

ATOLL RESEARCH BULLETIN
NO. 248

**THE BIRDS OF ASSUMPTION ISLAND, INDIAN OCEAN:
PAST AND FUTURE**

by R. P. Prÿs-Jones, M. S. Prÿs-Jones, and J. C. Lawley

Issued by
THE SMITHSONIAN INSTITUTION
Washington, D. C., U.S.A.
July 1981

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by R. P. Prÿs-Jones, M. S. Prÿs-Jones, and J. C. Lawley¹

INTRODUCTION

Assumption (9°43'S 46°30'E) is a small kidney-shaped island of c. 10.5 km² which forms part of the Aldabra archipelago, lying just south of the equator in the western Indian Ocean. Maps showing both the position of the archipelago relative to other land masses in the region, and also the relative positions of the islands and atolls comprising the archipelago, are given in Stoddart (1971). Despite being the closest neighbour of the large and well-studied Aldabra atoll, which is 27 km to the north-west, few people have recorded information on the birds of Assumption, and none who did was present there for more than a few days (Table 1). What little is known of the general ecology of the island has been largely summarized in a paper by Stoddart *et al.* (1970) which catalogues the massive human disturbance which the Assumption environment has suffered during the present century, principally as a result of phosphate mining. Their paper contains a detailed map of the island as well as numerous photographs taken during the late 1960s, and collates most records of birds made prior to 1977. Limited additional information may be found in Parker (1970) and Stoddart (1977a, 1977b).

The aim of the present paper is three-fold: firstly, to up-date knowledge of the status of the Assumption avifauna, based on trips we made to this island in 1977 and 1978; secondly, on the basis of all available published and unpublished records, to describe the original avifauna and document the time-scale and likely causes of its destruction; thirdly, to consider future conservation of the Assumption Island environment in the light of recent introductions of a number of exotic bird species.

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Manuscript received July 1980 - Eds.

Table 1. Main sources of information on the birds of Assumption.

| <u>Date of visit</u> | <u>Bird observers</u> | <u>Main references</u> |
|--------------------------|--|----------------------------------|
| Oct. 1878 | F. Rivers | Rivers (1878) |
| Sept. 1892 | W.L. Abbott | Ridgway (1895) |
| 8-10 Nov. 1895 | S.C.E. Baty | Baty (1895) |
| 13 Oct. 1901 | H. A'C. Bergne | Bergne (1901) |
| 12-13 March 1906 | M.J. Nicoll | Nicoll (1906, 1908) |
| 19-21 Sept. 1906 | P.R. Dupont | Dupont (1907) |
| April/May 1907 | H.P. Thomasset | Thomasset (1907) |
| 6-13 Sept. 1908 | J.C.F. Fryer | Fryer (1911) |
| 1916 | P.R. Dupont | Dupont (1916) |
| 4 Oct. 1929 | P.R. Dupont | Dupont (1929) |
| c. Oct. 1937 | L.D.E.F. Vesey-FitzGerald | Vesey-FitzGerald (1940, 1941) |
| 13 Dec. 1957 | W.D. Hartman | Hartman (1958) |
| 10 Oct. 1964 | J.W. Leech, R. Worrell, R.W. Thomas | Bourne (1966) |
| 10 Nov. 1964 | M.J. & M. Penny, R. Gaymer | Stoddart et al (1970) |
| 3 Oct. 1965 | R. Gaymer | " |
| 15-16 Sept. 1967 | C.W. Benson, J.M. Boyd, J.F. Peake, E.N. Wright | " |
| 8 Oct. 1967 | I.S.C. Parker | Parker (1970) |
| 31 July 1968 | J. Frazier, R. Hughes | Stoddart et al (1970) |
| 18-25 April 1977 | M. Walker | This paper |
| 26 Oct. - 2 Nov. 1978 | J. Lawley | Lawley (1979) & this paper |

N.B. List revised and up-dated from that in Stoddart et al (1970).

METHODS

Marilyn Prÿs-Jones (M.P-J.) visited Assumption between 18 and 25 April 1977, and recorded information on birds at the request of R. Prÿs-Jones (R.P-J.) who was then studying the birds on Aldabra Atoll. Although primarily interested in Lepidoptera, M.P-J. had more than a year's experience of bird watching on Aldabra, and took notes and sketches of those species of whose identity she was uncertain. During her visit she thoroughly covered the whole area of the island, spending each day in the field.

J. Lawley (J.L.) visited Assumption between 26 October and 2 November 1978 specifically to study the birds. During his stay he covered most of the island, although concentrating on the coastal area, as well as circling the island once by boat and making almost daily fishing trips in the early morning or late evening. He spent one night camped ashore on the south-west coast.

R.P-J. was responsible for the collation of the information obtained by M.P-J. and J.L., and for the writing of this paper. The species section, immediately following, includes all relevant information on birds recorded by either observer; where not otherwise specified by their initials, similar sightings were obtained by both. A complete listing of the known past and present status of all bird species recorded from Assumption Island, other than domestic chickens and ducks, is given in Table 2. Mr. Hector Paturau, who is referred to frequently below, was the phosphate mining company representative for Assumption until his recent death.

RESULTS AND DISCUSSION

Species Recorded in 1977/78Red-tailed Tropicbird *Phaethon rubricauda*

M.P-J. recorded several flying over the island, and J.L. saw one. The only previous records were made over seventy years ago by Abbott (Ridgway 1895), who found it breeding, and Nicoll (1906).

White-tailed Tropicbird *Phaethon lepturus*

M.P-J. saw one individual flying over the island, and found an adult with a tiny chick in a crevice under a bush at the north end of the island on 25/4/77. J.L. found a single pair which we saw going in and out of a hole in cliffs on the south-west coast on 30/10 and 1/11/78, apparently nesting. These represent the first records for this species from Assumption, although it breeds commonly on Aldabra (Diamond 1971).

Table 2. Bird species recorded from Assumption Island, and their present status.

| Species | Status | Recorded by | |
|---|--------|-------------|------|
| | | M.W. | J.L. |
| Red-tailed Tropicbird <i>Phaethon rubricauda</i> | (B), C | + | + |
| White-tailed Tropicbird <i>Phaethon lepturus</i> | B | + | + |
| Red-footed Booby <i>Sula sula</i> | (B), C | + | + |
| Masked Booby <i>Sula dactylatra</i> | (B), C | | |
| Abbott's Booby <i>Sula abbotti</i> | (B) | | |
| Greater Frigatebird <i>Fregata minor</i> | C | + | + |
| Lesser Frigatebird <i>Fregata ariel</i> | C | + | + |
| Green Heron <i>Butorides striatus</i> | B? | + | + |
| Squacco Heron sp. <i>Ardeola idae/ralloides</i> | C | | |
| Cattle Egret <i>Bubulcus ibis</i> | C | + | + |
| Little Egret <i>Egretta garzetta</i> | C | | |
| Grey Heron <i>Ardea cinerea</i> | B? | + | + |
| White-faced Tree Duck <i>Dendrocygna viduata</i> | C | + | |
| Malagasy Kestrel <i>Falco newtoni</i> | C | + | |
| White-throated Rail <i>Dryolimnas cuvieri</i> | (B) | | |
| Crab Plover <i>Dromas ardeola</i> | C | + | + |
| Greater Sand Plover <i>Charadrius leschenaultii</i> | C | | + |
| Grey Plover <i>Pluvialis squatarola</i> | C | | + |
| Sanderling <i>Calidris alba</i> | C | + | + |
| Little Stint <i>Calidris minuta</i> | C | | |
| Curlew Sandpiper <i>Calidris ferruginea</i> | C | + | + |
| Whimbrel <i>Numenius phaeopus</i> | C | + | + |
| Curlew <i>Numenius arquata</i> | C | | |

| | Status | Recorded by | |
|--|--------|-------------|------|
| | | M.W. | J.L. |
| Greenshank <i>Tringa nebularia</i> | C | + | + |
| Common Sandpiper <i>Actitis hypoleucos</i> | C | | |
| Turnstone <i>Arenaria interpres</i> | C | + | + |
| Great Crested Tern <i>Sterna bergii</i> | C | + | |
| Black-naped Tern <i>Sterna sumatrana</i> | C | | |
| Sooty Tern <i>Sterna fuscata</i> | C | | |
| Little Tern <i>Sterna albifrons</i> | C | | |
| Common Noddy <i>Anous stolidus</i> | C | | + |
| Fairy Tern <i>Gygis alba</i> | B? | + | + |
| Malagasy Turtle Dove <i>Streptopelia picturata</i> | (B), C | + | |
| Barred Ground Dove <i>Geopelia striata</i> | I, B | + | + |
| Grey-headed Lovebird <i>Agapornis cana</i> | (I) | + | |
| Malagasy Coucal <i>Centropus toulou</i> | (B) | | |
| Swift sp. <i>Apus apus/barbatus</i> | C | | + |
| Swallow sp. <i>?Hirundo rustica</i> | C | | |
| Red-whiskered Bulbul <i>Pycnonotus jocosus</i> | (I)? | + | |
| Malagasy Bulbul <i>Hypsipetes madagascariensis</i> | (B?) | | |
| Pied Crow <i>Corvus albus</i> | B | + | + |
| Souimanga Sunbird <i>Nectarinia sovimanga</i> | B | + | + |
| Red-headed Forest Fody <i>Foudia eminentissima</i> | (B?) | | |
| Malagasy Fody <i>Foudia madagascariensis</i> | (I) | + | |
| Common Waxbill <i>Estrilda astrild</i> | (I) | + | |
| Mozambique Serin <i>Serinus mozambicus</i> | (I) | + | |

Key to symbols: B - breeds; (B) - formerly bred; C - casual visitor or migrant; I - introduced; (I) - apparently failed introduction.

N.B. i) The "*Sula leucogaster*" recorded for Assumption by Fryer (1911) was almost certainly not the species now known by this name, i.e. the Brown Booby, but instead a misnomer for the Red-footed and/or Masked Boobies (Gibson-Hill 1950, Stoddart 1977b). Brown Boobies are, however, known as vagrants from Aldabra (Diamond 1971), and may well be added to the Assumption list by future observers. It is often difficult to be sure which species of booby is being referred to in the older reports, and further analysis of such records might be worthwhile.

ii) Contrary to the statement of Watson et al (1963), there appears to be no definite record of the Malagasy White-eye *Zosterops maderaspatana* from Assumption. However, Baty (1895) implies the presence of a "tectec", which might be referable to this species (cf. Dupont 1907).

iii) Thomasset (1907) records that "Rabbits, guinea fowl and chickens have been placed on Assumption.....and appear to be thriving." Other observers fail to mention either rabbits or guinea fowl, and it is unclear if Thomasset's records are based on personal observation or hearsay evidence.

Red-footed Booby *Sula sula*

Seen in some numbers both flying over and feeding offshore. Flock of c. 70-80 observed at rest on the sea by J.L. Formerly bred on Assumption (Nicoll 1906).

Greater Frigatebird *Fregata minor* and Lesser Frigatebird *F. ariel*

Frigatebirds were frequently recorded flying above the island. Most were not identified further, but both species were definitely noted.

Green Heron *Butorides striatus*

Seen frequently both on the coast and also inland around freshwater pools and sink holes where they appeared to feed. Watson et al (1963) and Penny (1974) list this species as breeding on Assumption, but there appears to be no definite record of this although Bourne (1966) includes a sighting of "what may have been young" of this species.

Cattle Egret *Bubulcus ibis*

Common. Appeared to feed around inland pools. Largest numbers recorded together by both M.P.-J. and J.L. were c. 70-80 individuals. The species was first recorded on Assumption as recently as 1964, although a flock of 60 was present by 1967 (Stoddart et al 1970).

Grey Heron *Ardea cinerea*

Seen occasionally both on the reef and near inland pools, with a maximum of two or three visible at any one time. One individual seen by J.L. was being harassed in flight by a Pied Crow, and another had been captured by a youth and was destined for the pot. According to the islanders they are resident and apparently breed. The most recent previous record was by Dupont (1907), and breeding has never been confirmed.

White-faced Tree Duck *Dendrocygna viduata*

Three largish, brown, wild ducks with black and white on their heads, which were seen by M.P-J. on a large pool in scrub behind the Settlement on 24/4/77, must have been this species. On the following day five were present. Not seen by J.L. These represent a first record from Assumption, although the species has previously been recorded as a vagrant on Aldabra (Benson & Penny 1971). The wife of the island manager told M.P-J. that they were not infrequently seen, and suggested that Mr. Paturau might have introduced them years previously; however, this would seem highly improbable, and he made no mention of having done so.

Malagasy Kestrel *Falco newtoni*

M.P-J. saw two, possibly three, kestrels flying round the trees of the Settlement area on 21/4/77, of which one was seen to catch and eat a *Phelsuma* gecko. Not seen by J.L. There is no previous record of this species from Assumption, but it is resident on neighbouring Aldabra (Benson & Penny 1971).

Crab Plover *Dromas ardeola*

Quite common. Up to ten seen together along the shore.

Greater Sand Plover *Charadrius leschenaultii*

One seen by J.L. in a shallow rock pool on the shore. Not recorded by M.P-J.

Grey Plover *Pluvialis squatarola*

One seen by J.L. in a shallow rock pool on the shore. Not recorded by M.P-J.

Sanderling *Calidris alba*

Several seen along the beaches.

Curlew Sandpiper *Calidris ferruginea*

Two seen by M.P-J. and one by J.L., all towards the southern end of the island. The only previous record is by Parker (1970), although the species is a common migrant to Aldabra (Penny 1971).

Whimbrel *Numenius phaeopus*

Single individual only noted by M.P-J. Seen commonly, either singly or in pairs, along the shore line or a little way inland by J.L.

Greenshank *Tringa nebularia*

Three seen by M.P-J. and a single bird by J.L.

Turnstone *Arenaria interpres*

Commonest shorebird present, occurring frequently in small flocks.

Great Crested Tern *Sterna bergii*

Four, seen by M.P-J. on the beach head on the south-east of the island, flew up and stooped over her before resettling on the same spot. Inspection of the area revealed no signs of nesting. Three other individuals were also seen by M.P-J. flying along the reef edge and then settling on the beach with three Crab Plovers. Not recorded by J.L. The species was listed for Assumption by Dupont (1907), but this is the only previous record although it breeds on Aldabra (Diamond 1971). The field description and sketch made by M.P-J. make unlikely the possibility of confusion with the similar Lesser Crested Tern *S. bengalensis*, which has been recorded as a migrant on Aldabra (Diamond 1971).

Common Noddy *Anous stolidus*

Frequently seen singly or in small groups around the coast by J.L. On 26/10/78 a large flock of c. 200 was present a mile offshore, mixed with a few Fairy Terns. Not recorded by M.P-J. Only previous record was by Dupont (1907) although the species breeds commonly on Aldabra (Diamond 1971).

Fairy Tern *Gygis alba*

Numbers seen on most days by M.P-J. with a maximum at one time of 30 individuals which were perched on flowering sisal; other birds seen in crevices in solution holes may have been breeding. Those recorded by J.L. were mostly singles or pairs just offshore, although he saw a bird flying inland with a beakful of fish. Said to breed by the islanders, and probable breeding recorded previously by Peake (Stoddart et al 1970), but no definitive proof yet available.

Malagasy Turtle Dove *Streptopelia picturata*

Three individuals seen by M.P-J. in the Settlement area on both 21/4 and 23/4/77. Two appeared to comprise a pair, i.e. a bright male and a duller female, and all resembled the Aldabran subspecies in colouration. Not seen by J.L. These sightings represent the first records for Assumption since 1908, when the species was noted by Fryer (1911).

Barred Ground Dove *Geopelia striata*

Restricted to the Settlement area, and not very abundant. M.P-J. saw a maximum of seven birds together, and found a nest containing an adult with two eggs in a *Casuarina* fork on 23/4/77. J.L. estimated that at least a dozen were present in 1978. These are the first records for Assumption, and Mr. Paturau told M.P-J. that he had introduced the species in 1976.

Grey-headed Lovebird *Agapornis cana*

One male, which was seen briefly by M.P-J. on 19/4/77 inland from the Settlement, constitutes the first record of this species for Assumption. The description taken was of a small, green parrot-like bird, with a grey head, which chattered like a Budgerigar. Not seen by J.L.

Swift sp. *Apus apus/barbatus*

On two occasions J.L. saw a black swift flying low along the shore (Lawley 1979). According to the islanders, such "hirondelles" are regular visitors. Not seen by M.P-J.

Red-whiskered Bulbul *Pycnonotus jocosus*

Four individuals were seen by M.P-J. in and around coconut trees north-east of the Settlement on 18/4/77, and two others in the platin area south of the Settlement on 19/4/77. She heard them at other times also, but they proved shy and difficult to find. J.L. did not see any in 1978, but was told by the wife of the island manager that she had recently seen one. These are the first records for Assumption.

Pied Crow *Corvus albus*

Seen predominantly around the Settlement area. Maximum count of 26 birds seen together by M.P-J. on 22/4/77; as three others had been shot by labourers on 20/4/77 this indicates a population size of around 30 individuals. J.L. estimated the total population in 1978 as between 15 and 20 birds.

Souimanga Sunbird *Nectarinia sovimanga*

Common resident throughout the island wherever trees or bushes are present. Seen feeding from *Scaevola* flowers by M.P-J. In April 1977 M.P-J. found old nests in a *Ficus* bush, on houses and down solution holes, but breeding was apparently over. In October/November 1978 J.L. found a nest suspended from a low bush, and observed both the male and female parents visiting the single tiny chick; only the female was seen to remain and brood.

Malagasy Fody *Foudia madagascariensis*

Between 20 and 30 individuals, both males and females, were released by Mr. Paturau in the Settlement on 18/4/77, after having been brought by ship from Mauritius via Mahe. M.P-J. subsequently resighted birds frequently, but always near the Settlement. Not recorded by J.L. in 1978. This is a first record for Assumption.

Common Waxbill *Estrilda astrild*

A single bird, seen by M.P-J. on some maize near the Settlement on 23/4/77, constitutes the first record for Assumption. Not seen by J.L.

Mozambique Serin *Serinus mozambicus*

Between 20 and 30 birds of this species were released by Mr. Paturau along with the fodies on 18/4/77, and form the first records for Assumption. Numbers were seen subsequently by M.P-J., all being near the Settlement except for one observed in scrub at the extreme north of the island on 21/4/77. Not recorded by J.L.

The Destruction of the Original Avifauna

If introduced species are included, a total of 46 birds have been recorded from Assumption (Table 2). Only three of these (the White-tailed Tropicbird, the Barred Ground Dove and the Souimanga Sunbird) are known to breed at the present time. This very depauperate avifauna is a result of extinctions, which can be inferred to have occurred in two main phases: firstly, following the introduction of goats and rats, which probably took place during the second half of the nineteenth century; secondly, following the human settlement of Assumption in June 1908, after which large-scale vegetation clearance and phosphate extraction began, and pests such as dogs and cats were introduced (although cats may possibly have arrived prior to human settlement).

Little evidence is available regarding the scale of the first phase of extinctions as there are no records which are known to antedate the presence of all introduced pests. The considerable phosphate deposits on Assumption are clear evidence that there must once have been large colonies of seabirds present, but observers in the period prior to human settlement record the breeding only of small numbers of four species. These species, three boobies and one tropicbird, are all

large and long-lived, indicating that smaller, and possibly less site-attached, species such as terns, which one might have expected to be present (Diamond 1979), may have rapidly succumbed to the presence of rats and, possibly, cats. Considering land birds, there is good evidence that at least two species not mentioned in the Assumption bird lists given by Stoddart et al (1970) and Stoddart (1977a) may have become extinct before human settlement began. The evidence for this is based on a careful reading of the text of a letter written by F. Rivers, the first of the observers listed in Table 1. This letter, recording a visit made in 1878, contains lists of the birds which Rivers saw on each of the Aldabra group of islands, the islands being discussed in the order in which he visited them, i.e. Astove, Cosmoledo, Assumption, and finally Aldabra itself. For Astove, Rivers states he found the "colibri", "crow", "cardinal", "ralle", "merle" and "Pigeon Hollandais"; for Cosmoledo, he records "The same land birds are found here as at Astove", but that in addition the "toutourelle rouge" was present. For Assumption, Rivers states that "there amongst the land birds the "Pigeon Hollandais" is not found, but the rest is like the other islands", i.e. Astove and Cosmoledo. This implies that besides the sunbird, crow, rail, and turtle dove, all independently recorded from Assumption by subsequent visitors, a "cardinal" (fody) and "merle" (bulbul) were also present in 1878. Rivers appears to have had no special interest in birds but, wherever they can be cross-checked, his statements appear accurate, and he comes across as a careful observer who recognized that the "merle" and "Pigeon Hollandais" of the Aldabra group of islands were different from those of the central Seychelles; by inference the "merle" and "cardinal" of the different islands of the Aldabra group were probably all the same, i.e. the Malagasy Bulbul and the Red-headed Forest Fody respectively. Stoddart (1977a), who did not include either the bulbul or fody in his tables of birds known from either Assumption or Cosmoledo, accepted Rivers' record of a bulbul from Astove, but doubted his record of a fody there on the grounds that Stirling (1843) failed to mention one. However, even ignoring the possibility of natural extinction and recolonization on small islands, negative evidence is tenuous, as exemplified by Rivers' own failure to record the Malagasy Coucal on Assumption or the Malagasy White-eye *Zosterops maderaspatana* on Astove or Cosmoledo.

The second phase of extinctions is better, but still inadequately, documented. Most species which formerly bred on Assumption but no longer do so appear to have disappeared very rapidly following human settlement (Dupont 1916, 1929), presumably through a combination of habitat destruction and direct predation by man and introduced animals. One definite exception is the Masked Booby which Vesey-FitzGerald (1941) found still to nest in 1937, although he considered that "it is doubtful if young are ever reared here in these days, since labourers in the guano fields destroy both eggs and parent birds". The single Malagasy Coucal also seen in 1937 by Vesey-FitzGerald (1940) may conceivably have been a vagrant from Aldabra rather than a remnant of the original Assumption breeding population. Of particular interest in view of the worldwide rarity of the species is the fate of the Assumption population of Abbott's Booby doubts as to the existence of which have been discounted by a systematic review of available

information (Stoddart 1977b). Second-hand information related to Betts (1940) suggested that adults may have continued breeding attempts until 1930 and not have entirely disappeared until 1936, but Vesey-FitzGerald (1941), who heard that the last one had vanished by 1926, seems likely to be a more reliable source in view of his presence on Assumption in 1937.

The Origins of Recent Arrivals

Ten of the species seen by us comprise new records for Assumption Island. Of these, two, the White-faced Tree Duck and the swift, are clearly casual vagrants. A further two, the White-tailed Tropicbird and the Malagasy Kestrel, probably arrived naturally from neighbouring Aldabra where both have breeding populations. Movement from Aldabra to Assumption may well play an important role in maintaining such bird populations as Assumption now possesses. This is particularly true for the various herons and egrets, none of which has definitely been recorded breeding on Assumption, for the Malagasy Turtle Dove and, possibly, for the Pied Crow. The three Malagasy Turtle Doves seen by M.P.-J. were the first records for Assumption for nearly 70 years, but as many individuals of the large Aldabran population are known to undertake daily, long-distance, intra-atoll movements (Benson & Penny 1971, R. Prÿs-Jones unpubl.) it is perhaps not surprising that some might occasionally reach Assumption. Likewise, the last record of nesting by Pied Crows on Assumption was as long ago as 1906 (Nicoll 1906, 1908), but this species is easily capable of crossing the small distance between Aldabra, where they breed, and Assumption. As an illustration of this, a flock of six Pied Crows were seen to fly in from the ocean onto the isolated small island of Astove in 1976, at a time when the minute population of this species recorded there in 1968 by Benson (1970b) had long since disappeared (H. Stickley, pers. comm.).

Two of the remaining six new species for Assumption, the Malagasy Fody and Mozambique Serin, were definitely introduced in 1977, and Mr. Paturau told M.P.-J. that he had released Barred Ground Doves in 1976. It likewise seems almost certain that the Grey-headed Lovebird, Red-whiskered Bulbul and Common Waxbill were introduced by man at some stage between 1968, the year of the last previous visit by ornithologists, and 1976, with the latter year being the most probable. The fodies and serins were definitely brought by ship from Mauritius via Mahe, and Mauritius is the probable origin of the other species also.

Future Conservation

Prior to the releases documented above, the Aldabra archipelago had been remarkably free of avian introductions, with a single sighting of what was probably a Barred Ground Dove on Cosmoledo being the only example on record (Benson 1970a). (The "sourin" seen on Cosmoledo by Bergne (1901), and identified as either a Mozambique Serin (Benson 1970a) or a Malagasy Fody (Benson et al. 1975), was probably in fact either a naturally occurring Malagasy White-eye (Stoddart 1977a) or possibly a female Red-headed Forest Fody.) Although the original

avifauna of Assumption has been largely exterminated, the introduction of exotic species, apparently in contravention of Seychelles law, is extremely disturbing because of the possible consequences of movements by such exotics from Assumption to Aldabra. Aldabra, unusually among large oceanic atolls, has its original avifauna virtually entirely intact. The only species known to have disappeared in historic times, the Barn Owl *Tyto alba*, apparently did so naturally (Benson & Penny 1971), although the endemic Aldabran Brush Warbler *Nesillas aldabranus* is at present on the verge of extinction (Prÿs-Jones 1979). Introduced species may both carry diseases and also pose a direct competitive threat to isolated island communities. In particular, the Malagasy Fody and Red-whiskered Bulbul have ecological counterparts on Aldabra in the Red-headed Forest Fody and the Malagasy Bulbul respectively. Benson & Penny (1971) have previously commented on the desirability of keeping Malagasy Fodies from Aldabra, and Assumption is clearly too close for a species that may possess the ability to colonize across considerable water gaps (Benson et al. 1975). A further worrying possibility if the Malagasy Fody should reach Aldabra is that it will hybridize with the Red-headed Forest Fody. In Madagascar, Benson et al. (1976/77) have shown that *Foudia omissa*, which is often classified as a subspecies of *F. eminentissima* (Moreau 1960, Moreau & Greenway 1962), has begun to hybridize with *F. madagascariensis* in an area where the ranges of these two species have recently been brought into contact as a result of habitat destruction.

The apparent lack of success of all introduced species on Assumption except the Barred Ground Dove is indicative of the present highly degraded nature of the environment there. In addition, there is a continuing human persecution of larger wildlife which may also be partly responsible for vagrant species from Aldabra failing to establish themselves. As evidence of this M.P.-J. witnessed the killing of three Pied Crows and at least 11 Green Turtles *Chelonia mydas* in a single week in 1977, and J.L. recorded the capture of a Grey Heron for food during his week's stay in 1978. It seems probable that the population of only a single bird species, the endemic race of the Souimanga Sunbird, can be considered self-sustaining at present.

The main conservation measures required on Assumption are effective control on human destruction of the natural fauna and flora, effective controls on the importation of further exotic species, the elimination of introduced mammalian pests, and the restoration of natural vegetation cover. With phosphate extraction still continuing such measures will clearly depend on the cooperation of the mining company as well as the interest of the Seychelles government. The introduction of various exotic species indicates a desire among people present on Assumption for a more diverse bird fauna than now exists, but is clearly the wrong way of achieving this. The first requirement is for improvements in the overall condition of the environment, following which consideration could be given to the re-introduction of bird species that are known formerly to have occurred there, in particular elements of the land bird fauna of Aldabra. Under no circumstances, now or in the future, should further species having no historical connection with Assumption be released there.

REFERENCES

- Baty, S.C.E. 1895 *Report on the Aldabra group of islands*. Mahe: Crown Lands Department.
- Benson, C.W. 1970a Land (including shore) birds of Cosmoledo. *Atoll Res. Bull.* 136: 67-81.
- Benson, C.W. 1970b Land (including shore) birds of Astove. *Atoll Res. Bull.* 136: 115-120.
- Benson, C.W. & Penny, M.J. 1971 The land birds of Aldabra. *Phil. Trans. R. Soc. Lond. B* 260: 417-527.
- Benson, C.W., Beamish, H.H., Jouanin, C., Salvan, J. & Watson, G.E. 1975 The birds of the Iles Glorieuses. *Atol Res. Bull.* 176: 1-34.
- Benson, C.W., Colebrook-Robjent, J.F.R. & Williams, A. 1976/77 Contribution à l'ornithologie de Madagascar. *L'Oiseau et R.F.O.* 46: 103-134, 209-242, 367-386; 47: 41-64, 167-191.
- Bergne, H. A'C. 1901 *Rough notes of a voyage to the Aldabra group*. Manuscript. [Not seen].
- Betts, F.N. 1940 Birds of the Seychelles:- II. The sea-birds - more particularly those of Aride Island. *Ibis* (14) 4: 489-504.
- Bourne, W.R.P. 1966 Observations on islands in the Indian Ocean. *Sea Swallow* 18: 40-43.
- Diamond, A.W. 1971 The ecology of the sea birds of Aldabra. *Phil. Trans. R. Soc. Lond. B* 260: 561-571.
- Diamond, A.W. 1979 Dynamic ecology of Aldabran seabird communities. *Phil. Trans. R. Soc. Lond. B* 286: 231-240.
- Dupont, P.R. 1907 *Report on a visit of investigation to St. Pierre, Astove, Cosmoledo, Assumption and the Aldabra group of the Seychelles Islands*. Seychelles: Government Printing Office.
- Dupont, P.R. 1916 *Aldabra: its guano deposits and other resources*. Manuscript, Seychelles National Archives: Aldabra Group, Correspondence relating, 1889-1943: C/SS/73.
- Dupont, P.R, 1929 *Report on a visit of investigation to the principal outlying islands of the Seychelles archipelago*. Manuscript, Department of Agriculture files, Mahe.

- Fryer, J.C.F. 1911 The structure and formation of Aldabra and neighbouring islands - with notes on their flora and fauna. *Trans. Linn. Soc. Lond.* (2) 14: 397-442.
- Gibson-Hill, C.A. 1950 Ornithological notes from the Raffles Museum: 9. Notes on Abbott's Booby. *Bull. Raffles Mus.* 23: 65-76.
- Hartman, W.D. 1958 Report on some land birds of Farquhar, St. Pierre, Astove, Cosmoledo, Assumption and Aldabra. *Seychelles Govt. Bull.* 21.
- Lawley, J.C. 1979 The European Swift *Apus apus* on Assumption Island. *Bull. Br. Orn. Club* 99: 153.
- Moreau, R.E. 1960 The Ploceine weavers of the Indian Ocean Islands, *J. Orn.* 101: 29-49.
- Moreau, R.E. & Greenway, J.C. 1962 Family Ploceidae. In *Check-list of birds of the world*, vol. 15, ed. Mayr, E. & Greenway, J.C., pp. 3-75. Cambridge, Massachusetts: Museum of Comparative Zoology.
- Nicoll, M.J. 1906 On the birds collected and observed during the voyage of the "Valhalla", R.Y.S., from November 1905 to May 1906. *Ibis* (8) 6: 666-712.
- Nicoll, M.J. 1908 *Three voyages of a naturalist, being an account of many little-known islands in three oceans visited by the "Valhalla"*, R.Y.S. London: Witherby.
- Parker, I.S.C. 1970 Some ornithological observations from the western Indian Ocean. *Atoll Res. Bull.* 136: 211-220.
- Penny, M.J. 1971 Migrant waders at Aldabra, September 1967 - March 1968. *Phil. Trans. R. Soc. Lond.* B 260: 549-559.
- Penny, M.J. 1974 *The birds of Seychelles and the outlying islands*. London: Collins.
- Prÿs-Jones, R.P. 1979 The ecology and conservation of the Aldabran Brush Warbler *Nesillas aldabranus*. *Phil. Trans. R. Soc. Lond.* B 286: 211-224.
- Ridgway, R. 1895 On birds collected by Doctor W.L. Abbott on the Seychelles, Amirantes, Gloriosa, Assumption, Aldabra and adjacent islands, with notes on habits, etc., by the collector. *Proc. U.S. Nat. Mus.* 18: 509-546.
- Rivers, F. 1878 (Letter to Chief Civil Commissioner, Seychelles, 11 December 1878, on a visit to Aldabra on board the Flower of Yarrow). Manuscript, Mauritius Archives, vol. TA 85.

- Stirling, W. 1843 *Narrative of the wreck of the ship Tiger, of Liverpool --- on the desert island of Astova*. Exeter: privately printed. [Not seen].
- Stoddart, D.R. 1971 Scientific studies at Aldabra and neighbouring islands. *Phil. Trans. R. Soc. Lond.* B 260: 5-29.
- Stoddart, D.R. 1977a *New historical records of birds at Aldabra and nearby islands*. Mimeographed report.
- Stoddart, D.R. 1977b *Abbott's Booby on Assumption*. Mimeographed report [*Atoll Res. Bull.*, in press].
- Stoddart, D.R., Benson, C.W. & Peake, J.F. 1970 Ecological change and effects of phosphate mining on Assumption Island. *Atoll Res. Bull.* 136: 121-145.
- Thomasset, H.P. 1907 *Report of a visit of investigation to Astove, Cosmoledo, Assumption and the Aldabra group of the Seychelles Islands*. Mauritius: Central Printing Establishment.
- Vesey-FitzGerald, L.D.E.F. 1940 Birds of the Seychelles: - I. The endemic birds. *Ibis* (14) 4: 480-489.
- Vesey-FitzGerald, L.D.E.F. 1941 Further contributions to the ornithology of the Seychelles Islands. *Ibis* (14) 5: 518-531.
- Watson, G.E., Zusi, R.L. & Storer, R.E. 1963 *Preliminary field guide to the birds of the Indian Ocean*. Washington: Smithsonian Institution.