (including Sinai)*. — *Fieldiana: Zool., n. Ser.*, No. 5.
- Prater, A.J., J.H. Marchant & J. Vuorinen (1977): *Guide to the identification and ageing of holarctic waders*. — British Trust for Ornithology, Tring.
- Schmidt, K.P., & H. Marx (1957): Results of the NAMRU-3 southeastern Egypt expedition, 1954. 2. Reptiles and amphibians. — *Bull. zool. Soc. Egypt* 13: 16–28.
- Schweinfurth, G. (1865): *Das Land am Elba- und Soturba-Gebirge*. — *Petermanns Mitt.* 1865: 330–340.
- (1868): *Pflanzengeographische Skizze des gesammten Nil-Gebiets und der Uferländer des Rothen Meeres*. — *Petermanns Mitt.* 1868: 113–129.
- Simon, P. (1965): *Synthèse de l'avifaune du massif montagneux du Tibesti et distribution géographique de ces espèces en Afrique du nord et environs*. — *Gerfaut* 55: 26–71.
- Snow, D. (ed.) (1978): *An atlas of speciation in African non-passerine birds*. — British Museum (Natural History), London.
- Tregenza, L.A. (1951): Observations on the birds of the S.E. desert of Egypt. — *Bull. zool. Soc. Egypt* 9: 1–18.
- United States Board on Geographic Names (1959): *Egypt and the Gaza Strip: Gazetteer no. 45*. — United States Printing Office, Washington, D.C.
- Vaurie, C. (1959): *The birds of the Palearctic fauna. Passeriformes*. — Witherby, London.

- (1960a): Systematic notes on Palearctic birds. No. 40 Caprimulgidae. — Amer. Mus. Novit. 1997: 1–14.
- (1960b): Systematic notes on Palearctic birds. No. 41 Strigidae: the genus *Bubo*. — Amer. Mus. Novit. 2000: 1–31.
- (1960c): Systematic notes on Palearctic birds. No. 42 Strigidae: the genus *Athene*. — Amer. Mus. Novit. 2015: 1–21.
- (1965): The birds of the Palearctic fauna. Non-passeriformes. — Witherby, London.
- Williams, J.G. (1955): A systematic revision and natural history of the Shining Sunbird of Africa. — Condor 57: 249–262.

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