

**Birds of the Cape Verde Islands
Notes on Species Observed
(9 August - 10 September 1986),
Distribution, Migration, Status, Origin and Conservation***

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15 Figures, 3 Tables

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Introduction

In a previous paper (NØRREVANG & DEN HARTOG 1984) ornithological data were presented collected during the Dutch marine biological "Tydeman" CANCAP VI expedition to the Cape Verde Islands in 1982. For general information on the CANCAP-project the reader is referred to DEN HARTOG (1984a)

*) CANCAP- project. Contributions to the Zoology, Botany and Paleontology of the Canarian-Cape Verdean Region of the North Atlantic Ocean, no. 70.

and VAN DER LAND (1987). The present paper provides supplementary data collected between 9 August and 10 September 1986 during a second expedition to the Cape Verdes, CANCAP VII, again on board of HNLMS "Tydeman". In the course of this expedition several islands and islets were visited not called at in 1982, viz.: Cima, Maio, Sal, Ilhéu Sal Rei (off Boa Vista) and Branco (although I did not personally land on the last-named islet). A survey of the localities where ornithological observations were made is presented in fig. 1. Procedures during the expedition were the same as in 1982. Ornithology again did not generally have priority, but this time I at least had the opportunity to concentrate largely on birds during a two-day visit to Cima (fig. 1: 12) and a five-day stay on Razo (fig. 1: 17). Prior to the official ship-board expedition I spent ten days on São Tiago, where bird observations were made along the coast during or after marine collecting activities. In addition I made several excursions into the interior of the island. Other islands where I had some time to concentrate on birds are: Sal, Maio, Ilhéu Sal Rei and São Vicente.

Notes on Species Observed

1. White-faced Frigate Petrel (*Pelagodroma marina eadesi*) - A few mummified and damaged individuals of this small petrel were found on the central plateau of Cima, where considerable stretches of sandy area were honey-combed by the burrows of this species. Previously (cf. NØRREVANG & DEN HARTOG 1984: 112), I stated that burrows of this species were also found on Razo in 1982. However, as I did not come across any small petrel's burrows at all during my 5-day stay on that island in 1986, I

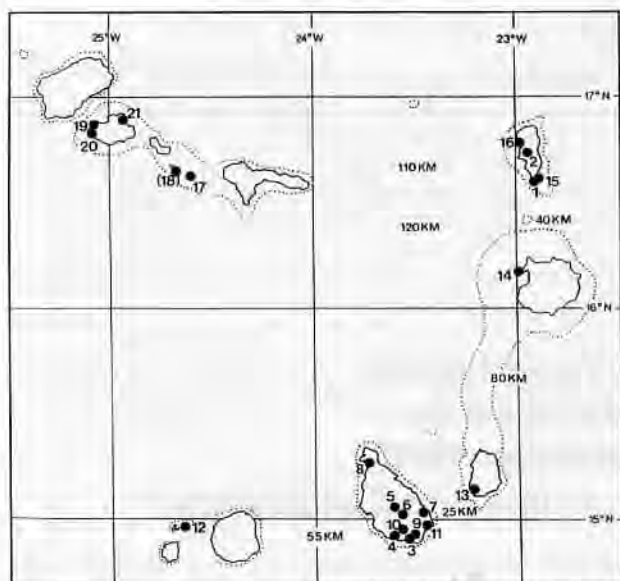


Fig. 1. Survey of the islands and localities (numbered in chronological order) where ornithological observations were made during the CANCAP-VII expedition: 1. Sal, Santa Maria, 9 August; 2. Sal, airport, 9 August; 3. São Tiago, Bay of Praia, 10 and 20 August; 4. São Tiago, Cidade Velha, 11 and 21 August; 5. São Tiago, São Jorge de Orgãos, 12 August; 6. São Tiago, São Domingos, 12 and 17 August; 7. São Tiago, Praia Baixo, 12 August; 8. São Tiago, Tarrafal, 12 August; 9. São Tiago, Praia airport, 15 August; 10. São Tiago, Trindade, 16 August; 11. São Tiago, São Francisco Bay, 17 August; 12. Cima, 23-24 August; 13. Maio, Vila do Maio, 26 August; 14. Boa Vista, Ilhéu Sal Rei, 27-28 August; 15. Sal, east of Santa Maria, Punta do Leme Velho, 29 August; 16. Sal, Baía de Palmeira, 30 August; 17. Razo, 1-5 September; 18. Branco, east side, 5 September, 19. São Vicente, rocky shore on west coast, 8 September; 20. São Vicente, Baía de São Pedro, 9 September; 21. São Vicente, Baía das Gatas, 9 September.

The dotted line roughly indicates the 200 m depth line. In addition are indicated the most significant distances between subsequent islands and island groups. Note that the picture shown by the 200 m depth line gets near the situation at the peak of the last glacial period, when sea-level was some 80-150 m lower than at present.

must have been mistaken. It now seems likely that what I took for collapsed petrel burrows were in fact the results of digging activities of other birds, possibly of Razo Larks (see there) or Brown-necked Ravens.

2. Harcourt's or Madeiran Storm Petrel (*Oceanodroma castro castro*) - Several dead, mummified Madeiran Storm Petrels were found on the central plateau of both Cima and Razo. In addition I found one freshly killed, mutilated bird on Razo.

Occasionally, at night, an individual, dazzled by the ship's lights, would land on board of HNLMS "Tydeman". Six specimen were secured in this way:

one on the leeward side of Cima (23 August), one near Boa Vista (28 August), and four on the leeward side of Razo (4 September). The series included four males (weight: 38, 42, 51 and 56 grams), one female (weight: 42 grams) and one bird of which the sex could not be determined (weight: 40 grams). An investigation of the stomach contents revealed the presence in four birds of some tiny fish bones, eye-lenses, and downy feathers. A fifth bird contained a small desintegrated fish, some 4.5 cm long, five otoliths (four of which in the gizzard), and eight small fragments of hard, white plastic (seven in the gizzard). The sixth bird contained only squid remains: one complete beak (upper and lower jaw 4 and 6 mm long, respectively) and five eye-lenses (5 to 6 mm in diameter). The stomach of two birds in addition contained a single individual of an unidentified worm, some 10-15 mm long.

The otoliths mentioned above were kindly identified by Dr. P.A.M. GAEMERS [Nationaal Natuurhistorisch Museum (NNM), Leiden]. They appeared to derive from four individuals, belonging to four different fish species, viz.: *Diaphus dumerili* BLEEKER 1856 (adult; length ca 6-8 cm), *D. aff. perspicillatus* (OGILBY 1898) (juvenile), *Aethopora efulgens* (GOODE & BEAN 1896) (juvenile) (all Myctophidae = Lantern fishes) and an unidentified, probably juvenile Stomiatoide. These four species all happen to be mesopelagic deep-sea fishes with luminescent organs which at night migrate to the surface layers to feed. Madeiran Storm Petrels apparently are attracted by the luminescent organs of these fishes (and squid as well), which, especially during dark nights, would seem to form the main food source. During moonlit nights, non-luminescent, glistening fish presumably will also be taken, and the intake of small fragments of hard, floating plastics, might also be accounted for by the glittering properties of these materials.

Previous information on the food of the Madeiran Storm Petrel was summarized by CRAMP (1977: 176).

3. ALEXANDER's Little Shearwater (*Puffinus assimilis boydi*) - Several mummified, damaged specimens of this shearwater were found on the sandy stretches of Cima and Razo. On Cima one live bird extracted from a burrow by some fishermen and meant for the pot was purchased (figs. 2, 3). Further efforts by both the fishermen and myself to collect additional individuals were unsuccessful, the species being apparently scarce at that time. However, at night, while sleeping on one of Cima's small beaches, I several times heard its characteristic call. According to the fishermen the species makes good eating, and is especially common from March to May.

On the south coast of Razo, at nightfall, I also saw and heard several Little Shearwaters on the cliffs near our camp-site and in the Brown Booby colony; one bird was collected.

4. Cape Verde Islands Shearwater or Cagarra (*Calonectris edwardsii*) - It is a well-established fact that the endemic Cagarra is not equally distributed over the islands. The most important colonies are those of Razo and Branco (ALEXANDER 1898a: 108; MURPHY 1924: 243; BANNERMAN & BANNERMAN 1968: 171; DE NAUROIS 1969a: 157). In addition significant numbers

breed on Brava and Santo Antão. It is striking that the species, common on Brava, seems to be absent, or nearly so, from the uninhabited nearby Rombos Islets (BOURNE 1955a: 520, 536; DE NAUROIS 1969a: 156). My own observations on Cima confirm this: I did neither find any nests, nor did I hear any birds calling at night.

Interesting information on Cagarra numbers at sea was presented by LAMBERT (1980: 8-9). Due to ship-board activities I had little opportunity for at sea observations. Therefore it should not be inferred from the sparse data to follow hereafter that Cagarra were absent on other occasions. In the afternoon and evening of 25 and 27 August, respectively, I saw a few birds west of Maio and Sal. On 8 and 9 September singleton birds were regularly spotted at the southern entrance of the channel between Santo Antão and São Vicente, and I occasionally observed small groups, up to a few dozen individuals, following fish schools. On 10 August at our homeward departure from Mindelo, between 8.30 and 10.00 p.m. several hundred Cagarra were seen in the northern part of the same channel, and north of the islands. In these waters there were numerous schools of small flying fish that attracted them. Many schools surfaced near the ship, so that the birds could often be seen within close range. They did, however, never follow the ship.

From 1 to 5 September, when visiting Razo, I had the opportunity to pay some special attention to the species. Judging from the presence of white-washed rocks it is obvious that the most important colonies on Razo have since long been situated on the leeward cliffs. Scattered nests occur on the relatively moist, wind-swept northern cliffs and on the slopes of the northern hills, but also on the rocky parts of the southern plateau, under large stones and boulders.

Previously (NØRREVANG & DEN HARTOG 1984: 113), we expressed our concern about the status and future of the Razo population. My first impressions in 1986 were even more depressing: We landed on the southern, leeward side of the island, on a small promontory of the abrasion platform (ca 0.5 km west of the Brown Booby colony). Here it was easy to ascend the cliff, partly along a ledge and a low alcove



Fig. 2. Fishermen searching for Little Shearwaters in an almost deserted breeding colony of small petrels on Cima; August 1986.



Fig. 3. ALEXANDER's Little Shearwater, probably a first year bird, extracted from a burrow; Cima, August 1986.

with holes and narrow funnels. The ledge and the floor of the alcove were whitewashed by guano and fresh spillings, suggesting the presence of many Cagarra nests. However, I never observed more than two chicks in this particular spot, always in exactly the same place. Also during my strolls over the island I found no more than some 20 occupied nests, each with a large downy chick (fig. 4). One nest, found on 5 September, was occupied by an adult bird incubating an addled egg. Considering that egg-laying commences about mid-June (NØRREVANG & DEN HARTOG 1984:113) this egg must have been incubated for some 75-80 days (!).

I may here recall that on 15 June 1982, on one particular hill slope, we found several occupied nests. As this was at the very beginning of the breeding season, there seemed, moreover, good reason to assume that the birds observed were the forerunners only of a considerably larger number to breed eventually at this location. The more unpleasantly I was surprised in 1986 to find only three nests containing a chick on this same hill slope.

On the basis of these daytime observations alone, I would have inferred that the once numerous Cagarra colony had all but vanished. Night observations on the south coast, however, presented a totally different picture, with hundreds of birds landing on the cliffs (figs. 5, 6). At the spot described above, where we landed, the first Cagarra would come inshore, and land on the cliffs at about 8.30 p.m., shortly after sunset. And each night between this point of time and 10.00 p.m. some 60 to 100 individuals would silently land on the ledge and in the alcove, where by day I had seen no more than two chicks. I further noticed that up to 20 or 30 birds



Fig. 4. Cape Verde Islands Shearwater, downy chick presumably about 4-weeks old; Razo, September 1986.

(usually in pairs) would enter the same hole or funnel, suggesting the presence of many more occupied nests in the interior of the cliff. I had the strong impression that the birds shortly after disappearing (presumably to feed their chicks) returned to the alcove, where many birds usually lay down in pairs. Some pairs displayed billing. It seems likely that they stayed there until dawn, but I usually ceased my observations before midnight.

Nightwalks made in eastern direction also revealed the presence of numerous Cagarra pairs lying on ledges and on the periphery of the plateau, including the territory of the Brown Booby colony.

As mentioned, it was impossible to be sure whether all these pairs were raising a chick, and which chicks and adults belonged together. I therefore refrained from collecting any specimens. However, during my stay on Razo several Cagarra had crashed at night on board the "Tydeman", and four of these, all females (weight: 387, 390, 397 and 401 grams) were secured. The stomachs of these birds were empty (several regurgitations had been found on deck) but the gizzards contained crushed squid beaks as well as eyelenses of fish and fragments of fish bones; in one gizzard I found two fish otoliths (4 mm long) and 2 small fragments of nylon fish line.

Although it proved utterly impossible to make an accurate estimate of the present size of the Razo Cagarra colony, my impressions and observations at night suggest that the overall number of Cagarra still runs in the thousands. This, however, is hardly a reason for optimism, for it is also obvious that

breeding is now mainly restricted to inaccessible sites, deep into the cliffs. Provided that Cagarra hunters would restrict themselves to collecting chicks, this circumstance would seem to be prohibitive for a total extermination of the colony. Unfortunately, it is extremely easy to collect adult birds flying in at night, so that, if culling of chicks no longer proves remunerative, it might be attractive to fishermen to make up their harvest with adults. This would implicate a rapid decline and ultimate devastation of the colony. In conclusion I am rather pessimistic about the future of the Razo colony, unless measures are taken. To me it seems quite unlikely that at present a group of five fishermen would be able to harvest, within a few days, over a thousand chicks, as still recorded in 1981 by SCHLEICH & WUTTKE (SCHLEICH 1982: 80; SCHLEICH & WUTTKE 1983: 41). I am aware that my concern is based on impressions and assumptions rather than on factual figures, and I can only hope that my pessimism will prove to be unjustified.

By means of a torch we intercepted a few dozen birds before these could enter the alcove near our landing place. Several of these prematurely regurgitated, which may have been partly due to the fact that we upset them by our activities. It even appeared that birds could be forced to regurgitate "at will" simply by holding them, and/or by directing the beam of the torch on them. This enabled me to collect a number of stomach contents. One bird regurgitated an unidentified flying fish (Exocoetidae), about 12 cm long. The other regurgitations contained exclusively fish fry (several dozen specimens, ca 4-8 cm long), representing a single species, viz., *Emmelichthys ruber* (TRUNOV 1976) (Emmelichthyidae) (identification by Mr. M.J.P. VAN OIJEN, NNM). So far this species was exclusively recorded from St. Helena (South Atlantic Ocean), Jamaica and Bermuda (EDWARDS & GLASS 1907: 640). It may reach a length of 30 cm. Adults live between about 100 and 200 depth, whereas juveniles occur near the surface.

I repeatedly noted that regurgitation rests left on the rocks had disappeared on the following morning. It did not seem evident that the Cagarra, adapted to snatch their prey from the ocean surface, would still recognize these materials as food and peck these up again at daybreak. It also seemed doubtful that these material had been taken by scavenging Ravens, as only a single pair of these birds roamed the island at the time of my visit, and I never observed this pair near the camp site. The last possibility I could think of was that these food-rests were taken by *Tarentola gigas gigas* (BOCAGE 1875)* a robust gecko, some 20 cm long, abounding on the southern cliffs of Razo, and occupying the same alcoves, holes and funnels as the Cagarra. SCHLEICH (1980: 153), basing himself on an analysis of droppings of the Branco subspecies of this gecko, *T. g. brancoensis*, mentioned a diet of these reptiles mainly consisting of insects, but other items such as pieces of skin, also listed by SCHLEICH, may reflect scavenging activities. I may add to this that the hab-

*) The valid senior specific name *borneensis* GRAY, 1845 (cf. JOGER 1984a, b), was rejected by the International Commission on Zoological Nomenclature in favour of *gigas* BOCAGE, 1875 (cf. SCHLEICH 1987, 1988; ICZN 1990).

itat occupied by Cagarra and geckos may indeed harbour a variety of insects and other invertebrates, but these do not generally concern sizeable species (cf. e.g. WHEATHER 1986). Therefore, it seems most unlikely that this invertebrate fauna alone would suffice in sustaining the population of these large and abundant geckos. Actual proof that the geckos had indeed consumed any regurgitations left on the rocks showed up very accidentally more than a year later, when I selected a few colour slides taken at night of Cagarra's landing on the cliffs. Two of these slides appear to show in the foreground two geckos feasting on Cagarra regurgitations (fig. 7a, b).



Figs. 5, 6. Cape Verde Islands Shearwaters, adult birds; Razo, September 1986.

In conclusion I am convinced that the Cape Verde giant geckos first of all are scavengers, which during the reproductive season of the Cagarra (June - October) mainly thrive on "waste products" of these birds, such as broken eggs, droppings (?), dead chicks, etc. Considering their size and strength, these geckos might even prey occasionally on newly hatched Cagarra chicks.

In the Cape Verde Islands occur a considerable number of Macaronesian geckos, mostly of small or medium size. Several islands and islets have their own species or subspecies, or even more than one. The fact that, of all forms, the Branco and Razo geckos represent giant forms is noticeable and presumably no coincidence. The phenomenon of gigantism (just as dwarfism) among island forms is well-known, especially among reptiles. Apart from genetic and possible other mechanisms, there is at least one unconditional ecological prerequisite for such species to evolve, viz., the ample presence of food, and this must also apply to the Branco and Razo geckos. Restricting myself to Razo, not having visited Branco, I may recall that this island is very dry, poorly vegetated, and as far as I could see poor in macroscopic



Fig. 7 a, b. Night pictures, accidentally showing two giant geckos, (a) approaching and (b) feeding on regurgitations of Cagarra; Razo, September 1986.

terrestrial invertebrates (both in species and biomass), and that these giant geckos seem to be restricted mainly to the extensive Cagarra colonies on the lee-side of the island. A scavenging life-style therefore, specialized on the amply available and highly nutritious source of Cagarra "waste products" (although not necessarily throughout the year) seems a plausible possibility for this species to have evolved, and to maintain itself in such considerable numbers. Viewed in this light a total devastation of the threatened Cagarra colonies of Razo and Branco would seem to have serious consequences for the giant geckos as well. Paradoxically these geckos may have benefitted greatly from the yearly Cagarra culling trips, by the offal left behind by the hunters. Further studies on the association of the Cagarra and these geckos, their biology and habits, are necessary to confirm the above hypothesis, and may also be rewarding in other respects.

Recent studies by SCHLEICH (1982a; 1984; 1987) and JOGER (1984a, b, c) have shown the Cape Verde Islands to be a centre of radiation of Macaronesian geckos, many islands harbouring endemic taxa. In principle, therefore, other isolated, non-searched areas, islets or stacks, might also harbour undiscovered bird-associated taxa.

The Cape Verde Cagarra differs significantly from the Macaronesian Cagarra (*Calonectris diomedea borealis*) in the size and colour of body and bill. In 1982 - once having had this bird in the hand - we did not hesitate to regard it as a different species (NØRREVANG & DEN HARTOG 1984: 112), and although a matter of secondary importance, I am still of that opinion. There is not the slightest proof of mixing between the two forms, and indeed the difference in size would seem prohibitive for hybridisation. BOURNE (1986: 165), on the basis of three important basic characters (weight; wing and tail length) showed that Mediterranean populations (*C. d. diomedea*) are intermediate in character and hence concluded that the Cape Verde population can only be regarded a subspecies. His data from Tunisia, Malta and Crete reveal a clinal size reduction in eastern direction. However, birds from Crete and the Cape Verdes, although approaching each other in size, belong to the most remote and least related populations. In my view a valid decision about the taxonomic status of the Cape Verde Cagarra can only be made by comparing it with the Macaronesian form, which indeed is significantly different.

5. Bulwer's Petrel (*Bulweria bulwerii*) - The literature on this species suggests that it is uncommon in the Cape Verdes. It was first discovered by CORREIA (in 1922), who collected specimens on Cima (2 adults, 3 downy young) and Razo (15 adults and 25 eggs) (cf. MURPHY 1924: 237-238). Few records were published since. DE NAUROIS (1969a: 154-155) found the species on Cima, but searched in vain for it on Razo. He did, however, collect Barn Owl pellets on the last-named islet, which proved to contain remains of *Bulweria* skulls (cf. BANNERMAN & BANNERMAN 1968: 184). LAMBERT (1980: 8) presented some at sea observations, and SCHLEICH & WUTTKE (1983: 42) and NØRREVANG & DEN HARTOG (1984: 114) mentioned it from Razo.

In 1986, I found one dead, mummified bird on Cima and a few on the north coast of Razo, where, in the moist, steep cliffs on the east side of the large abrasion flat on the north-west coast (Ponta de Testa Lisa), I also discovered three holes occupied by a fairly large, grey-black, downy chick (one of which emaciated and apparently abandoned by the parent birds). These cliffs are dangerous to climb, and as I found these nests without taking unnecessary risks, it seems likely that this location harbours a significant breeding population of Bulwer's Petrel.

6. Brown Booby (*Sula leucogaster*) - A small colony of the Brown Booby, possibly not exceeding some 50 birds, and definitely less than a hundred individuals, mostly adults, was recorded on the south-eastern tip of Cima. On an inaccessible ledge I noted (only) one bird incubating an egg. This colony represents the sad remainder of a once thriving population [BOURNE (1955a: 519), still mentioned about 250 pairs], reduced by human depredation. This process still goes on, as indicated by the near absence of immature

birds. Visiting locals from nearby islands (Fogo, Brava) collect chicks whenever they have the opportunity, and indeed the only chick I saw was a ca 2-week old nestling, taken by a few fishermen.

A much larger colony was still in existence on the cliffs of the south-east coast of Razo. This colony extended discontinuously over a distance of about 1 km, and comprised some 350-400 birds, including about 200 adults. The birds did not only occupy ledges on the steep, though rather low cliff-walls, but also the outer edge of the plateau, where, on 1 September, I counted some 25 juveniles, varying from ca 4-week old (purely white) downy chicks, to almost fledged, "frizzled" individuals. In addition I found four nests with eggs: one with a single egg, three with two eggs (the nest is no more than a shallow depression and nesting material is sparse, consisting of a few feathers and /or twigs, a stray piece of rope, etc.). On 5 September, when I inspected the colony again to check whether any of the eggs had hatched, I failed to find three of the nests. I also established that a number of chicks had disappeared from the easternmost part of the colony and I have little doubt that a party of fishermen from Brava, which had left the island on the previous day, had raided the colony before departing.

During the expedition I saw no other Brown Boobies, except for a single bird in the Bay of Praia, São Tiago.

7. Red-footed Booby (*Sula sula*) - In a previous paper (DEN HARTOG 1987), I have already described the record of a Red-footed Booby on Cima, which constitutes the first record of this species in the Cape Verde Islands.

8. Magnificent Frigate Bird (*Fregata magnificens*) - The Cape Verde population of this species was described as a separate race, *F. m. lowei*, by BANNERMAN (1927; see also BANNERMAN & BANNERMAN 1968: 194), but this was not generally accepted, and also ignored in the authoritative compilatory work of CRAMP (1977: 244). At present the Frigate Bird is one of the most threatened species in the archipelago. Possibly it was never very common, breeding being restricted to a few localities (cf. KEULEMANS 1866; DOHRN 1871: 9; ALEXANDER 1898a: 29, 114; MURPHY 1924: 257-258). DE NAUROIS, some 20 years ago (1969a: 161), estimated the total number to have reduced to some 10 or 12 pairs, breeding on the isolated islets of Curral Velho and Baluarte, off Boa Vista. These islets still accommodate significant colonies of the Brown Booby, an important condition for the kleptoparasitic Frigate Birds to survive (cf. KEULEMANS 1866: l.c.; DEN HARTOG 1984b: 91-92; Anonymus 1985: 4). Nevertheless, considering the very low figure given by DE NAUROIS, it is in fact amazing that the Frigate Bird has lived to survive in the Cape Verdes up to the present day. That it still has so is obvious from various observations during the last decade, mostly from the coasts of Boa Vista, especially near Curral Velho, Baluarte, and Sal Rei: LAMBERT 1980: 13 (1 immature bird pursuing Cagarra); NØRREVANG & DEN HARTOG 1984: 115 (1 bird); Anonymus 1985: 4 (a few individuals); MADGE 1985: 5 (1 bird); KOEDLIK & DE BRUYN (pers. communication; 1 bird at Ponto Chave, winter 1986-1987); HAZEVOET 1989a: 2 (1 bird); 1989b: 20-21 (10 sightings in about 2 weeks, altogether 6-8 birds); 1989d: 4 (2 birds). Members of

the CANCAP VII expedition observed one bird near Ilhéu Sal Rei on 28 August, 1986. There are a few observations from other islands, viz., Maio, Sal and Razo [HAZEVOET (in press); KOEDIJK & DE BRUYN (pers. communication; 2 birds near Vila do Maio, winter 1986-1987)]. HAZEVOET (in press) estimates the present Cape Verde population of the Frigate Bird at no more than some 10 individuals.

9. Red-billed Tropic Bird (*Phaethon aethereus*) - In the eastern Atlantic the Cape Verdes and the Iles de la Madeleine, off Dakar, Senegal, form the northern limits of the breeding range of the species. It still breeds in sparse numbers on isolated, mostly inaccessible cliff sites on most of the southern islands of the Cape Verde Archipelago, but seems to be absent, or nearly so, in most of the northern islands, viz.: São Vicente, Santo Antão, São Nicolau, Maio, Santa Luzia and Branco (cf. BANNERMAN & BANNERMAN 1968: 203; DE NAUROIS 1969a: 160; LAMBERT 1980: 12).

From an account of CORREIA (cf. MURPHY 1924: 256-257) it is obvious that the Rombos islets, including Cima, used to form one of the strongholds of the species in the Cape Verdes, and BOURNE (1955a: 519) some 30 years later still considered this to be true, though not based on hard evidence. Apart from "a few unemployed" individuals off-shore, he saw no Tropic Birds, but found "many old nest sites in the long grass and holes and crevices of the islands, suggesting a breeding population of hundreds of pairs". In particular the suggestion that Tropic Birds on Cima used to breed on the ground among the grassy vegetation is disputable. This phenomenon was neither mentioned by previous authors, nor confirmed later on.

In 1986 I only observed Tropic Birds on Cima and Razo. During my visit to Cima (23/24 August) I saw no more than two or three individuals (in this respect BOURNE's and my own observations are in agreement) and I fear that the population has reduced greatly. Whatever the case, from 1 to 5 September, i.e. hardly more than one week after my visit to Cima, I observed the species in numbers on the leeward side of Razo and I located several occupied holes in the low precipitous cliffs. One accessible hole, checked twice, contained no egg or chick.

During my stay on Razo, Tropic Birds could be observed frequently at sea within a mile or so from the coast, mostly flying in pairs or in small, even-numbered groups of up to 12 birds. On the basis of these observations an estimate of the present Razo population at some 80 birds seems realistic.

10. Grey Heron (*Ardea cinerea*) - Just as in 1982, this species was seen on a few occasions: 23 August, Cima, one bird, not fully mature; 27 and 28 August, Ilhéu Sal Rei, one or two birds (observations by members of the expedition); 30 and 31 August, Sal, Bay of Palmeira, possibly one and the same bird, not fully mature.

11. Little Egret (*Egretta garzetta*) - The status of this species in the Cape Verdes has been discussed most recently by DE NAUROIS (1982b), who, on the basis of his own observations, came to a maximal estimate of ca 500 resident birds for the whole archipelago, but this figure seems rather high.

I observed the Little Egret on 11 occasions, altogether 12 to 14 birds: 11 August, São Tiago, near Cidade Velha, 1 bird; 16 August, São Tiago, plantation at Trindade, 1 bird; 17 August, São Tiago, Ribeira de São Domingos, 1 bird; 23/24 August, Cima, one (possibly the same) bird on each day; 2 and 3 September, Razo, north-west side and south side, 2 birds; 4 September, Razo, north-east side, Punta Salina, 1 bird; 8 September, São Vicente, west coast, 3 birds; 9 September, São Vicente, north coast, Baía das Gatas, 1 bird.

According to DE NAUROIS the species occurs exclusively along the shore, foraging in tidal pools and breeding in rock crevices, under rock overhangs, etc. Occasionally, however, the species may also be observed elsewhere, notably in the interior of São Tiago, as is obvious from two of the above-mentioned records (Trindade; São Domingos) and from an account of BANNERMAN & BANNERMAN (1968: 230), who stated: "sometimes in palm gardens (in which there are watertanks) on the plains of the interior. Usually when tanks holding brackish water, pumped up by air-driven windmills, were present, so were both species of Egret, but the Cattle Egret invariably outnumbered the other by 20 to one".

12. Egyptian Vulture (*Neophron percnopterus*) - In 1986, unlike in 1982, I did not see any significant concentrations of this species. Altogether I only observed 9 birds: 11 August, São Tiago, Cidade Velha, 1 adult; 17 August, São Tiago, route Praia-São Francisco Bay, 1 adult; 26 August, Maio, Vila do Maio, 2 birds soaring above the village; 8 September, São Vicente, route Mindelo-Baía das Gatas, 1 bird; 9 September, São Vicente, São Pedro village, 3 adults + 1 immature bird. Unlike in 1982 (NØRREVANG & DEN HARTOG 1984: 109) Egyptian Vultures were absent on Razo.

Equally sparse and scattered observations were made by recent birding expeditions (MADGE 1985; HAZEVOET 1986a: 6). Historical data on this strongly anthropophilous species, first mentioned by BOLLE (1856: 17-18), have been summarized by BANNERMAN & BANNERMAN (1968: 262-268) and DE NAUROIS (1985: 247-248). These data, however scanty, suggest that there is little reason to assume that the present status of the species would differ significantly from former days; periodical fluctuations in number seem a normal phenomenon. An interesting early reference to the species, which escaped the notice of the above reviewers and of LE GRAND (1986), is KNIGHT (without date: 36), who visited Mindelo, São Vicente in 1880, and observed the species on Porto Grande beach ("They were quite tame, and allowed us to approach them within a yard or so. These useful scavengers are protected by law, and a heavy fine is inflicted on any one who kills one of them - hence their tameness").

13. Kestrel (*Falco tinnunculus*) - The Kestrel is distributed over the entire archipelago, but records from Sal and Santa Luzia are rare (DE NAUROIS 1969a: 212; HAZEVOET 1986a: 7). Two endemic insular races are currently recognized, viz., *Falco tinnunculus neglectus* and *F. t. alexandri*; the first restricted to the north-western islands, the second to the eastern and (presumably) south-western islands.

The difference between the two forms was first noticed by ALEXANDER (1898b: 278), but the population of the eastern islands was not described as a separate race until BOURNE (1955b) made a comparative study of 12 birds from the north-western islands and 13 from São Tiago and Maio, which revealed significant differences between these two series. This study actually did not disprove a possible existence of clinal variation, as no specimens were examined from Boa Vista and Sal, and from the south-western islands. This omission was made up later on to some extent only, when five birds from Boa Vista were studied, which proved to belong to *F. t. alexandri* (BOURNE 1957: 189). HAZEVOET (1986 a: 7) claimed a bird observed on Sal to belong to *F. t. neglectus*, but this needs confirmation.

In 1986 my own observations of Kestrels, all solitary birds, were mainly restricted to São Tiago, where the species is rather common: 11 August, route Praia-Cidade Velha, 1 bird; 12 August, route Praia-São Jorge de Orgãos, a few birds; 13/14 August, route Praia-Tarrafal, several birds; 15 August, south of airport, 2 birds; 17 August, just north of Praia, 1 individual observed to catch a lizard; idem, São Domingos, 1 individual.

In addition, on 23/24 August, the species was sighted several times on Cima (possibly the same one or two individuals) and another observation, by members of the expedition, was made at sea, ca one mile alee of the islet. On 26 August I observed a few individuals in the surroundings of Vila do Maio.

I did not observe any Kestrels on Sal and São Vicente, and the species was definitely absent from Razo.

14. Black Kite (*Milvus migrans migrans*) - Not being very familiar with the Kites, NØRREVANG & DEN HARTOG (1984: 117) uncritically identified all individuals observed in 1982, both on São Tiago and Santo Antão, as Black Kites, although this species was not known to occur on Santo Antão. However, a critical re-examination of a colour-slide taken in 1982 at Monte Trigo of a soaring Kite suggests that this bird either is indeed a Black Kite, or a hybrid (C.J. HAZEVOET, pers. communication).

In 1986 Kites were exclusively observed on São Tiago: 14 August, on the route Tarrafal-Porto Formoso and above the sea, several individuals; 18 and 21 August, near Cidade Velha, several individuals on each day. All birds observed at close range (Cidade Velha) were positively identified as Black Kites.

15. Osprey (*Pandion haliaetus*) - Information up to 1969 on the Osprey in the Cape Verde Islands was recently summarized by DE NAUROIS (1987a), who estimated the total population at some 50 pairs; a figure which still seems realistic at present. Being a conspicuous bird, due to size and behaviour, the Osprey can hardly be overlooked, and this may suggest that it is relatively common. In reality, however, none of the islands and islets harbours more than a few pairs.

On Cima (23/24 August) I found three old perches littered with fish bones, and members of the expedition on board of HNLMS "Tydeman" sighted two Ospreys at sea, on the leeward side of the island. On 27 August I sighted one bird above the narrows between Boa Vista and Ilheu Sal Rei. On the southern part of the last-named islet I again found several well-marked perches.

On Razo (1-5 September) one pair haunted the eastern part of the island and at least one other pair resided on the western part. Actually, I regularly observed three individuals on the west side. One of these may have been an immature bird (cf. HAZEVOET 1986a: 7) but possibly it formed part of another pair (cf. MADGE 1985: 7). On the south-eastern plateau I found a few whitewashed perches strewn with fish bones, and, in addition, three old nests. These nests, lying on one line, some 100 m apart, and mounted on slight rocky elevations, were ideally situated to overlook the plateau. In the absence of conspicuous reference marks, it proved much less easy to relocate these nests than one would expect, but all the same this way of nesting must be quite vulnerable to human depredation.

Data on the diet of Cape Verde Ospreys are very sparse (DE NAUROIS 1969a: 170; in particular Carangidae, Acanthuridae, probably Scombridae, Exocoetidae with an average length of 30 cm; see also DE NAUROIS 1987a: 667). On Razo I was struck by the fact that perches were littered mainly with remains of garfish (Belonidae), whereas remains of a more varied diet, including fishes of considerable size, were found in and around the nests. From the largest nest (fig. 8) and from one significant perch on the north-west coast of the island most of the fish remains were collected. A survey of these materials is presented in table 2 and 3. Although collecting was done more or less randomly, it seems likely that the picture given in table 3 is to some extent biased in favour of the large, conspicuous items/species. Drs. M. J. VAN OIJEN (NNM), to whom I am indebted for the identification of these materials, moreover remarks that all but one of the heads of triggerfish (*Canthidermis maculatus*) are split dorsally, suggesting human handling rather than Osprey feeding activities. If so, this may also hold for certain other items found in and around this nest. Possibly therefore, some if not all larger remains of tough-



Fig. 8. Deserted eyrie of Osprey on western part of Razo; September 1986; note fish remains.

skinned fish, notably of Triggerfish, Moray-Eel (Murenidae) and small sharks (*Paragaleus pectoralis* and *Mustelus mustelus*) may derive from human fishing activities, and Ospreys may have collected these items later on, only to serve as nesting material. This would to some extent explain the difference in variety of fish species found on the perch (6 species) and the nest (at least 16 species), but it certainly

does not explain all the differences. The presence of a predominant proportion of epipelagic garfish on the perch (and also on a few other perches that were superficially examined in the field) might reflect influx of these migratory fishes out of the reproductive season of the Osprey, but this is sheer speculation.

On 7 September one Osprey was observed by members of the expedition on the west coast of São Vicente, and on 9 September I observed one pair on the cliffs of the westernmost part of São Pedro beach, also São Vicente.

16. Guinea-Fowl (*Numida meleagris*) - On 26 August, in a savanna-like area with sand, dry grass and acacias, north-west of Vila do Maio, beyond some abandoned salt pans, I came across three Guinea-Fowl. The birds were extremely shy and even under cover of bushy scrub they could not be approached at close distance.

FRADE (1976: 51) considered the Cape Verde Islands population sufficiently characteristic to distinguish a separate subspecies, viz. *Numida meleagris bannermani*. Apart from the fact that insular subspecies seem often ill-founded, based on non-representative samples, the case of the Cape Verde Islands Guinea-Fowl in particular deserves reservation, as this bird was almost certainly (and probably more than once) introduced in the archipelago. Doubt as to the subspecific status of the Cape Verde population has also been expressed recently by BOURNE (1986: 167) and DE NAUROIS (1987c: 319).

17. Quail (*Coturnix coturnix*) - Also on 26 August, in the same area, I flushed nine individuals of this species. I am unable to say whether these birds belonged to the resident race (*C. c. inopinata*) or to the Palearctic migratory race (*C. c. coturnix*). Considering that other migrant visitors were spotted on this same day and spot, the birds observed may well have been migrants.

18. Oystercatcher (*Haematopus ostralegus*) - On 5 September two individuals of this species were observed by members of the expedition on the flat eastern part of Branco. A familiar bird in Holland, and in fact unmistakable, I have no reason to doubt this observation. The Oystercatcher was previously reported only by BOURNE (1955a: 550; 25 August, Cima, 17-22 September, São Tiago).

19. Kentish Plover (*Charadrius alexandrinus*) - The Kentish Plover has been referred to by previous authors as the most common wader in the Cape Verdes, and apart from the erratic Black-winged Stilt (cf. DE NAUROIS & BONNAFFOUX 1969; DE NAUROIS 1986a) it also is the only wader that breeds in the archipelago. I observed the species on various occasions: 9 August, Sal, Santa Maria, beach, 4 birds; 13 August, São Tiago, Tarrafal, pool behind beach, 1 bird; 15 August, Praia, airport and stony plain south of airport, 5 birds (including at least 1 immature) together with Cape Verde Coursers; 17 August, São Tiago, São Francisco Bay, 2 birds; 26 August, Maio, slightly west of Vila do Maio, sand quarry with shallow pools, 42 birds including many immatures; 27 August, Ilhéu Sal Rei, beach, 2-4 birds; 29 August,

Sal, bay east of Ponta do Leme Velho, 2 birds; 9 September, São Vicente, Baía de São Pedro, beach, 20-25 birds.

20. Ringed Plover (*Charadrius hiaticula*) - In contrast to the former species this is a winter visitor. Reported for the first time by BOURNE (1955a: 551), a considerable number of records was published since (BANNERMAN & BANNERMAN 1968: 310-311; FRADE 1976: 51; LAMBERT 1980: 15; SUMMERS-SMITH 1984a: 149; HAZEVOET 1986: 7). Summer records from the period between 2 May and 16 August are as yet not available.

I met this species twice: 29 August, Sal, east of Ponta do Leme Velho, 1 bird; and 9 September, São Vicente, Baía de São Pedro, beach, 1 bird among Kentish Plovers, Turnstones, and Sanderlings.

21. Turnstone (*Arenaria interpres*) - The Turnstone is one of the most common migrant shore birds of the Macaronesian islands, and the situation in the Cape Verdes forms no exception. Here the species may be seen all the year round, though much sparser in the summer months (c.f. e.g. BANNERMAN & BANNERMAN 1968: 319-320). My own observations seem to indicate that the number of "summer residents" is very low indeed, for in June 1982, I did not see a single individual. In contrast, some 100 birds (many in full summer-dress) were observed during August and early September of 1986. I therefore conclude that the vast majority of these were early autumn migrants. The following are my detailed observations: 9 August, Sal, south coast, beach and salt pans at Santa Maria, 4 birds; 23 August, Cima, 2 or 3 birds; 24 August, Cima, ca 15 birds; 26 August, Vila do Maio, 8 birds among 42 Kentish Plovers; 27 August, Ilhéu Sal Rei, ca 15 birds; 28 August, Ilhéu Sal Rei, few birds; 29 August, Sal, south-east coast, Ponta do Leme Velho, 10-15 birds; 30/31 August, Sal, west coast, Bay of Palmeira, several birds on each day; 1 September, Razo, south-east coast, several birds; 2 September, Razo, abrasion plateau on north-west coast, 1 bird; 3 September, Razo, south-east coast, several birds; 4 September, Razo, north-east coast, Ponta Salina, few birds; 8 September, São Vicente, west coast, 5 birds; 9 September, São Vicente, São Pedro beach, ca 25 birds. Having sighted the first individuals on Sal, on 9 August, it is striking that the species was not observed between 10 and 21 August on São Tiago, situated some 160-185 km to the south-south-west of Sal. Possibly therefore the birds from Sal represented the very first migrant arrivals of the Turnstone in the Cape Verdes.

22. Curlew Sandpiper (*Calidris ferruginea*) - A single individual of this species, presumably an early autumn migrant, was observed on 9 September on São Pedro beach, São Vicente.

23. Sanderling (*Crocethia alba*) - This is another migrant visitor which NØRREVANG & DEN HARTOG did not observe in June 1982. BANNERMAN & BANNERMAN (1968: 333) summarized the records of this species in the Cape Verdes. Additional records were presented by FRADE (1976: 52), SUMMERS-SMITH (1984), MADGE (1985), and HAZEVOET (1986: 8). Most records date from the period October-March. In addition ALEXANDER (1898a: 100, 109, 113) re-

ported a sighting on 4 April and a few between 5 and 13 May, whereas BOURNE (1955: 551) saw two birds on 29 August. LAMBERT (1980), who visited the archipelago in the periods 10 April-2 May and 3-15 October, did not observe the species.

In 1986 I observed Sanderlings on six occasions from August to early September: 9 August, Sal, Santa Maria, 1 bird; 10 August, SãoTiago, Praia, Praia de Gamboa, 2 birds; 24 August, Cima, north coast, 1 bird; 26 August, Maio, Vila do Maio, 1 bird; 27 August, south-east side of Ilhéu Sal Rei, 2 birds; 9 September, São Vicente, Baía de São Pedro, 12 birds.

24. Whimbrel (*Numenius phaeopus*) - NØRREVANG & DEN HARTOG (1984: 118-119) reported the first summer records of this species in the Cape Verdes. Up to that date Whimbrels had only be sighted between September and May (BANNERMAN & BANNERMAN 1968: 352; FRADE 1976: 53; LAMBERT 1980: 15-16, SUMMERS-SMITH 1984: 149), although BANNERMAN & BANNERMAN (l.c.) already predicted the Whimbrel to be "one of those waders, like the turnstones, which can be seen in the islands in every month of the year, as they are on the African mainland". And indeed, in 1986 a considerable number of additional summer observations was made for August and early September, without exception bearing on solitary birds: 12 August, São Tiago, Praia Baixo; 17 August, São Tiago, São Francisco Bay; 23/24 August, Cima, ca 10 observations but probably only 3-5 birds; 27 August, Ilhéu Sal Rei; 29 August, Sal, east of Punta do Leme Velho; 30/31 August, Sal, Bay of Palmeira, one - possibly the same - bird on each day; 1 September, Razo, south-east coast, several observations but probably no more than 3 different birds; 2 September, Razo, coastal plateau on north-west coast; 3 September, Razo, south-east coast; 4 September, Razo, coastal plateau at Punta Salina; 8 September, São Vicente, west coast, 1 or 2 birds; 9 September, São Vicente, beach at Baía de São Pedro; 9 September, São Vicente, Baía das Gatas.

25. Jack Snipe (*Lymnocyptes minimus*) - On 26 August, in the coastal area west of Vila do Maio, among vegetation dominated by *Zygophyllum portulacoides*, I twice flushed a small, snipe-like bird, presumably the same individual. It flew up unexpectedly and almost without noise when I nearly stepped on it and kept close to the ground, perching again among the vegetation after a short, straight-lined, weakly zigzagging flight. Although I only observed it shortly I have no doubt that the bird was a Jack Snipe.

Although a fairly well-known winter visitor in North- and tropical East Africa (CRAMP 1983: 404), it seems to be relatively rare in tropical West Africa (GLUTZ VON BLOTZHEIM et al. 1977: 14-15). The range in western Africa in the non-breeding season according to MACKWORTH-PREAD & GRANT (1970: 271) and URBAN et al. (1986: 299) includes Senegambia, Ghana and Nigeria. The bird observed on Maio constitutes the first record for the Cape Verde Islands.

26. Cape Verde Islands Courser (*Cursorius cursor exsul*) - Coursers, not recorded in 1982, were seen in 1986 on São Tiago and Maio. The following are my records: 15 August, east of Praia, on airfield plateau, 7 birds (1 pair on the northern part of the airfield,

and 2 pairs plus 1 single bird on the barren, stony plain south of the airport; presumably the 5 last-named birds were again spotted on the following day); 26 August, surroundings of Vila do Maio, 5 birds (1 pair and 3 singletons; one bird observed on the village beach seemed accustomed to human presence and could easily be approached within a distance of ca 4-5 m).

Having been reported from Razo by MURPHY (1924: 269), I looked in vain for the species during my stay on that island.

Although the Cape Verde Islands Courser is generally treated as a separate race, it hardly differs from the North African race *C. c. cursor*. CRAMP (1988: 98) explicitly stated that "many Maghreb birds (are) indistinguishable from (the) Cape Verde population".

27. Lesser Black-backed Gull (*Larus fuscus*) - On 7 September a gull was sighted which for some minutes kept pace with the ship. It was in full summer dress: upper parts black or almost so, rump and tail white, legs yellowish, bill bright yellow with conspicuous bright orange spot on lower mandible. The bird was very much darker than the Atlantic Herring Gull (*Larus argentatus atlantis*), and there is no doubt that it represented an adult lesser Black-backed Gull, probably *L. fuscus fuscus*.

28. Cuckoo (*Cuculus canorus*) - On 26 August, just south of Vila do Maio, I observed a single Cuckoo, flying east-west, a few meters above the ground, and passing by at close distance. Considering its rufous-brown upper parts it was an immature bird.

There are only two previous records of this species from the Cape Verde Islands, made in the same time of the year (cf. BANNERMAN & BANNERMAN 1968: 379): one by FEA (Brava, 5 September 1898, one immature bird) and one by BOURNE (São Tiago, August 1951, one bird).

29. Barn Owl (*Tyto alba detorta*) - Although I did neither observe or hear any Barn Owls, nor collect any of their pellets, I mention the species here in connection with an interesting note by SCHLEICH & WUTTKE (1983: 42-43) which I overlooked previously. On Razo these authors found a hole containing some 30 kg of bony material, mainly consisting of bones of geckos (*Tarentola spec.*) and "Seeschwalben" (as terns are absent in the Cape Verdes, it is obvious that these bones in fact derived from small Procellariidae). The authors were inclined to attribute this accumulation to a Kestrel or Kite, but there seems little doubt that they actually found a regular roost or nest site of a Barn Owl. This view is supported by previous data on the alimentary regime of Barn Owls from Razo (and Branco), based on an analysis of owl pellets (HEIM DE BALSAC 1965; cf. also DE NAUROIS 1969a: 179-180; 1982a: 156-158), which showed these to consist mainly of remains of small petrels (*Oceanodroma castro*, *Pelagodroma marina* and some *Puffinus assimilis* or *Bulweria bulwerii*), reptiles (*Tarentola*, *Mabuya*) and in addition some remains of Iago Sparrows and even Razo Larks. Data of the same authors from São Tiago indicate a diet mainly consisting of mice, rats, Spanish Sparrows and insects; DE NAUROIS (1969a: 180) also mentioned remains of geckos. ALEXANDER (1898a: 91) found insects ("13 Beetles, a kind of Cockroach, very common in the

house") in the stomach of a bird from Brava.

It has been assumed mistakenly that BOLLE (1856: 10) was the first to report this species from the Cape Verdes (cf. BANNERMAN & BANNERMAN, 1968: 380; DE NAUROIS, 1982a: 155), for there can hardly be any doubt that already DAMPIER (1981: 58), who visited the islands in 1683 and 1699, made reference to this bird: "... Crusia's, another Sort of grey-colour'd Fowl almost as big as a Crow, which are only seen at Night (probably a Sort of Owls) and are said to be good for consumptive People, but eaten by none else". It is obvious that the name Crusia used by DAMPIER is a different (phonetic) spelling of Coruja, still the current (Portuguese and) local name of this species [cf. also KEULEMANS 1866: 365; Crusha (Kroezje)].

30. Cape Verde Island Swift (*Apus alexandri*) - This bird, originally described by HARTERT (1901: 328) as a subspecies of *Apus unicolor*, is now generally regarded a distinct species (e.g. BANNERMAN & BANNERMAN 1968: 384-386; DE NAUROIS 1986b). It is locally common in villages and towns, and between 10 and 18 August I regularly saw it in São Tiago (Praia, São Domingos, Santa Catharina, Tarrafal). In addition I observed this species on Sal (9 August, Santa Maria, 5 individuals) and Razo (3 September, 2 sightings, possibly the same bird).

Contrary to the information presented by ALEXANDER (1898b: 283), and accepted by BROOKE (1971: 16), this swift, like its congeners, lays purely white eggs (cf. DE NAUROIS l.c.: 135).

31. Cape Verde Islands White-headed Kingfisher (*Halcyon leucocephala acteon*) - This conspicuous bird has exclusively been reported from the three south-western islands: São Tiago, Fogo and Brava. It differs only very slightly from *H. l. leucocephala*, the continental West-African race, so that it is not surprising that no different island races developed in the Cape Verdes. The West-African race being far from sedentary interinsular movements in the Cape Verdes would not seem unexpected, and it therefore is noticeable that the species is absent from some islands offering seemingly suitable habitat conditions. In this perspective it is of interest that Mr. O. KØEDIK and Miss D. DE BRUYN (pers. communication) during visits to São Vicente, Santo Antão and São Nicolau were informed by local inhabitants that the "Passarinha" used to occur in the former island, whereas still occurring in the latter two, though only in very small numbers. These rumours were not confirmed by observations and therefore might easily be disregarded as unlikely, had they not found a dead (presumably dispersive) immature bird on Sal, of all places! The bird was found on 13 February in a dry well along the road connecting Palmeira airport and Santa Maria. Its skull was deposited in the collection of the Nationaal Natuurhistorisch Museum (NNM), Leiden.

Of the three islands from which the species has always been known I only visited São Tiago, where it is (still) rather common. In the interior of the island, in cultivated fields, villages and barrancos, this confident bird can hardly be missed. I made the following observations: 12 August, São Domingos, 3 birds (including 1 pair); São Jorge de Orgãos, 4 birds (including 1 pair); 13 August, route Praia-Tarrafal, ca 10 birds; 14 August, east coast, route Tarrafal-

Praia, 5 birds; 16 August, Trindade, at least 8 birds; 17 August, São Domingos, 1 bird.

32. Razo Lark (*Alauda razae*) - During our very short visit to Razo in June 1982 (NØRREVANG & DEN HARTOG 1984) we only saw about 15-20 Razo Larks, all but one united into a single flock, including several immature birds. This made us fear that the population of this once fairly common bird might have declined considerably. Fortunately this concern has not been substantiated. VAN HARREVELD (1985: 106), who visited Razo in March of 1985, estimated the number of birds on the central plateau to be at least 50, and HAZEVOET (1986a: 13; 1986b: 134) made an estimate of ca 50 pairs. Other recent estimates even amount to "at least 150 individuals and perhaps over 200" (Anonymus 1985: 4), 200-250 birds (HAZEVOET 1989b: 29) and 75-100 pairs (HAZEVOET 1989c: 83).

My 5-day visit to Razo in 1986 enabled me to get a much better impression of the numbers of the species than in 1982, and there is no doubt that it is still rather common. Each day I observed several dozen individuals, and on 3 September another member of the expedition (Dr. PRUD'HOMME VAN REINE) and I counted about 100 Razo Larks in one morning. I therefore estimate the present population to amount to at least 200 individuals. Although the species occurs mainly restricted to the southern and south-western plateau, as reported previously, we also observed it on broken, stony areas in the eastern part of the island, on the southern slopes of the north-eastern hills, and on top of the north-western heights. It seems possible that dispersal over the island is seasonal (whatever seasons mean on Razo, for any wet period on this drought-ridden island may in fact be more significant than calendar seasons), and that the birds tends to flock and to wander about in between breeding periods (the sparse information available suggests that there may be two more or less distinct reproductive periods, one in spring and one in the autumn; cf. DE NAUROIS 1987b: 136-138).

During our visit in 1986 the birds were generally observed in pairs (initiation of the breeding period?). In addition small flocks of up to eight individuals were encountered, but even within such groups I usually observed pair-bonding. I did not observe courting or mating; singing, however, could be heard everywhere on the plateau. Singing birds kept on or close to the ground, and although it is



Fig. 9. Razo Lark; adult male showing the large conspicuous bill; September 1986.

difficult to estimate height, I don't think they ever rose more than 10 meters into the air.

Little detailed information is available about the food and feeding habits of the Razo Lark. ALEXANDER (1898a: 107), who discovered the species, wrote: "Their chief food seemed to be grass-seed, but now and again we found flocks picking up a livelihood on the stretch of black rocks close to the sea". MEINERTZHAGEN (1951: 94), on the other hand, stated: "..., the short time during which I observed *razae*, they were constantly excavating for grubs and not surface feeding for seeds". And DE NAUROIS (1969a: 186) reported that an analysis of the stomach contents of two birds collected in 1965 revealed the presence of abundant fragments of several species of ants, debris of Coleoptera (beetles), grains (of seed), germ plants, vegetable debris and fine gravel (see also: BANNERMAN & BANNERMAN 1968: 401).

The unusually large bill of the Razo Lark (as compared to e.g. the Skylark) (fig. 9) seems to have escaped from the notice of scientists until MEINERTZHAGEN (1951: 90, 94) both mentioned it and stressed its significance as a digging organ. BURTON (1971) presented data on sexual dimorphism, showing a striking difference in bill-size between males and females. The size of the bill reached in adult males is well illustrated by VAN HARREVELD (1985: 107 fig. 61) and HAZEVOET (1986a: 13; 1986b: 137, fig. 94). Figures published previously by ALEXANDER (1898a: pl. III) and BANNERMAN & BANNERMAN (1968: pl. 46) reflect this character insufficiently, and it may be noted in passing that this also holds for the crest, which indeed often is inconspicuous, but of considerable size when erected (fig. 10).



Fig. 10. Razo Larks; note rather significant size of erected crest; September 1986.

I regularly observed significant digging activities, but not to the extent observed by Dr. PRUD'HOMME VAN REINE, who informed me that he actually saw the birds disappear into the ground, only the rear edge of the tail remaining visible. I did, however, find ample evidence of such excavating activities on the sandy parts of the plateau, in patches

with cover of dry, grassy vegetation (figs. 11, 12)*. Within the circumference of such patches - where lizards (*Mabuya stangeri*) were relatively common and where, if anywhere, one would expect both seeds and insects - the soil was often found to be completely ploughed up. SCHLEICH & WUTTKE (1983:



Fig. 11. Sandy plateau on western part of Razo with patch of withered, grassy vegetation in the foreground, showing conspicuous marks of digging activities, possibly by the Razo Lark (see text); September 1986.



Fig. 12. Detail of fig. 11; note conspicuous excavations.

*) Mr. C. J. HAZEVOET, Amsterdam (pers. communication) informs me that he considers it impossible that Razo Larks could produce the kind of excavation marks shown in figs. 11 and 12. He attributes these marks to Brown-necked Ravens (a real possibility which escaped my notice), and remarks that he actually observed foraging Ravens in Maio producing similar marks. He further suggests that the observations of Dr. PRUD'HOMME VAN REINE must bear upon secondary use by Razo Larks of excavations produced by Ravens. Although he may well be right, the issue is somewhat controversial, and further observations on the digging abilities of the Razo Lark are therefore necessary.

42; caption of fig. 11) suggested that the Razo Lark digs a hole to breed. My own observations do not substantiate this idea; I found two old, empty nests, each in a shallow depression among dense, withered, grassy vegetation. Relative to its digging habits, the bill of the Razo Lark is often unclean, due to adherent dust or soil. Apart from digging I observed that the birds use their bills to turn little stones.

The Razo Lark is far from timid. Dr. PRUD' HOMME VAN REINE observed it driving off Iago Sparrows and I observed an individual charging at a sizeable lizard (*Mabuya stangeri*) which was pursued over a distance of about three meters.

A concise survey of present knowledge about the species was published by CRAMP (1988: 207-209, pls. 10.8, 13.20) and even more recently HAZEVOET (1989c) presented additional data on behaviour and breeding.

33. White-fronted Finch-lark (*Eremopterix nigriceps nigriceps*) - In the older literature the endemic (nominate) Cape Verde Islands race of this widespread African species was exclusively reported from São Tiago, Maio and Boa Vista. In 1963, however, DE NAUROIS (1969a: 184; cf. also BANNERMAN & BANNERMAN 1968: 403) established the first occurrences in Brava and Fogo. In particular in the last-named island it is now a common species (cf. FRADE 1976: 54; NØRREVANG & DEN HARTOG 1984: 121; SUMMERS-SMITH 1984: 149; MADGE 1985: 10; HAZEVOET 1986a: 10; 1989a: 6; 1989b: 29). FRADE (l.c.) also listed a single female bird from São Nicolau (collected in 1970), where the species was also observed by HAZEVOET (1989a: 6). Whether this species was ever collected in Santo Antão (BOCAGE 1898) is somewhat doubtful (cf. BANNERMAN & BANNERMAN 1968: 405).

In 1986 I only observed this species on 26 August, on Maio, where it was common on the flat, stony surroundings of Vila do Maio. Several dozen birds, males and females, mostly united in small, loose flocks, were seen. In a savanna-like area west of Vila do Maio I observed an additional sizeable flock of some 20-30 individuals.

34. Bar-tailed Sand-lark (*Ammomanes cincturus cincturus*) - The nominate race of the Bar-tailed Sand-lark is also endemic in the Cape Verdes. It was exclusively known from the four easternly islands, occurring mainly restricted to the barrenmost stony areas, until HAZEVOET (1989b: 29) reported it also from São Nicolau.

In 1986 I made the following observations: 9 August, Sal, Santa Maria, near Novotel, 2 birds; idem, airport, 2 birds; 15 August, São Tiago, just south of airport, 2 birds together with Coursers; 26 August, Maio, north and east of Vila do Maio, several pairs and solitary birds; 27 August, Ilhéu Sal Rei, central stony plain, 1 bird; 30 August, Sal, east coast, Bay of Palmeira, a few birds.

35. Boa Vista Bifasciated Lark (*Alaemon alaudipes boavistae*) - This endemic, insular subspecies is exclusively known from Boa Vista and Maio. On 26 August I observed this bird to be common around Vila do Maio, both in the stony areas around the village and among the *Zygophyllum* vegetation near the salt pans. Altogether I observed at least 20 birds, all solitary. The Cape Verde Islands race is generally described as being more rufous than the North-West

African, nominate race (cf. e.g. BANNERMAN & BANNERMAN 1968: 408), but my field notes state that some Maio birds were strikingly pale. The existence of a pale and a rufous morph is apparently well-known from the African continent; CRAMP (1988: 81) was the first to note that this phenomenon also occurs in the Cape Verde Islands population.

36. European Swallow (*Hirundo rustica*) - On 9 August, at Santa Maria, Sal, I observed three individuals of this migrant species. On 3 September one additional bird was seen on Razo.

37. House Martin (*Delichon urbica*) - On both 23 and 24 August, a House Martin (possibly the same bird) was sighted on Cima.

38. Brown-necked Raven (*Corvus ruficollis*) - Just as in 1982 Ravens were seen on all the islands visited and during nearly every excursion, though never in large numbers. Several pairs, or small groups up to ten birds, were generally present around human settlements (11 and 18 August, São Tiago; 26 August, Vila do Maio; 9 September, São Pedro, São Vicente), but I did not observe the species around the village of Santa Maria, Sal (9 August). Stray birds or pairs were generally seen in lowly populated or uninhabited areas. On each of the uninhabited inlets of Cima, (23/24 August), Razo (1-5 September) and Ilhéu Sal Rei (27/28 August) I only observed a single pair.

A resumé of this species (feeding, reproduction, morphology) was given by DE NAUROIS (1981).

39. Alexander's Blackcap (*Sylvia atricapilla gularis*) - The Cape Verde Islands Blackcap is rather common in the greener parts of the islands. As my excursions were mostly restricted to the drier parts, I only observed this species on two occasions, both on São Tiago: 12 August, São Jorge de Orgãos, village, at least 10 birds (males & females); 16 August, Trindade, beyond the plantation, in dry part of barranco, several, feeding on ripe figs in company of Iago Sparrows.

40. Cape Verde Islands Spectacled Warbler (*Sylvia conspicillata orbitalis*) - The only warblers I saw, a few birds belonging to this species, were observed in 16 August, in the plantation of Trindade, São Tiago, among the foliage of some medium-high trees.

41. Waxbill (*Estrilda astrild jagoensis*) - The present distribution of the Waxbill in the Cape Verdes seems to be restricted to São Tiago (cf. HAZEVOET 1989b: 32), where I made the following observations: 12 August, São Jorge de Orgãos, village and plantations, at least 100 birds, many feeding on young "Acacia" leaves (and/or possibly on associated ants), and a group of ca 30 birds bathing in company of a few Iago Sparrows in a shallow pool in an otherwise dry barranco; 16 August, Trindade, plantation, several birds; 17 August, São Domingos valley, several birds.

Previous authors (e.g. ALEXANDER 1898a: 92; BOURNE 1955a: 553; DE NAUROIS 1969a: 194, 1987c: 313; FRADE 1976: 56) also mentioned the (former) presence of Waxbills in Santo Antão, São Vicente, São Nicolau, Fogo and Brava.

It is generally assumed that the species was introduced. BANNERMAN & BANNERMAN (1968: 436), however, incorrectly cited DOHRN (1871: 7) by stating

that the Cape Verde population derives from birds escaped in 1865 on São Vicente. What DOHRN did report, was an escape of hundreds of individuals of "*E. phoenicotis*, *subflava*, *melopoda* etc." from a transport of exotic birds bound for Europe. He further suggested that some of these "Bengalis" might establish and maintain themselves in the islands. He did not however, mention *Estrilda astrild* in this connection. In point of fact he too mentioned this species from São Tiago only (as *E. cinerea*). Actually, there is some doubt about the trustworthiness of records from the north-western island group (cf. e.g. BANNERMAN & BANNERMAN 1968: 437), and only a rediscovery of the species in one of these islands can remove this doubt.

The Cape Verde Waxbill was described by ALEXANDER (1898a: 85) as *Estrilda jagoensis* (on the basis of a single adult male). Subsequent authors considered it merely a race of *E. astrild*. WHITE (1960; see also BANNERMAN & BANNERMAN l.c.) established that Cape Verde birds agree very well with an unnamed race from Benguella, Angola, which confirms the general notion that the Cape Verde population derives from introduced birds. WHITE's specimens presumably came from the south-western islands, and most likely from São Tiago, but the author does not state this. Thus, if the species should be rediscovered in the north-western islands, it will be necessary to verify whether the same race is involved.

42/43. Iago Sparrow and Spanish Sparrow (*Passer iagoensis* and *P. hispanoliensis*) - The Iago Sparrow was seen on several islands and on various occasions: 11 August, São Tiago, São Jorge de Orgãos, many; 13/14 August, São Tiago, Tarrafal, several; 16 August, São Tiago, Trindade, especially in the dry barranco beyond the plantation, many feeding on ripe figs in company of Blackcaps; 17 August, São Tiago, São Francisco Bay, on barren coastal rocks, a few pairs; 18 August, São Tiago, Cidade Velha, several; 23/24 August, Cima, many pairs and small flocks, total population estimated to some 200-300 birds; 26 August, Maio, surroundings of Vila do Maio, common, and regularly forming mixed flocks with the Spanish Sparrow; 1-5 September, Razo, rather common, especially on the leeward side of the island. A flock of 10-30 birds was continually present at our campsite, alert and daring, always ready to rob our food rations and there must have been a total population on the island of some 200 individuals; 9 September, São Vicente, in *Acacia* bushes at São Pedro beach, a few.

Spanish Sparrows were exclusively observed in and around Vila do Maio (26 August, rather common; see above). Curiously, the species was not seen during my rather long stay in Praia (10-18 August), where it was common in 1982 (NØRREVANG & DEN HARTOG 1984: 123). Although I paid a short visit to São Vicente I had no opportunity to pay attention to the situation of the Sparrows in Mindelo.

As pointed out by SUMMERS-SMITH (1984: 143) the situation on Fogo concerning the Iago Sparrow is not clear. BOURNE (1955: 553) was the first to report the species from this island on authority of "a reliable inhabitant" and DE NAUROIS (1969a: 213 tab. 2) also listed it as a breeding bird [although his notes (l.c.: 197-200) do not contain a single explicit record]. NØRREVANG & DEN HARTOG (1984: 123) men-

tioning both the Spanish and the Iago Sparrow, explicitly stated the latter to be the most numerous species. Recent visits to Fogo, however, have not confirmed this: SUMMERS-SMITH (1984a, b), MADGE (1985: 12) and HAZEVOET (1986a: 14; 1989b: 32) did not meet the species. Admittedly, therefore, the information of NØRREVANG & DEN HARTOG seems suspect (and it seems we made an inexcusable mistake!). Unfortunately, I had no possibility to re-visit Fogo in 1986 for confirmation or otherwise. However, considering that the Iago Sparrow is common on nearby Brava and Cima, I am not fully convinced that the species is absent from Fogo, (cf. the above note concerning Praia). Thus, pending a thorough investigation of the situation on this island, doubt remains.

SUMMERS-SMITH (1984: 143) mentioned that also very little is known about the status of the Sparrows on Sal. The Iago Sparrow was only reported by BOURNE (1955: 553; "Blossom"-material collected in 1924), DE NAUROIS (1969a: 199), and quite recently by HAZEVOET (1986a: 14). The Spanish Sparrow has exclusively been reported from this island by DE NAUROIS (1969a: 196), and HAZEVOET (1989a: 7; 1989b: 32). Although I visited a few localities on Sal (the airport, the surroundings of Palmeira and Santa Maria), I did not observe a single Sparrow on the island.

Notes on Migration

Western Palearctic species observed during the CANCAP VI and VII expeditions that are not known to breed in the Cape Verdes are listed in table 1. The birds observed in June 1982 may be regarded as stray summer visitors or odd temporary residents. Some House Martins observed were even suspected to breed (NØRREVANG & DEN HARTOG 1984: 121), but, on reflection, this seems doubtful.

Although the possibility cannot be excluded that some of the birds observed in the period of August-September 1986, notably among the small waders, may also represent temporary residents, it is obvious that the conspicuous difference in the number of species and individuals observed during the two periods reflects an influx of autumn migrants during the expedition in 1986. The detailed data presented in the "Notes on species observed" further suggest that significant autumn migration of the most common waders, viz. Turnstone, Whimbrel and Sanderling, was already perceptible prior to mid-August.

Notes and Speculations on Distribution, Speciation and Origin of the Avifauna of the Cape Verde Islands; a Review

The biogeographical character and origin of the Cape Verde avifauna has previously been discussed by MURPHY (1924), BOURNE (1955a), MOREAU (1966: 314-318), and quite recently by DE NAUROIS (1987c).

The islands are situated in the tropics of West Africa (ca 23-25°W, 15-17°N). The shortest distance to the continent amounts to some 450-500 km, and there is no evidence that they were ever connected with the mainland. The present avifauna differs strikingly from that of the adjacent part of the con-

Table 1. Non-breeding Palearctic visitors observed in the Cape Verde Islands during the CANCAP VI and CANCAP VII expeditions [* = possibly belonging to resident race].

Species	CANCAP VI (4-22 June 1982)	CANCAP VII (8 August - 13 Sept. 1986)
Grey Heron	4	3-4
Whimbrel	3	ca 20
Greenshank	2	-
Grey Plover	1	-
Ringed Plover	-	2
Turnstone	-	ca 100
Sanderling	-	ca 20
Little Stint	1	-
Curlew Sandpiper	-	1
Quail	-	9 *
Oystercatcher	-	2
Jack Snipe	-	1
Cuckoo	-	1
Lesser Black-backed Gull	-	1
Pallid Swift	1	-
European Swallow	2	4
House Martin	ca 100	1
Number of species	8	12 (+ 1*)
Number of individuals	ca 24	ca 156 (+ 9*)

continent (Senegambia), and includes 41 breeding species: 32 land-birds and 9 seabirds.

a. The Landbirds

The land-birds are of mixed character, composed of elements with a Palearctic and/or Ethiopian distribution, and a few cosmopolites and introductions. With four exceptions the species do not differ from their congeners on the European and African continents, or only to a degree warranting subspecific status. Some of these subspecies even seem ill-defined, based on very little material, and are in need of a re-appraisal.

This low degree of speciation suggests that for a number of species the distance to the mainland does not form an insuperable barrier, and that these species mix on a significant scale with continental populations, or actually form part of it. This presumably holds for several coastal birds and possibly for some raptors and other birds (Courser, Quail?) as well. Other populations, of sedentary species, must represent relatively young immigrants, which have reached the islands by chance and are now completely isolated.

Considering that the islands are situated within the tropics, the presence of a significant component of Palearctic bird taxa (absent from the rest of Africa, except the Maghreb and/or part of the other Macaronesian islands) is a conspicuous feature, undoubtedly correlated with the prevalent easterly winds in the north-western African region, now and in the past. At present the "eternal" North-easterly Trade Winds form 80% of all the winds blowing in the archipelago (LOBIN & OHM 1987: 306). For several reasons this does not implicate that the presence

of isolated, sedentary populations of Palearctic species in the Cape Verdes resulted from colonization of migrant stock ("migration suspension"; cf. LECK 1980); in spite of the fact that small numbers of Palearctic migrants regularly reach the islands.

Most Palearctic migrants wintering in Africa come from high latitudes, where breeding, apart from physical condition, endogenous rhythms, and food supply, is to a high extent determined by exogenous master factors such as photo-periodicity (day-length) and temperature (e.g. a significant temperature rise in spring) (cf. MURTON & WESTWOOD 1977), which show relatively little variation in the tropics. An example of such migrants which regularly reach the Cape Verdes, and other Macaronesian islands as well, we may consider northern waders such as Turnstone, Sanderling and Whimbrel. Although these species may be observed in the islands throughout the year, often in full summer dress, not a single breeding attempt has ever been reported or suspected. Similarly, considering the general tendency for sedentariness at lower latitudes, there are no obvious reasons why migratory populations of Palearctic species with a wide latitudinal breeding-range would behave much different. Yet it may be argued that several of the sedentary Palearctic elements of the Cape Verde avifauna happen to belong to partially highly migratory and dispersive species, viz.: Blackcap, Buzzard, Quail and Moorhen, which have even colonized the remote Azores (implicating a non-stop oversea flight of some 1600 to 2000 km). However, although a most impressive performance, it should be realized that birds (for whatever reason) having lost contact with the European continent and flying in westerly or south-westerly direction have little other choice than flying on. Except for those few individuals that by sheer accident happen to

reach the mid-Atlantic Azores, such birds will eventually perish all the same. That some species, including those mentioned above, have established local, sedentary populations in the Azores (ca 26-30°W, 37-39°N) is indisputable, and may be explained by the fact that these islands are situated amply within the southern limits of the Palearctic region, which implicates a light-regime, climate and vegetation essentially similar to that in large parts of Europe and therefore an increased chance for such species to get adapted to the local circumstances.

In contrast, the journey to the Cape Verdes (mainly via migration routes over the European and African continents) bridges some 25 to 40 degrees of latitude, with inherent dramatic changes in the light-regime, climate and vegetation. Thus, on theoretical grounds (although speculative), and in the absence of definite proof of the contrary, I am reluctant to accept that Palearctic migrants which by chance happen/happened to reach the Cape Verdes would establish/have established sedentary island populations, although the Quail may present a special case (to be discussed later on). Rather, one would expect this phenomenon to occur in Palearctic species wintering in corresponding southern latitudes. As mentioned, northern Palearctic species and northern populations of species with a wide latitudinal distribution generally show the strongest migration. Africa, however, does not extent into high southern latitudes, but a few temperate to subtropical European migrants, such as the White Stork (*Ciconia ciconia*), the European Bee-eater (*Merops apiaster*) and the House Martin are indeed known to breed occasionally in southern Africa (cf. e.g. MURTON & WESTWOOD 1977: 161-162). Several other species, such as the Black stork (*Ciconia nigra*) and the Bittern (*Botaurus stellaris*), have established pendant subspecific populations on both hemispheres, and a similar relation exists between closely allied species like the European Buzzard (*Buteo buteo*) and the African Buzzard (*Buteo oreophilus*). For additional examples I refer to Voous (1960) and SNOW (1978a).

Breeding and migration in tropical regions is usually governed by the sequence of dry and wet seasons rather than photoperiodicity, migration taking place within much narrower latitudinal limits, and as a rule having a less pronounced character. As a consequence the chance seems more considerable that intra-African migrants and wanderers would establish sedentary populations in areas such as the Cape Verdes, where seasonal changes are - at least at present - insignificant or very irregular.

Yet, expansion of breeding-ranges normally proceeds gradually or, in case of geographical or ecological barriers, step by step: through dispersion of juvenile birds, nomadic movements, island hopping etc. Therefore, colonization of the Cape Verdes also would seem to have come about essentially in this way, mainly by influx of basically sedentary, desorientated birds from the West African coastal regions carried to the islands by the North-easterly Trade Winds or on the dust clouds of the Harmattan. However, several species occurring in the Cape Verdes are presently absent from West Africa or indeed the entire African continent. For this reason, and added to this the relatively young age of the avifauna of the Cape Verdes (see above), it is plausible to consider this fauna in the perspective of Late Quaternary climatic fluctuations, when distributional

patterns of many bird species must have been quite different. During the glaciations large parts of the Northern (and Southern) Hemisphere, including northern Europe, were covered by a permanent ice cap, implicating a more arid global climate with significant deserts (RASOOL 1984: 107, 108 fig. 7.2) and a southward shift and compression of climatic and vegetational zones. The last glaciation reached its peak some 18,000 BP. Wide-spread and rapid deglaciation began about 14,000 BP and roughly reached its present state some 8,500 BP (LOCKWOOD 1979: 150); between 10,000 and 9,000 BP the Skandinavian ice-cap retreated with a speed of no less than 1 km per year (!) and sea-level world-wide rose some 80 to 150 m (e.g. FAIRBRIDGE 1960; PORTER 1983: xii). This large scale deglaciation initiated a pronounced pluvial period in tropical and subtropical Africa (between 13,000 and 8,000 BP; e.g. LOCKWOOD 1979: 120), which, between 8,000 and 4,000 BP, was followed by a climatic optimum with fluctuating precipitation (e.g. CROWE 1971: 480-481), and with global temperatures on the average some 2°C higher than at present (e.g. RASOOL 1984: 107). During this and previous interglacial periods the present Sahara is generally assumed to have been covered by significant vegetation, and given this situation many species currently occurring both to the north and the south of this desert are likely to have had a (more) continuous distribution. Also, many Palearctic species which do not at present occur south of the Maghreb, presumably ranged further south into West Africa and had a better chance to reach the Cape Verdes than nowadays. This may apply to species such as the Blackcap and the Spectacled Warbler, and possibly the Red Kite and the Buzzard. Similarly a number of Ethiopian species, nowadays split up into geographically isolated races or considered as super-species, presumably once had a more continuous distribution in Africa south of the Sahara, as may hold for the Iago Sparrow (cf. SUMMER-SMITH 1984).

The presupposition that West African (and/or other) immigrants in the Cape Verdes were basically sedentary before they colonized the islands seems logical, and avoids the difficult question why and how present-day relict populations otherwise acquired this character. However, starting from this presupposition, the distinct sedentariness of many island populations can be explained satisfactorily by natural selection.

The survival in the Cape Verdes of relict populations may have been favoured by the comparatively mild, maritime climatic conditions, the presence of altitudinal zones and the absence of continental competitors. However, deteriorating conditions during the glaciations and after the Holocene climatic optimum presumably also caused an unknown number of species to die out in the islands too.

These same deteriorating conditions, with the Sahara expanding (a process speeded up in recent decades by man-caused desertification), are, and must have been, in favour of drought adapted species. Some of the Saharan or sub-Saharan elements now occurring in the Cape Verdes may actually have reached the islands amply after the Holocene climatic optimum.

Relative to what is said above and to what shall follow, it may be elucidating to sketch roughly the topography of the Cape Verdes during the last glaciation (cf. fig. 1). At that time, due to a world-wide

drop in sea-level of some 80 to 150 m, the division of the archipelago into three more or less separate island groups was relatively more pronounced than it is today (as may be inferred from nautical maps; see also ROTHE 1982: 8). The islands of the north-western group were partly connected; only Santo Antão and São Nicolau were presumably separated from the rest by narrow channels. As to the eastern islands: not only were Boa Vista and Maio connected (or almost so) but the distance Boa Vista-Sal was also shorter, and the top of the present Confiante Seamount, situated in between these islands, rose above sea-level. This implies that São Tiago and Maio, presently separated by the shortest distance between any of the islands (ca 25 km), at that time lay farthest apart. This distance, however, was exceeded more than twice by the shortest distance between the eastern and south-western groups (the interval São Tiago-Fogo; ca 55 km) and about four times by the shortest distance between the eastern and north-western groups (the interval Boa Vista/Sal-São Nicolau; ca 110-120 km). Nowadays the eastern group is broken up; the interval Boa Vista-Maio (ca 80 km) exceeding the shortest distance between the eastern and south-western groups (the interval São Tiago-Fogo) and approaching the shortest distance to the northwestern group (the interval Sal/Boa Vista-São Nicolau).

The African Cream-coloured Courser (*Cursorius cursor cursor*) is known to make considerable nomadic movements, and significant north-south migration has been established in the Saharan belt, including the periphery of West Africa (cf. CURRY-LINDAHL 1981: 309, 369). The species being a strong flyer, it is not surprising that it has reached and colonized the Cape Verdes, where a poorly defined separate race (*C. c. exsul*) developed. This race is known to make irregular interinsular movements in the archipelago (DE NAUROIS 1983) and occasional re-inforcements by continental birds seems quite possible.

The same reasoning applies to the anthropophilous, nomadic Brown-necked Raven, which has also spread over the entire archipelago, although it has not differentiated from the continental population. GORE (1981: 115) suggested stray individuals of this species observed in Gambia to represent arrivals from the Cape Verdes.

The larks have a restricted distribution in the archipelago. They are absent from some islands offering seemingly suitable habitats.

The Boa Vista Bifasciated Lark occurs exclusively on the extremely dry, sandy and stony plains of Boa Vista and Maio. The distance between these two islands (ca 80 km) far exceeding the intervals Boa Vista-Sal (ca 40 km) and Maio-São Tiago (ca 25 km) (cf. fig. 1), this restricted distribution is noticeable. Accepting that the Cape Verde population is a separate race (cf. BANNERMAN & BANNERMAN 1968: 408; CRAMP 1988: 74, 81, pl. 2), this distribution cannot reflect a recent colonization. Also, as this lark co-exists with the Bar-tailed Sand-lark, the White-fronted Finch-lark, and the Courser, its absence from Sal and São Tiago cannot reasonably be explained by competition with any of these species. It therefore seems more likely that its present distribution already existed during the last glacial period when Boa Vista and Maio were connected, or almost

so (cf. fig. 1), whereas Sal and São Tiago have always been surrounded by deep water. Accordingly, the present (highly sedentary) populations of Maio and Boa Vista must have become separated between ca 14,000 and 8,500 BP (the period of large scale deglaciation; see above), which would implicate that this lark must have developed its present subspecific characters before that time. One wonders whether after some 10,000 years of separation the present populations of Maio and Boa Vista are still fully identical.

The Bar-tailed Sand-lark, a bird characteristic of the dry easternmost islands, has now also reached São Nicolau (HAZEVOET 1989b: 29). It therefore would seem that its distribution is determined by ecological conditions rather than by the topography of the Cape Verdes during the last glacial period. The same reasoning applies to the White-fronted Finch-lark, which for reasons unclear is absent from Sal, but which has spread in recent decades to Fogo, Brava, and São Nicolau (see "Notes on species observed"). These recent range extensions would seem to be correlated with increased desertification.

The Razo Lark is endemic to Razo. Its extremely dry habitat suggests that this species too derives from Saharan or sub-Saharan stock. Currently it is generally considered a modified Skylark (*Alda arvensis*) (cf. e.g. HALL 1963), but possibly its affinities with the Crested Larks should be re-considered (see, however, HARRISON 1966). The Palearctic Skylark does not at present occur southward of the Maghreb, whereas Crested Larks also inhabit the drier regions of Africa north of the equator. Two species, viz. the Crested Lark (*Galerida cristata*) and the Sun Lark (*Galerida modesta*) occur in the entire southern sub-Saharan belt, and two other species, *G. fremantlii* and *G. malabarica* (= *G. theklae*) occur in the Ethiopian-Somalian region; a fifth species, *G. magnirostris* occurs in southern Africa (HALL & MOREAU 1970: 18-19, maps 23, 24). Recently DE NAUROIS (1987b, 1987c) again referred the Razo Lark to the genus *Spizocorys*, to which it was originally assigned by ALEXANDER (1898a: 107). CRAMP (1988: 207) and HAZEVOET (1989c) maintain the species in *Alda*.

Considering that Branco and Santa Luzia lie within visual distance of Razo, the restricted distribution of the Razo Lark shows that it is strictly sedentary. Its predecessor may have reached Razo by chance during the Holocene period, and may never have had a wider distribution (having evolved by rapid speciation of the small, inbreeding population). It seems more likely, however, that it reached the Cape Verdes much earlier and once had a much wider range, at least including Razo, Branco, Santa Luzia and São Vicente, which formed a single island during the last glaciation. According to this view the present population of the Razo Lark can only be a relict (see also BOURNE 1955a: 522-523; 1966: 426). The reasons for its general disappearance can only be guessed at, but the conditions having favoured its survival on Razo may to some extent be considered and analyzed. It needs no discussion that its present habitat suffices at least its minimal ecological requirements (whatever these may be). The scarcity on the island of potential predators may present a basic factor. These predators are the Kestrel (at present not even a permanent inhabitant; see "Notes

on the species") and the Barn Owl, whereas the Brown-necked Raven may also be included (as a potential nest robber). None of these birds, however, is a specialized bird predator. The diet of Cape Verde Kestrels includes lizards, insects, presumably land snails, and a certain share of passerine birds (cf. e.g. DE NAUROIS 1987d: 201). The Barn Owls on Razo seem to feed mainly on nocturnal prey, notably geckos and small petrels, but there is no doubt that Razo Larks are taken occasionally (see "Notes on the species"). Thus, apart from its diurnal mode of life, the very presence of important seabird colonies on Razo may have caused the Razo Lark to be relatively unattractive as a food item to the Barn Owl (and possible other predators). In this context one also should not overlook the apparent association of Cagarra and giant geckos; and it is interesting to speculate about the consequences, even for the Razo Lark, of a possible extermination of the Razo Cagarra colony (cf. "Notes on species observed"). Finally, one wonders to what extent the co-existing Iago Sparrow forms a "cover" for the Razo Lark.

A species definitely deriving from Africa south of the Sahara is the Cape Verde Islands Kingfisher. The almost similar West African nominate subspecies (*Halcyon l. leucocephala*) ranges from Senegambia into the equatorial regions and shows a three-stepped latitudinal migration within this area whereas breeding may occur during migration (MURTON & WESTWOOD 1977: 162; CURRY-LINDAHL 1981: 256-257; CRAMP 1985: 706-707; FRY et al. 1988: 269). According to GORE (1981: 77) the species appears in numbers near the Gambian coast during the rains from July to November. This little sedentary character might explain why the species could reach the Cape Verdes, although it seems not just imaginary that this species was once introduced. Its restricted occurrence on São Tiago, Fogo and Brava would seem to be determined first of all by ecological factors. The total absence of published records from other islands, notably São Nicolau and Santo Antão, which also offer a seemingly suitable habitat, is noticeable (see, however, "Notes on species observed").

The present breeding range of the Purple Heron (*Ardea purpurea*), which includes the Maghreb and a few wet areas in Senegambia (cf. DE NAUROIS 1969a: 167; LARIVIERE & DUPUY 1978: 88, 95-96; GORE 1981: 35-36), suggest a more continuous area of distribution during the Holocene pluvial and climatic optimum, at least including parts of the present Sahara. Whether the Cape Verde Islands population (*Ardea purpurea bournei*) reached the archipelago during that period or much earlier, it is impossible to say, but apparently it was long enough isolated to develop characteristic differences in plumage. Presumably once having been more widely spread in the archipelago, a vulnerable relict population survives in São Tiago. This population was discovered in the 1950's (BOURNE 1955a: 539) and described as a new subspecies by DE NAUROIS (1966). In the 1960's the population, mostly residing in the São Domingos valley, was estimated at some 100 to 200 pairs (DE NAUROIS 1966: 93; 1969a: 167; BANNERMAN & BANNERMAN 1968: 209-214). FRADE (1976: 49) listed no less than 8 specimens collected in November 1969, providing the latest published indication of a still thriving colony. Later visitors failed to trace the species, and SUMMERS-SMITH (1984a: 148) was

informed by local people that the species had disappeared "about 10 years ago". In 1985, it was observed again (Anonymus 1985), but in 1986, during visits to Trindade and the São Domingos valley, I looked for it in vain. More recently, however, in 1988-1990, a small heronry, estimated at some ten pairs, was located in the crown of a huge Kapok Tree (*Ceiba pentandra*) at Boa Entrada (HAZEVOET 1989b: 21-22; pers. communication).

Deteriorating climatic conditions since the last climatic optimum may have caused the much larger population of the Little Egret to adapt itself to a high extent to breeding on rocky, coastal cliffs, but did not effectuate changes in its morphology and plumage. Although a dispersive bird, also regularly observed along the coasts of other Macaronesian islands (cf. BANNERMAN 1965: 312-313; BANNERMAN & BANNERMAN 1966: 183-184; PEREZ PADRON 1986: 61; DEN HARTOG & LAVALEYE 1981: 10), breeding has never been recorded there.

The Cattle Egret, a common resident of the entire southern sub-Saharan belt, was only recently recorded for the first time as a breeding bird in São Tiago (BANNERMAN & BANNERMAN 1968: 215 ff; DE NAUROIS 1969a: 168-169), but it may have been overlooked previously.

With the exception of the Osprey and the Egyptian Vulture, which show no signs of speciation throughout their wide distributional ranges, the Cape Verde birds of prey (in conformity with the situation in the other Macaronesian archipelagos) have developed insular races. This indicates that mixing of insular and continental populations does not occur, or only on an insignificant scale, although distance by itself cannot form a barrier for these skilled flyers, which also do not shun to fly above the sea. On the other hand, the general uniformity of the populations throughout the archipelago suggests that interinsular mixing occurs more frequently. Only one species, viz. the Kestrel, seems to have developed two races (see "Notes on species observed").

In the near absence of at sea observations, indirect evidence of intersular movements in some species may be inferred from the occurrences reported in literature, notably concerning small uninhabited islands such as Cima, and in particular Razo (because it has been visited more frequently), where it is unlikely to overlook any conspicuous species. Taking into account the reports of ALEXANDER (1898a: 107; 1898b: 278), MURPHY (1924: 262), SCHLEICH & WUTTKE (1983: 42-43) and HAZEVOET (1986a: 6), and added to these my own observations of 1982 and 1986, it appears that the Kestrel is not a permanent inhabitant of Razo, and that the Egyptian Vulture disappeared and re-appeared at least twice during the last decade (1977-1986).

The Osprey and the Peregrine Falcon (*Falco peregrinus*) have a more or less cosmopolitan distribution with breeding ranges extending from within the arctic circle into, and south of, the tropics of the Old World. So, being adapted to a variety of climates it is difficult to correlate their presence in the Cape Verde (and Canary) Islands with any special climatic event. The Osprey's breeding-range in southern Europe and Africa north of the Sahara is mainly restricted to the coastal regions. During the Holocene climatic optimum it may have had a wider distribution in Africa. At that time there were several sig-

nificant lakes in the Sahara, where it may have resided, just as it now resides around some East-African lakes.

Unlike the Osprey, the Peregrine Falcon has developed a variety of races, and the Cape Verde Islands population was also described as such (*F. p. madens*), although on the basis of three skins only (cf. RIPLEY & WATSON 1963). DE NAUROIS (1969c: 309-310) estimated that the Cape Verdes might sustain a population of some 50 birds maximally, whereas the actual number is thought to amount to less than 10 pairs. It is not surprising that such a small, inbreeding population would develop some characters differentiating it from the resident North-west African mainland race (*F. p. pelegrinoides*).

The Egyptian Vulture shows a discontinuous distribution in North Africa (cf. VOOUS 1960: 64 map 71; CRAMP 1980: 66). Being rather common in the Cape Verdes, several authors have stressed its near absence as a breeding bird in West Africa. Its main range extends from the south-western Palearctic, including Spain and the Maghreb, into the Oriental region, with scattered populations in the Sahara and the Canary and Cape Verde Islands. A relict character of the Cape Verde population would seem plausible (cf. DE NAUROIS 1985: 263-266), but it should be borne in mind that the species tends to be anthropophilous, and that man and his livestock did not settle in the islands until the end of the fifteenth century. Also, the islands never had an indigenous mammal fauna. Still it would seem possible that flourishing seabird colonies once sustained a small population of vultures, scavenging on dead birds and taking eggs and chicks. Seasonally such a population may also have ransacked the beaches of some islands in search of (dead) turtles, once abounding in the archipelago, and their eggs and hatchlings (cf. e.g. FRETEY & LESCURE 1981). On the other hand, considering the present occurrence of significant north-south movements of Egyptian vultures in the western Sahara (cf. CRAMP 1980: 65-67; CURRY-LINDAHL 1981: 294-295, 385 map 216), the Cape Verde Islands population actually may not be (and possibly never was) fully isolated and occasionally receive reinforcement from the continent.

The Kestrel, in several subspecies, occurs widely distributed over the Palearctic, Ethiopian and Oriental faunal regions. In the arid Saharan belt, however, it is virtually absent. Hence, the nominate subspecies (*Falco t. tinnunculus*) of Europe and the Maghreb and the West and Central African race (*F. t. rufescens*) are geographically separated, although it seems possible that during the Holocene climatic optimum, these two populations merged in the Saharan region and formed a continuous cline. As mentioned (see "Notes on species observed") two races are recognized in the Cape Verdes: one in the north-western (*F. t. neglectus*) and one in the eastern island group (*F. t. alexandri*). BOURNE (1955b; 1957: 189), when establishing the last-named race, neglected to include birds from the south-western islands (Fogo and Brava) in his studies (presumably because these were not available), but yet assumed these to belong to the race of the eastern islands. This may well be correct, but considering the relatively remote position and special character of Fogo and Brava, it is obvious that birds from these islands need further attention. Pending this, it is probably best to ignore them in the present discussion. The presence of sep-

arate races in the north-western and eastern islands suggests a significant degree of isolation, whereas implicating ample intersular mixing within each island group. BOURNE (1957: 189) made mention of one bird of intermediate character from São Nicolau, and (1986: 168) suggested *F. t. alexandri* to derive its character through more frequent arrivals of continental "migrants".

Considering the distance between the various islands and island groups, it does not seem self-evident that two races could develop. Rather, one would expect either one race, or more than two. As mentioned before, however, the isolation of the eastern and north-western island groups was relatively more significant during the last glaciation (cf. fig. 1), and the influence of the predominant North-easterly Trade Winds, (in the past, and still so) may have added to the effect of isolation. In this perspective, and taking into account the overall difference in ecological conditions between the eastern and north-western island groups, the existence of the two races may be understood more readily.

Possibly, the impact of the factors discussed above was of secondary importance altogether, the two races having been slightly different from the outset: deriving from two separate "waves" of continental stock, which established themselves during different Late Quaternary periods. In this view, the younger race (which may derive from Holocene immigrant birds, and which may still occasionally receive re-inforcement from the continent) would seem to have replaced the older race (possibly a Late Pleistocene immigrant) in the eastern islands through hybridization and/or competition. This process may now have slowed down, or come to an equilibrium due to distance, east-west orientation (hampering westward penetration), and the different character of the north-western islands.

The existence of two races of Kestrel in the Cape Verdes was recently called in question by DE NAUROIS (1987c: 319; 1987d: 206-208).

The situation concerning the Kites in the Cape Verde Islands is also unclear and to some extent comparable to that of the Kestrels. In older reports all Kites were referred to as Black Kites (e.g. BOLLE 1856: 19; MOSELEY 1879: 55; KEULEMANS 1866: 364-365; ALEXANDER 1898a), until HARTERT (1914: 89) on the basis of ALEXANDER's material described a new insular subspecies of Red Kite (*Milvus m. fasciicauda*). DE NAUROIS (1969a: 171-172; 1972; 1982c: 6; 1984: 41-41; 1987c: 321-322), however, ascertained and emphasized that both the Red and Black Kite are indigenous in the Cape Verdes; the former occurring in the northwestern islands, the latter ranging throughout the eastern/south-western island chain. He also claimed that this situation was quite different around the turn of the century (when the Red Kite still would have been dominant in the eastern and south-western islands too), and concluded that the Black Kite is a recent immigrant which apparently is outcompeting the Red Kite. Whether indeed the Red Kite used to be the most common species in the eastern and south-western islands can only be substantiated by a re-examination of the historical collections of ALEXANDER (1897), the "Blossom" expedition (1923-1924), CORREIA (1922), and others. DE NAUROIS' claim that the Red Kite is now absent from these islands also needs confirmation. Recently, SUMMERS-SMITH (1984a: 148) reported to

Table 2. Survey of fish remains from deserted eyrie of Osprey on the south-western plateau of Razo.

Family/Species	Description of material	Inferred minimal number and percentage of fish	Estimated total length (TL)
Triakidae <u>Mustelus mustelus</u> (Linnaeus, 1758)	head (12 cm), part of body skin, caudal fin (17 cm).	1 (2.3%)	75 cm
Hemigaleidae cf. <u>Paragaleus pectoralis</u> (Garman, 1913)	3 heads(13-14 cm) + attached part of vertebrae column (17-35 cm).	3 (6.8%)	65-70 cm
Unidentified Murenidae	several parts, including 2 heads and some sizeable body parts (30-64 cm).	3 (6.8%)	70-72 cm
Unidentified Exocoetidae	2 caudal fins (8 cm, 10 cm), 1 pectoral fin (19 cm).	2 (4.5%)	36-40 cm
Belonidae <u>Ablennes hians</u> (Valenciennes, 1846)	caudal part of body (19 cm).	1 (2.3%)	65 cm
<u>Tylosurus spec.</u>	2 caudal fins (7 and 8.5 cm), 2 caudal parts of body + caudal fin (14 and 23 cm), 1 head (19 cm), 1 part of neurocranium.	5 (11.4%)	57-80 cm
Aulostomidae <u>Aulostomus chinensis maculatus</u> (Valenciennes, 1839)	head (17 cm).	1 (2.3%)	50 cm
Unidentified Carangidae?	4 complete caudal fins (9-10 cm).	4 (9 %)	?
Sparidae <u>Diplodus cf. puntazzo</u> (Cetti, 1777)	head + parts of body.	1 (2.3%)	25 cm
Kyphosidae <u>Kyphosus spec.</u>	caudal part of body + caudal fin.	1 (2.3%)	17 cm
Unidentified Pomacentridae?	neurocranium (part) + skin, dorsal fin base + caudal fin.	1 (2.3%)	19 cm
Scaridae <u>Sparisoma cf. rubripinne</u> Valenciennes, 1839	2 heads, 1 caudal part of body.	3 (6.8%)	25-48 cm
Acanthuridae <u>Acanthurus monroviae</u> Steindachner, 1876	caudal fin + skin of caudal body part, some additional skeletal elements.	1 (2.3%)	28 cm
Unidentified Scombridae?	4 caudal fins (6.5 cm) + caudal parts of body.	4 (9 %)	?
Balistidae <u>Canthidermus maculatus</u> (Bloch, 1786)	5 heads + attached parts of body skin, vertebrae column, spinous parts of dorsal fins, caudal fins), 2 neurocrania, some other fragments.	7 (15.9%)	36-48 cm
Monacanthidae <u>Aluterus cf. punctatus</u> (Agassiz, 1829)	3 heads + attached body skin (17-35 cm).	3 (6.8%)	35-37 cm
Unidentified rest	several skeletal elements, including 3 neurocrania.	3 (6.8%)	?
		Total	44 (99.9%)

have observed in the mountainous interior of São Tiago numerous birds showing characteristics of this species. BOURNE (1986:166) supported these observations. The observations of both authors implicitly suggest that the Black Kite and the Red Kite in the Cape Verdes tend to haunt different habitats (coastal and mountainous regions respectively).

The Red Kite has a western Palearctic distribution ranging southward to include the Maghreb and the Canary and Cape Verde Islands, where separate insular races occur. The Black Kite has a much wider distribution, including the Palearctic, Oriental,

Australian and Ethiopian regions (cf. VOOUS 1960: 69 map 87). In Africa it occurs in at least three races, viz.: *Milvus migrans migrans* (Maghreb, Cape Verdes), *M. m. parasitius* (most of Africa south of the Sahara), *M. m. aegyptius* (Egypt, Sudan) and possibly *M. m. arabicus* (Somalia, Yemen) (cf. DE NAUROIS 1972: fig. 12; BROWN et al. 1982: 308). Perhaps, therefore, the most conspicuous fact concerning the Kites in the Cape Verdes is not the presence of an isolated Pleistocene relict population of the Red Kite, but that of an allegedly unchanged population of the Palearctic nominate race of the Black

Kite, exclusively known from West Africa as a migrant visitor (cf. CURRY-LINDAHL 1981: 244, maps 27 and 190; GORE 1981: 48). For reasons explained before I am reluctant to accept that the Cape Verde population derives from European Palearctic migrants. Therefore, if not a Late Quaternary relict, it would seem to derive from intra-African, trans-Saharan migrants or wanderers. Having colonized the Cape Verde Islands, its absence in the less remote Canary Islands is noticeable.

The Palearctic Buzzard (*Buteo buteo*) is represented in Madeira, the Azores and the Canary Islands by separate insular subspecies, and the Cape Verde Islands population too was described as such (*B. b. bannermani*). Exclusively reported from the mountainous islands, MOREAU (1966: 317) considered it a glacial relict. Recently, however, DE NAUROIS (1982; 1987c: 320) challenged the taxonomic status of the Cape Verde Islands population (as well as its strictly sedentary character), and suggested a close affinity with the Long-legged Buzzard (*B. rufinus*). A relatively small race if this last-named species, *B. r. cirtensis* breeds in north-western Africa, southward into northern Mauritania (cf. BROWN et al. 1982: 399).

The Barn Owl is almost cosmopolitan in distribution, though absent as a breeding bird from the major part of Asia (VOOUS, 1960: 175 map 219). In addition to the continents it has colonized numerous, often rather isolated islands, and developed many insular subspecies, including one in the Cape Verdes (*Tyto alba detorta*).

The Cape Verde Islands Swift, for many years considered conspecific with *Apus unicolor* of the Canary Islands and Madeira, is currently regarded as a separate, endemic species, *A. alexandri* (cf. BANNERMAN & BANNERMAN 1968: 384; BROOKE 1970: 21; DE NAUROIS 1986b). According to BROOKE it takes an isolated position within the genus *Apus*, but others: LACK (1956), BOURNE (1966: 427-428; see also BANNERMAN & BANNERMAN 1968: 386) and DE NAUROIS (l.c.: 138) suspect a close affinity with *A. unicolor* and the widely spread Palearctic *A. apus*, and possibly therefore both island species derive from *A. apus* stock. DE NAUROIS also established similarities with *A. niansae* (Central Africa) and *A. pallida* (Mediterranean region and north-west Africa south to Mauritania).

The Quail is represented in the Cape Verdes by a resident race (*Coturnix coturnix inopinata*) and the Palearctic migratory race (*C. c. coturnix*). Apart from being slightly smaller, the resident birds do not seem to show constant differences in plumage (cf. HARTERT 1917: 422). BOURNE (1955a: 541-542) referring to field observations in July, noted that resident birds are very variable, and suggested hybridization with the migratory race. More recent indications seem to suggest that this phenomenon also takes place on the African continent: apparently correlated with the fact that the Quail reaches sexual maturity very rapidly (within ca six weeks). First generation birds possibly breed in Europe within two months after hatching and a few months later again in Africa and vice versa (cf. CURRY-LINDAHL 1981: 302-303, 362 map 223).

MOREAU (1966: 317) suggested the Cape Verde Islands race to represent a glacial relict. This idea, however, was based on the assumption that it would exclusively breed in higher (i.e. cooler) altitudes,

whereas breeding has also been recorded from even the flattest and driest islands: Sal, Boa Vista and Maio (cf. BOURNE 1955a: 552; DE NAUROIS 1969a: 175-176, 214; 1987c: 312).

The Moorhen (*Gallinula chloropus*) is known to make long erratic movements, often reaching distant islands and settling there to breed, provided that suitable habitat conditions are available (and the same is shown by other members of the Rail family, one of the most notable groups to colonize remote islands). The Palearctic race (*G. c. chloropus*) has reached all the Macaronesian island groups (cf. BANNERMAN 1963: 317-318; 1965: 118-119; BANNERMAN & BANNERMAN 1966: 105-108; 1968: 301-303), although breeding has not been reported from Madeira. The African race (*G. c. meridionalis*) even colonized remote St. Helena, ca 1700 km distant from the nearest African coast. For information concerning the Cape Verde population I refer to DE NAUROIS (1969b).

The Kentish Plover is almost cosmopolitan, and distributed as a breeding bird along the coasts of the entire African continent. Its presence in the Cape Verdes and the other Macaronesian islands is fully in accordance with this range.

The same applies to the Rock Pigeon (*Columba livia*), which is widely distributed in the Palearctic, Oriental and North Ethiopian regions. It ranges along the rocky coasts of the eastern Atlantic between ca 62°N (Farøer) and 8°N (Sierra Leone), all Macaronesian islands inclusive (cf. e.g. VOOUS 1960: 135-136; 172 map 211).

The Black-winged Stilt was only recently reported as a breeding bird in the Cape Verdes, on the island of Sal (DE NAUROIS & BONNAFOUX 1969: 106-107; DE NAUROIS 1986a: 540-542). Its distribution being determined to a high extent by instable habitat conditions, the species often occurs erratically (VOOUS 1960: 102). In my view there is little doubt that this species has since long bred in the archipelago, possibly at intervals. Birds frequenting the Cape Verdes presumably represent arrivals from the West African coastal regions. In this context may also be mentioned the Greater Flamingo (*Phoenicopterus ruber*). The discontinuous distribution of this species first of all correlates with the discontinuous distribution of its special habitat (VOOUS 1960: 21-22, 38 map 34). Colonies are easily disturbed and the species has since long vanished as a breeding bird from the Cape Verdes, where it was still encountered by e.g. DAMPIER, BOLLE and ALEXANDER. The scanty details on the former status of this species were summarized by DE NAUROIS (1984: 42).

Another bird which early in this century probably bred in very small numbers in the sparse wet localities in the Cape Verdes, notably in Boa Vista, is the erratic Marbled Teal (*Anas angustirostris*) (cf. ALEXANDER 1898a: 114; BANNERMAN & BANNERMAN 1968: 251-254; DE NAUROIS 1984: 43-45). This species has a discontinuous distribution in wetlands in the predominantly arid and sub-arid Mediterranean and North African regions. Its former presence in the Cape Verdes, as well in the Canary Islands (cf. BANNERMAN 1963: 315), therefore seems not exceptional.

The endemic subspecies of the Blackcap and the Spectacled Warbler would seem to represent relicts of the Holocene climatic optimum or a previous

Table 3. Survey of fish remains taken from perch of Osprey on the north-western part of Razo.

Family/species	Description of material	Inferred minimal number and percentage of fish	Estimated total length (TL)
Unidentified Exocoetidae	5 pectoral fins (9-15 cm).	3 (2.5%)	?
Belonidae			
? <i>Tylosurus</i> spec.	1 head (18 cm), 99 upper jaws (8-14 cm), 37 lower jaws, 82 mandibles (right or left) + 18 fragments, 28 caudal fins and possibly some pectoral and pelvic fins.	100 (84.1%)	50-90 cm
Unidentified Carangidae?	3 caudal fins.	3 (2.5%)	?
Scaridae			
<i>Sparisoma</i> cf. <i>rubripinne</i> Valenciennes, 1839	4 neurocrania, 3 complete beaks, 4 complete upper jaws, 1 left side of upper jaw, 3 lower jaws, 1 caudal fin, 2 pectoral fins, several other skeletal elements.	8 (6.7%)	?
Acanthuridae			
<i>Acanthurus monroviae</i> Steindachner, 1876	2 caudal fins (7 cm) + parts of caudal peduncle including spine.	2 (1.7%)	30 cm
Unidentified Scombridae?	3 caudal fins.	3 (2.5%)	?
		Total	
		119 (100 %)	

interglacial period. Their distribution in the Cape Verdes, occurring in all islands with significant vegetation, is definitely determined ecologically.

The Cape Verde Islands Cane Warbler (*Acrocephalus brevipennis*) is generally considered an endemic species. According to HALL & MOREAU (1970: 157) its closest relatives are *A. gracilirostris* and *A. rufescens*, both widely distributed in Africa south of the Sahara. These authors explicitly stated (1) that the Cape Verde species cannot in fact be distinguished from continental birds, except for its habits (see also: DE NAUROIS 1987c: 322-323), and (2) that it agrees with the geographically closest taxon of the group, *A. r. rufescens* (also present in Senegambia), except for its size. The known distributional range of this Warbler (São Tiago, Brava and São Nicolau) is difficult to explain. In São Tiago it is still rather common, but recent efforts by HAZEVOET (1989b: 30; 1989d: 4-5) to find the species in the two other islands were unsuccessful.

A few species, viz., Guinea Fowl, Waxbill and House Sparrow undoubtedly represent introductions. The Guinea Fowl, also kept as a domestic bird, presumably was introduced more than once from other one-time Portuguese colonies in West-Africa. The first known reference of its presence in the Cape Verdes dates back to 1594 (CARLETTI 1965: 20; cf. NØRREVANG & DEN HARTOG 1984: 18).

The Spanish Sparrow was probably also introduced. It occurs widely distributed over southern Spain and the Maghreb and was present in the Canaries and the Cape Verdes since at least the first half of the 19th century. After it was reported for the first time it seems to have spread rapidly in western direction in both archipelagos. From this it may be inferred that it represents a recent arrival in these islands or, as mentioned, an introduction. As recently as in 1935 the species reached Madeira on the wing (after prolonged easterly winds; cf. BANNERMAN 1965:

100). This being so, it could also have reached the less distant Canaries in this way, and therefore this possibility cannot even be excluded entirely with regard to the Cape Verdes: via the Canaries or southern Morocco. Remains the question what could have caused these recent range expansions.

Other species, definitely introduced but now vanished, are the Goldfinch (*Carduelis carduelis*), the Black-headed Village Weaver (*Ploceus cucullatus*) and the Blue Waxbill (*Uraegincthus bengalus*) (cf. BANNERMAN & BANNERMAN 1968: 435, 439-441; DE NAUROIS 1984: 42-43, 46-47).

b. The Seabirds

The most striking feature of the seabird fauna of the Cape Verdes is perhaps the total absence, without obvious ecological reasons, of terns and gulls (Lariidae), which only visit the islands in small numbers as winter passagers/visitors (e.g. MADGE 1985; HAZEVOET 1986a: 8; KOEDLIJK & DE BRUYN, pers. communication). In addition, the absence of the West African Cormorant (*Phalacrocorax carbo lucidus*) is noticeable. This bird breeds in numbers on the coasts of the continent, notably on the Banc d'Arguin (e.g. GEE 1984: 38). In the Cape Verdes the species was exclusively observed by ALEXANDER (1898a: 101, 105, 107, 114, 117), by the "Blossom" expedition (cf. BANNERMAN & BANNERMAN 1968: 192) and possibly by the "Herald" (cf. BOURNE 1966: 426). Although ALEXANDER (l.c.: 101) suggested that he observed one pair breeding, there is no substantial evidence for this (cf. DE NAUROIS 1984: 45).

By contrast, petrels and shearwaters are well represented. Three of these mainly breed in the

Southern Hemisphere*: White-faced Frigate Petrel (*Pelagodroma marina*) (subantarctic to subtropical, ca 30-50°S), Little Shearwater (*Puffinus assimilis*) (subantarctic to subtropical, ca 20-50°S) and Soft-plumaged Petrel (*Pterodroma mollis*) (cold-temperate to subantarctic, ca 40-50°S). Breeding in the Northern Hemisphere is restricted to the Macaronesian Islands (subtropical to tropical, ca 15-40°N). In the Cape Verdes these species are represented by a single subspecies each, and two of these, *Pelagodroma marina eadesi* and *Puffinus assimilis boydi*, are generally considered endemics. As regards the Soft Plumaged Petrel: until recently two subspecies were recognized in Macaronesia, one of which *Pterodroma mollis feae* in the Cape Verdes. In addition, this bird also breeds on Bugio, Madeira archipelago, some 1500 km to the North. This is most peculiar as another subspecies, *P. m. madeira* breeds on Madeira itself, lying within visual distance. BOURNE (1983) and ZINO & ZINO (1986) have made clear that the two taxa actually should have specific rank. It thus seems that *P. mollis* sensu lato represents a superspecies, so that a re-appraisal of the taxonomic status of *P. m. mollis* (Tristan da Cunha archipel) and *P. m. dubia* (several subantarctic islands) also seems necessary (relative to this issue, see also BOURNE 1957: 184-187; 1966: 426).

Three other Cape Verde species breed mainly or entirely in the Northern Hemisphere: Madeiran Storm Petrel (*Oceanodroma castro*) (temperate to tropical, ca 15-40°N; in addition the equatorial Galapagos Islands, and Ascension and St. Helena Islands, South Atlantic, 8°S and 16°S, respectively), Bulwer's Petrel (*Bulweria bulwerii*) (subtropical to tropical, 15-40°N; in addition Marquesas Islands, South Pacific, 10°S) and the Cape Verde Islands Cagarra (*Calonectris edwardsii*), here considered an endemic sister species of Cory's Shearwater (*C. diomedea*) (rest of Macaronesia and the Mediterranean).

The Brown Booby and the Magnificent Frigate Bird are circumtropical species, whereas the Red-billed Tropic Bird has a more restricted tropical distribution (Atlantic: East Pacific coast of Central America; northern Indian Ocean). At present the Cape Verde Islands form the northernmost distribution limits of these three species in the eastern Atlantic. There are no indications that in recent historical times they bred farther north in the Canaries or other Macaronesian islands. Presuming that this absence is somehow temperature correlated, it would seem possible that during the last glaciation these tropical species were also absent from the Cape Verdes, so that colonization of these islands took place at a relatively recent date, possibly during the Holocene climatic optimum.

There seems no sense in speculating about the age of the petrels and shearwaters, but it is obvious that the presence of these highly oceanic birds dates back to (a) much earlier epoch(s). Only the study of fossil deposits might give some indication about this.

Early Historical Information

Having touched in the previous chapter upon species, both indigenous and introduced, now extinct in the Cape Verdes, but until quite recently present, one wonders whether any other species vanished unnoticed since the discovery of the islands. Meanwhile, OLSON & DEN HARTOG (1990) reported on the former presence on Cima of the Masked Booby (*Sula dactylatra*). As to the landbirds, it is noticeable that Hoopoes (*Upupa epops*), Bustards (Otididae) and Stone-Curlews (Burhinidae), for which the islands offer seemingly suitable habitat conditions, are not currently represented (although a vagrant Hoopoe was recorded by BANNERMAN & BANNERMAN 1968: 395). Bustards in particular may have been hunted down to extinction before ornithologists appeared on the scene. Possibly, however, these birds were never present. After all, chance must have played a considerable role in reaching and colonizing the Cape Verdes.

Some scattered, early historical references concerning the Cape Verde Islands avifauna were mentioned by BOLLE (1856), whereas BANNERMAN & BANNERMAN (1968: 7-47) gave a historical review of the islands with emphasis on birds. The last-named authors quoted extensively from DAMPIER's "A New Voyage Round the World" (of which many editions appeared, the first in 1697; cf. the introduction by GRAY in the 1968 Dover-edition), but somehow neglected to mention DAMPIER's notes contained in "A Voyage to New Holland" (first published in 1703 and of which I consulted a 1981 re-issue of the 1729 edition). Yet, these contain interesting information (cf. DAMPIER 1981: 54-64). Referring to Maio, DAMPIER (l.c.: 58) stated: "The Fowls are Flamingo's, Great Curlews and Guinea-Hens ...", and: "They have also many other Sort of Fowls viz. Pidgeons and Turtle-doves; Miniota's, a Sort of Land-fowls as big as Crows, of a grey Colour, and good Food; Crusia's, another Sort of grey-colour'd Fowl almost as big as a Crow, which are only seen in the Night (probably a Sort of Owls) and are said to be good for consumptive People, but eaten by none else. Rabek's a Sort of large grey eatable Fowls with long Necks and Legs, not unlike Herons; and many Kinds of small Birds".

Referring to São Tiago, DAMPIER (l.c.: 63-64) provides the following note: "Of Fowls they have Cocks and Hens, Ducks, Guinea Hens, both tame and wild, Parrakites, Parrots, Pidgeons, Turtle-Doves, Herons, Hawks, Crab-catchers, Galdens (a larger Sort of Crab-catchers), Curlews, etc."

It is interesting to speculate about the identity of the birds listed. The identity of some at least is puzzling. One difficulty is that domestic and wild birds are apparently bracketed together.

It may well be that the "Parrakites, Parrots, Pidgeons and Turtle-doves" mentioned all bear upon introduced domestic birds, but this is not self-evident. The Senegal Parrot (*Poicephalus senegalus*) and the Senegal Long-tailed Parakeet (*Psittacula krameri*) are common West African species occurring in dry woodland, savannas and cleared agricultural areas (SNOW 1978b: 223, 226; GORE 1981: 69). Considering this, it seems possible that these species once belonged to the indigenous fauna of the Cape Verdes. However, if so, the situation had already drastically

*) Data to follow on general distribution of seabirds based on: VOOUS 1960; CRAMP 1977; TUCK & HEINZEL 1978; HARRISON 1985.

changed when BOLLE visited the islands in 1852. This author stated (1856: 23): "Die Papageien glänzen auf den Capverden durch ihre Abwesenheit, was sonderbar erscheinen muss ... Kaum sieht man jetzt hin und wieder einige zahme, aus dem portugiesischen Guinea herübergebrachte: einen grauen Papagei (*Psittacus erithacus*), einen *Ps. senegalus*, eine grüne Perrüche (Periquito) u.a.m."

As regards DAMPIER's "Pidgeons and Turtle Doves": these too may have been domestic birds. However, apart from Rock Pigeons there may have been present other non-domestic forms. Several species of the genera *Columba*, *Streptopelia*, *Turtur*, *Oena* and *Treron* occur on the neighbouring West African mainland (cf. SNOW 1978b: 202-221; GORE 1981: 67-69; URBAN et al. 1986), and the fact that the other Macaronesian archipelagos in addition to the Rock Pigeon harbour(ed) one or more indigenous species of *Columba* and *Streptopelia* (Azores: 1; Madeira: 2; Canary Islands: 3) also cannot be ignored. In this context I may further note that the "grandissima copia di Colombi" recorded by the navigator CADAMOSTO when he landed in the Cape Verdes in 1456 (cf. BOLLE 1856: 24; BANNERMAN & BANNERMAN 1968: 9), are in my view referable to the Cape Verde Cagarra or possibly to the Masked Booby and not to pigeons or doves.

Of the other birds listed by DAMPIER the "Cruscia" can be identified as the Barn Owl (see "Notes on species observed").

"Miniota" is a feminine phonetic spelling of the masculine Portuguese noun *Minhoto* (also spelled *Minhoto*), a popular (old-fashioned) name for Kite, Buzzard and Marsh Harrier (*Circus aeruginosus*) (TATE 1924: 146-150). Several Portuguese dictionaries that were checked only mentioned Kite; one mentioned Buzzard. At present the Buzzard is rare in the Cape Verdes; its distribution is restricted to mountainous islands. It is absent from Maio and it therefore would seem reasonable to suppose that DAMPIER's *Miniota*'s were Kites, which - there is all reason to believe this - have in recent historical times always been the most common medium-sized raptors in the islands. It seems possible, however, that DAMPIER's description refers to the Brown-necked Raven, although neither bird would seem to rank as "good food" (see DAMPIER's quotation above). It is noteworthy that another scavenger, the Egyptian Vulture, is currently known in the Cape Verdes as *Minhoto Branco* (White *Minhoto*).

"Crab-catcher" and "Galden" (usually spelled *Gaulding*) are popular old names referring to members of the Heron family. These names were apparently widely used in the eighteenth century, also by learned men (e.g. RAY 1713: 182, 189; BROWNE 1789: 478-479; and also GMELIN 1789 in the 13th ed. of LINNAEUS' *Systema Naturae*: 631, 635, 639). The same holds for the French "Crabier" (cf. e.g. BUFFON & DAUMENTON 1780: 117-147). The official name for the Squacco Heron (*Ardeola ralloides*) still is "Héron crabier" (e.g. JØRGENSEN 1958: 9; CRAMP 1977: 273).

The references just cited reveal that *Gaulding* and Heron were employed especially for larger members of the present genus *Ardea*, whereas *Crab-catcher* (*Crabier*) mostly referred to bitterns and smaller herons. In the West-Indies the name *Gaulin* (obviously a corruption of *Gaulding*) and the French "Crabier" are currently used indiscriminately for any local member of the Heron family. Only one species,

the Yellow-crowned Night Heron (*Nyctanassa violacea*), which actually feeds largely on crabs, is known also by the English name *Crab-catcher* (or *Crab-eater*).

If we take DAMPIER's notes seriously, he saw at least three different kinds of heron in São Tiago. At present there are only three species that breed in the island, two of which, Little Egret and Cattle Egret are superficially similar (besides, the latter species is possibly a recent immigrant). It therefore seems possible that DAMPIER's *Crab-catcher* and *Galden* refer to the Little Egret and the endemic race of the Purple Heron, respectively. The latter may still have been quite common in those days. DAMPIER's "Heron" might apply to migrant Grey Herons, which nowadays also frequent the Cape Verdes.

The name *Rabek* ("large grey eatable Fowls with long Necks and Legs, not unlike Herons") is puzzling. It would seem to derive from *rebec* (also spelled *rebeck*), an old form of musical instrument with a few strings and a convex resonance box, and might refer to the vocalizations, the shape, or a particular posture of the bird concerned. However, the word is also used in the sense of: an old woman, a hag. It does not seem plausible that this name refers to another species of heron, but one wonders whether it might not apply to a species of Bustard, now absent from the Cape Verdes, but of which one species, the Houbara Bustard (*Chlamydotis undulata*) occurs widely spread in northern Africa, having also reached the Canary Islands, where a resident race, *C. u. fuertaventurae* evolved (cf. e.g. BANNERMAN & BANNERMAN 1963: 84-89; CRAMP 1980: 651; URBAN et al. 1986: 156-157).

The name *Hawk* is still often used without restraint to indicate any medium-sized raptor, falcons included. It therefore might refer to the Buzzard, the Kites (provided that DAMPIER meant another bird by "Miniota"), the Peregrine Falcon, or possibly even to the Kestrel(s). Whether different birds are meant by *Curlew* (*Whimbrel*?) and *Great Curlew* is also questionable.

It seems unlikely that we will ever have a sound notion of the avifauna of the Cape Verdes as present during the first centuries after their discovery, but interesting, obscured details might crop up from the ancient maritime literature, unpublished ship journals, etc.

Conservation

After the Cape Verde Islands became an independent nation in 1975, numerous development-programmes were initiated and as a result much is changing in the archipelago: The infra-structure is improving (new roads and airfields being build), manufacturing industries are being stimulated, barren regions re-afforested, etc. The standard of living, if still low, also has improved and there is an increase in population and life-stock. It needs no explanation that original habitats and bird populations have suffered and declined ever since the islands were colonized by man, but recent developments and changes, though in many respects a blessing to the in former times often famine-ridden population, are bound to speed up this process, so that nature conservation measures are needed more than ever.

Any regulations at present in force concerning hunting and protection of wildlife in the Cape Verde Islands - that is on paper - date from a decree promulgated on 20 January 1955 by the Minister for Overseas Provinces of Portugal ("IUCN Environmental Law Centre" 1986: 47-49). This decree applied to all Portuguese overseas provinces. Appended to it is a list of species which are fully protected or for which there are hunting regulations. This list is of no or very little relevance as far as the Cape Verdes are concerned ("IUCN Environmental Law Centre" l.c.: 298-299). The only birds included which are indigenous in the Cape Verdes are Egrets, Quail and Razo Lark. In addition is listed *Macrosclincus coctei*, the giant skink (a lizard) of Razo and Branco; here the wish seems father to the thought, as this species was almost certainly exterminated in the beginning of the present century (cf. SCHLEICH 1979; 1982b). It is amazing that the list does not include a single seabird or raptor.

In the Cape Verde Islands seabirds have presumably been exploited ever since the islands were discovered and colonized at the end of the fifteenth century, and as a result numbers, especially of the larger species, have reduced greatly. At least one species, the Masked Booby, was exterminated, and another species, the Magnificent Frigate Bird, has now all but vanished. Human depredations and disturbances of seabird colonies, however, proceed up to the present day, and it has become less difficult to reach even the remotest localities. Hence, the need of protective measures and the desirability to establish some nature sanctuaries has been expressed repeatedly (cf. DE NAUROIS 1964; BANNERMAN & BANNERMAN 1968: 44-47; LE GRAND et al. 1984: 389; NØRREVANG & DEN HARTOG 1984: 127).

Although protection by law of the majority of indigenous birds (both seabirds, and a variety of terrestrial birds) is to be recommended for reasons of principle, it would be unrealistic to expect any significant effects of this at short notice. It takes time to get the public informed and it seems hardly feasible to have such a law enforced by a control and penalty system. Much more effect can be expected from the establishment of a limited number of representative, totally protected and guarded sanctuaries. It is no news that for more than one reason the Desertas (Branco and Razo) and Rombos Islets (Cima, Louis Carneiro, Ilhéu Grande) are eminently suited to serve that purpose. These islets still harbour significant, though declining populations of all Cape Verde seabirds, except FEA's Soft-plumaged Petrel or Gon-gon (*Pterodroma feae*) and the Magnificent Frigate Bird. As they are uninhabited and unfit for permanent human settlement, clashes with private interests in principle form a minor problem. Only fishermen from nearby islands, who do not only visit the islets to fish, but also to take their share of the seabirds and their eggs, are to suffer to some extent. When camping on the islets, they will often take only what they need, but on other occasions bird colonies, notably those of the endemic Cagarra, are raided on a large scale. The Cagarra colonies of Razo and Branco (still) are the largest in the archipelago, and many fat, almost fledged juveniles are culled each year in October (cf. ALEXANDER 1898a: 108; 1898b: 284; SCHLEICH 1982b: 80; SCHLEICH & WUTTKE 1983: 41; Anonymus 1985: 4), even if these raids

do not seem to have (and probably never had) the wholesale character as formerly on Selvagem Grande (cf. SCHMITZ 1893; DEN HARTOG et al. 1984: 124; ZINO 1985). Nevertheless, a complete and permanent embargo of these Cagarra hunts may cause appreciable loss of income to those involved. On the other hand (see "Notes on species observed") there are at present obvious signs of over-exploitation, and although in my view there is no acute danger of total devastation of the colonies, the Cagarra hunts will soon cease to be remunerative if they go on unlimited. In point of fact, an embargo of these hunts may, in the long term, be to the fishermen's own benefit, because the off-shore presence of Cagarra flocks helps them in locating large commercial (predatory) fish such as Tunny and Wahoo (*Acanthocymbium* spp.), which, like the Cagarra, follow schools of small pelagic fish and squid.

Whereas perspectives for survival are still good regarding the Cagarra and other indigenous seabirds, it seems doubtful whether the Magnificent Frigate Bird can be saved from extinction, even in case of the most effective protective measures. Its present numbers are at the very lowest level (cf. "Notes on species observed"), and to keep a chance, little as it is, to save this bird from extinction, there is only one priority, viz., to give fully protected status to it and to the last refuges where it has been recorded to reside and breed (Ilhéu do Curral Velho and Ilhéu do Baluarte; these islets still harbour significant colonies of the Brown Booby, an important condition for its survival; see "Notes on species observed"). The fact by itself that the Frigate Bird has survived in the Cape Verdes reflects the remote situation and inaccessible character of these last breeding-places. However, even a few occasional visits by fishermen in fine weather could be disastrous. Unfortunately this same remote character will make it very difficult to effectuate any paper measures taken. Indeed, a successful protection of the Frigate Bird in the Cape Verdes would stand for a milestone of nature conservation in the archipelago!

Fortunately, Cape Verde authorities have become increasingly aware of the necessity of nature conservation, and since the above was written, matters were considerably speeded up. Especially due to the initiative of Mr. C.J. HAZEVOET, Amsterdam, the "Program for National Parks and Protected Areas" came into being, to be executed under the auspices of the Instituto Nacional de Investigação Agrária (INIA) and the International Council of Bird Preservation (ICBP, Netherlands Section). For the details and implementation of the ambitious plan, I refer to HAZEVOET (in press) and to several unpublished reports (INIA 1988; HAZEVOET without date "1988", 1989b, 1989d).

In this favourable atmosphere the first manifest result was scored when, on 26 May 1990, a bill was passed by the Cape Verde National Assembly by which the island of Santa Luzia and all the islets in the Cape Verde Archipelago were declared protected nature reserves (Republica de Cabo Verde, Boletim Oficial, no. 25, 29-vi-1990, 2º suplemento, Lei no. 79/iii/90) (cf. fig. 13).

Where, in recent times, the Portuguese and Senegalese governments have realized the status of fully protected national nature reserve for the Selvagens (1971), and the Iles de la Madeleine (1976), it is

gratifying to see that the Cape Verde government does not lag behind.

However, there is still a long way to go, for paper measures should now be put into practice, which requires the creation of a reliable, well-structured guard-system, with motivated, well-trained and paid (!) wardens. The new reserves should preferably be guarded throughout the year, or, in case this will not at once be feasible, at least during the reproductive period of the most vulnerable species. For Razo and Branco this implies the period May–November (the reproductive season of the Cagarra), for the Rombos islets the period November–July (roughly the reproductive season of the Little Shearwater and the White-faced Frigate Petrel).

Some modest accommodation should be built on both the Desertas (Razo) and the Rombos islets (Cima) for the wardens and visiting scientists to operate from; and fast boats should be available to patrol the nearby islets as well. The Ilhéus do Curral Velho and Baluarte may be watched from look-out posts on the coast of Boa Vista, but here too boats are indispensable to take action in case of illegal landings on the islets.

On the other hand, selective tourism in the form of birding and nature excursions under the guidance of wardens or other qualified persons should be admitted within certain limits, and may even form a source of income.

A further step in legislation will have to be the protection by law of the majority of bird species indigenous in the Cape Verdes and to penalize collecting of eggs, disturbance of breeding sites, etc.

All these measures should go, and already are going, hand in hand with informative educational campaigns, etc. (HAZEVOET, in press), to promote a general change in mentality of the population towards flora and fauna (stressing such aspects as beauty, uniqueness, their role in the ecosystem, utility for man, etc.) and to develop a general notion of

national pride towards the newly established, internationally renowned nature reserves.

Desiderata for Further Research

Although invaluable, the considerable amount of literature dealing with the avifauna of the Cape Verde Islands, is in fact little more than an accumulation of anecdotic information, miscellaneous taxonomical notes and species lists, resulting from short visits by individual ornithologists and expeditions (cf. e.g. LE GRAND 1986). Only a few authors, notably MURPHY (1924), BOURNE (1955a), MOREAU (1966) and DE NAUROS (e.g. 1969a and 1987c) have added significant studies concerning the fauna as a whole, in perspective of the geographical position, Late Quaternary history, and ecology of the islands. In particular the beautifully illustrated, compilatory book by BANNERMAN & BANNERMAN (1968) aroused the interest in the Cape Verde avifauna in broader circles, and stimulated further research. However, the literature on the subject still can neither boast on a single thorough population study, nor on any detailed study concerning breeding biology, behaviour, etc., of any of the indigenous birds.

This is a serious gap, especially where it concerns species reducing in number, or worse, threatened with extinction. Studies on seabird colonies concerning breeding success, age structure, numbers, etc., may offer clues for management in the newly established nature reserves. This may account in particular for the Cagarra, persecuted by man since time out of mind for its meat and fat. Not only is there still much to be learned about the life and habits of this bird, and about its relation with the giant gecko, but there is also not a single report dealing with the traditional culling trips: the way in which these were organized, and the methods of collecting and processing. ALEXANDER (1898a: 108; 1898 b: 284), SCHLEICH (1982b: 80) and SCHLEICH & WUTTKE (1983: 41) are the only authors to have devoted a few lines of text to this, from a cultural-historical point of view, interesting practice. It is still not too late to interview fishermen about methods, number of birds collected, unwritten rules, distribution, revenues, etc., and to put these on record. In this context I may point to the fact that any details on former, large scale expeditions to Selvagem Grande, would have been forgotten totally (except, maybe, for some matter-of-fact information on the numbers taken), had it not been for a small, rather obscure paper by SCHMITZ (1893) (translated into English by ZINO 1985).

The taxonomic status of several (allegedly) endemic subspecies in the Cape Verdes, notably land-birds such as Cream-coloured Courser, Guinea-Fowl and Bar-tailed Sand-Lark, needs a re-appraisal; and this may even hold for the Kingfisher. It is also desirable to get a better insight into the confusing situation concerning Quail, Kestrel and Kites, and to settle the systematic position of the Razo Lark and the Cape Verde Islands Swift.

The fossil record of the Cape Verde Islands does not include any birds. The only place where I observed amounts of fossil bird bones (presumably of Recent and Late Pleistocene age) is on the north-eastern part of Cima. Here I found significant sand

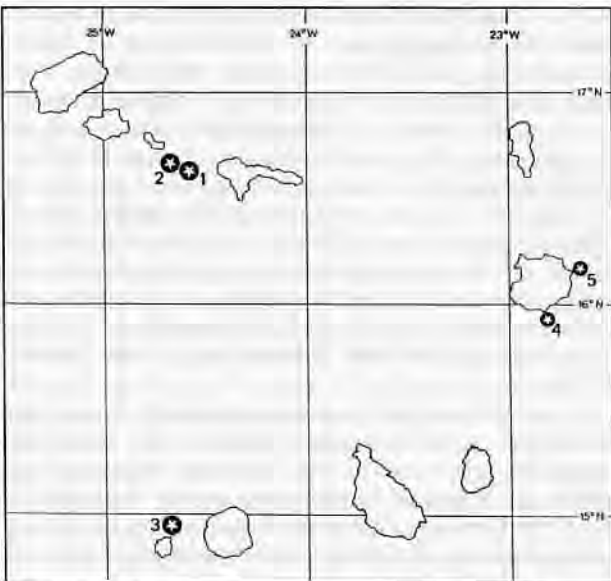


Fig. 13. Most important bird-islets in the Cape Verde Islands, now officially declared national nature reserves: 1. Razo; 2. Branco; 3. Ilhéus Rombos; 4. Ilhéu do Curral Velho; 5. Ilhéu do Baluarte.

deposits, rich in guano, showing marks of severe erosion down to and exposing the underlying rocky substrate (fig. 14)*. Large amounts of sand seemed to have been washed down to the sea and the ground was strewn with numerous empty shells of the gas-



Fig. 14. Eroded sand deposits on the north-eastern part of Cima, containing Recent Quaternary (and possibly Pleistocene fossil) bird bones and egg-shells; August 1986.

tropod snail *Zootecus insularis* and bird bones. The steep side of the remaining sand deposit also revealed the presence of empty shells and bird bones, and in addition some egg-shells (fig. 15). A modest sample of bones was collected, which, among other things, yielded remains of the Masked Booby, a species now extinct in the Cape Verdes (OLSON & DEN HARTOG 1990). A further study of these deposits may be of great interest.

Lastly it should be mentioned that several remote and less accessible islets and areas have only been poorly surveyed by ornithologists, so that there is every reason to proceed purely explorative trips and expeditions in the Cape Verdes. Among the areas that definitely need further attention are to be mentioned: Santa Luzia, Ilhéu Grande and Luis Carneiro (Rombos Islets) and considerable parts of Boa Vista, São Nicolau and Santo Antão, including their satellite islets and stacks. However, even the better known islands may yield interesting and unexpected details concerning presence/absence and distribution of species; in this connection the situation with regard to the sparrows on Fogo and Sal may be mentioned.

* It is possible that this locality represents the guano quarry mentioned by BOURNE (1966: 426) and that its eroded character is first of all determined by human activities, but I am not sure about this as BOURNE refers to the west side of the island, and as I also found other, undeniable examples of strong, natural erosion in the form of deep gullies running from the central part of the island to the cliffs, uncovering the mineralized root systems of a once more significant vegetation.



Fig. 15 a, b. Detail of vertical wall of eroded sand deposit (cf. fig. 14) showing entrance of small petrel's burrow and fossil egg-shell (enlarged in fig. b).

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I greatly acknowledge the contribution to the present publication of my colleague Drs. M.J.P. VAN OIJEN, who identified the considerable amount of fish remains taken from a perch and eyrie of an Osprey on Razo (table 2, 3) and from regurgitations of Cape Verde Islands Shearwaters. Dr. P.A.M. GAEMERS (also NNM, Leiden) identified fish prey of the Madeiran Storm Petrel on the basis of otoliths obtained from stomachs. Mr. C.J. HAZEVOET (Amsterdam) provided some literature and up-to-date information. He also read the first version of the manuscript, and saved me from a few obvious mistakes. My colleagues Dr. G.F. MEES and Prof. Dr. L.B. HOLTHUIS, also were helpful in providing literature. Mr. O. KOEDIJK and Miss D. DE BRUYN permitted me to include some of their more reliable and interesting observations made during a trip to the Cape Verdes in the winter of 1985-1986. Mrs. J. M. G. HAMMOUDA-DE GRAAF, J. V. TEN HAVE, and A. L. WIELKENS typed the manuscript.

The present publication was submitted and accepted for publication in 1988, but in several respects outdated when it was meant to go to the press. Therefore I am most grateful to the editor, Dr. W. LOBIN, for allowing me, as late as in October (and in a hurry), to make numerous changes and additions.

Summary

Bird observations are presented resulting from the Dutch CANCAP VII expedition (1986) in the Cape Verde Islands. During this expedition special attention was paid to the avifauna of the uninhabited islets of Cima and Razo.

A total number of 42 species was observed, residents and migrants (vagrants). Among the non-resident birds the Red-footed Booby (*Sula sula*) and the Jack Snipe (*Lymnocyptus minimus*) had not previously been recorded, whereas the Oystercatcher (*Haematopus ostralegus*) and the Cuckoo (*Cuculus canorus*) had only been recorded once or twice.

Miscellaneous notes are presented on biology, food, behaviour, numbers, etc., of several resident species, such as: Madeiran Storm Petrel (*Oceanodroma castro*), Bulwer's Petrel (*Bulweria bulwerii*), Cape Verde Islands Cagarra (*Calonectris edwardsii*), Brown Booby (*Sula leucogaster*), Osprey (*Pandion haliaetus*) and Razo Lark (*Alauda razae*).

A comparison of non-resident birds observed in June 1982 (CANCAP VI) and in August 1986, shows a significant difference in the number of species and individuals, indicating perceptible migration during the latter period.

The terrestrial avifauna of the Cape Verdes is mainly composed of Palearctic, Saharan and Ethiopian species, with a few cosmopolites and introductions. The fauna must be relatively young, as most species do not significantly differ from pendant continental populations. The Palearctic element, comprising species that are absent from West Africa or the entire African continent, is well represented. It is unlikely that this element derives from suspended European migrants. Hence, it is plausible to consider the matter in the perspective of Late Quaternary climatic fluctuations, when, during periods of a more favourable climate (such as the Holocene climatic optimum, ca 8,000-4,000 BP), with significant vegetation in the present Sahara, many Palearctic birds presumably ranged further south into West Africa. The majority of Cape Verde species would seem to derive from stray, basically sedentary, North-west and West African stock, and from intra-African wanderers and migrants. The prevalent easterly winds in the North-west African region must greatly have favoured (and still so) dispersal to the islands.

Possibilities for colonization, and insular distribution are/have been determined mainly by ecological conditions. Distance between islands (and island groups), however, apparently also forms a substantial barrier for some species, notably the Boa Vista Bifasciated Lark (*Alaemon alaudipes boavistae*) and the Razo Lark.

The presence/distribution of all species indigenous to the Cape Verdes, the seabirds inclusive, is discussed. Some special attention is paid to the Larks and the Kestrel (*Falco tinnunculus*).

Some early historical notes on the avifauna of the Cape Verdes by the navigator WILLIAM DAMPIER,

dating from the turn of the 17th century, are cited and discussed.

Conservation measures in the Cape Verdes are urgently needed, notably regarding the seabirds. In particular the larger species, viz. the Brown Booby (*Sula leucogaster*), the Red-billed Tropicbird (*Phaethon aethereus*) and the Cagarra (*Calonectris edwardsii*), have since long been persecuted, and their numbers have declined dramatically. The uninhabited Rombos and Desertas islets, however, still harbour significant colonies of all but two seabird species. In addition, the islets of curral Velho and Baluarte, off Boa Vista, still form the last breeding refuges of the Magnificent Frigate Bird (*Fregata magnificens*) in the eastern Atlantic. All these islets were very recently given the official status of protected nature reserve. To enforce this new law, it is necessary to put these reserves in the custody of a well-organized guard-system. A second step in legislation should be the protection by law of individual bird species. These measures should be, and are in fact, attended by a campaign pursuing a general change in mentality towards fauna and flora. The new developments regarding nature conservation in the Cape Verde Islands are the result, and form part of, the ambitious "Program for National Parks and Protected Areas", initiated in 1988 under the auspices of the Instituto Nacional de Investigação Agrária (INIA) and the International Council of Bird Preservation (ICBP).

Detailed studies on Cape Verde bird populations, breeding biology, behaviour, etc., so far virtually wanting, are desirable. Information concerning the traditional Cagarra culling trips to Razo and Branco should be put on record. A re-appraisal of the taxonomic status of at least some (allegedly) endemic subspecies in the Cape Verdes is desirable. Fossil deposits containing bird bones, such as present on Cima, need further attention. Explorative trips and expeditions to remote islets and areas in the Cape Verdes may still be rewarding.

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