

OBSERVATIONS ON ANIMAL LIFE ON MARION AND PRINCE EDWARD ISLANDS

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ABSTRACT

A total of 25 species of breeding birds has been listed and, in addition, 10 which were not found breeding, have also been recorded from these islands. All these birds, with the exception of the Sheathbill (*Chionis minor* Hartlaub), belong in the main to the pelagic ecosystem and only partly to the terrestrial ecosystem. Six distinct habitats, which are occupied by certain species of birds on the islands, are described.

The seasonal movement of the birds and their general breeding cycles have been studied. The greater part of the field work has been concentrated on ethological study of the Gentoo Penguin (*Pygoscelus papua* Forster) and the Sooty Albatross (*Phoebetria fusca* Hilsenberg).

The Sooty Albatross and the Light-mantled Sooty Albatross (*Phoebetria palpebrata* Forster) were found not to interbreed as their courtship attitudes differ. Important barriers between the Soft Plumage Petrel (*Pterodroma mollis* Gould) and the Kerguelen Petrel (*P. brevirostris* Lesson or *lugens* Kuhl) have been studied.

INTRODUCTION

Zoological research on the islands was divided into two sections, the intertidal and the terrestrial, and in this preliminary report only the latter is dealt with. Field work included taxonomic and ecological surveys of the invertebrates, the few mammals and the many birds which occur on the islands. The fauna of the sub-antarctic islands is poor in species but rich in number, and is very isolated as far as the invertebrates are concerned. A limited number of habitats, which differ according to topography and microclimate, is found. A certain distinction can be made between the distribution of the flora and fauna, as the animal species seem to fit more closely into certain niches and are not as widespread in different habitats as are the plants. For our present consideration it will suffice to distinguish six main habitats for animal life (Fig. 1), viz:

- (a) the coastal area of either black or grey lava,
- (b) the black lava humps with swamps in between,
- (c) the uneven block lava of the black type,
- (d) the undulating grey lava,

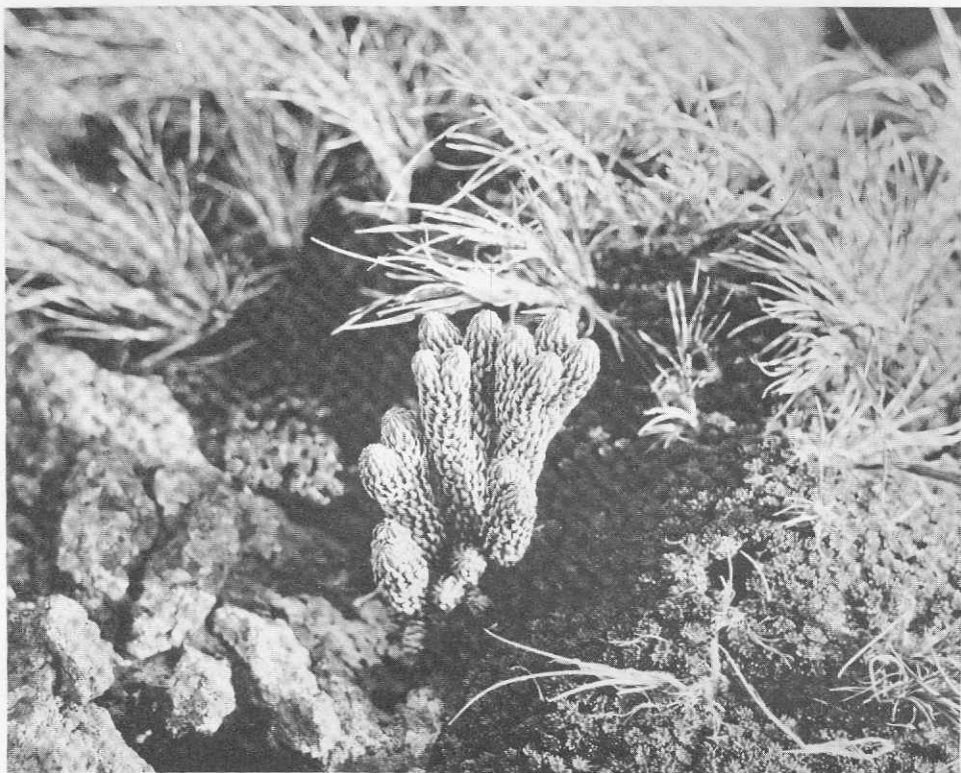
- (e) inland cliffs, and
- (f) the cinders above the highest vegetation which occur at 2000 ft. altitude.

MAMMALS AND INVERTEBRATES

Only two species of seals occur on the islands. It is very encouraging that the Fur Seal (*Arctocephalus tropicalis* Gray), which had nearly disappeared from the sub-antarctic islands, has become established on different beaches of both islands. Breeding populations of these seals were found confined to three landing places relatively close together on the NW corner of Marion island during the summer and, in addition, a small, isolated group was to be seen during February and March on the eastern side of the island.

The Elephant Seal (*Mirounga leonina* d.), which totalled about 10,000 in 1951/52 (Rand¹), was found to be more numerous along the northern and eastern coasts than on the western and southern sides of Marion Island, where there are fewer landing places. This can be seen at Kaalkop on the west side of the island where there is a relatively good beach which is thickly populated. So it was realised that suitable landing beaches, rather than weather conditions, affect the distribution of the seals on the island.

The females are absent from the island for most of the year but from mid-September to the end of October they come ashore, when the pups are born. Throughout this period regular counts of all the seals on two beaches were made clearly showing the changes in the population and its composition. The females return to the sea only to come ashore again in January and February to moult. Thereafter they depart until the following pupping season. The bulls moult in March and April.



Photograph 4: Marion Island. *Lycopodium saururus* growing from the side of an *Azorella selago* cushion on which epiphytic *Agrostis magellanicum* occurs. (v.Z.B.Jr.)

The author wishes to express his gratitude to Prof. E. M. van Zinderen Bakker and other members of the Prince Edward Islands Expedition for assistance and encouragement throughout the expedition, and to the Secretary of Transport for permission to publish this preliminary paper.

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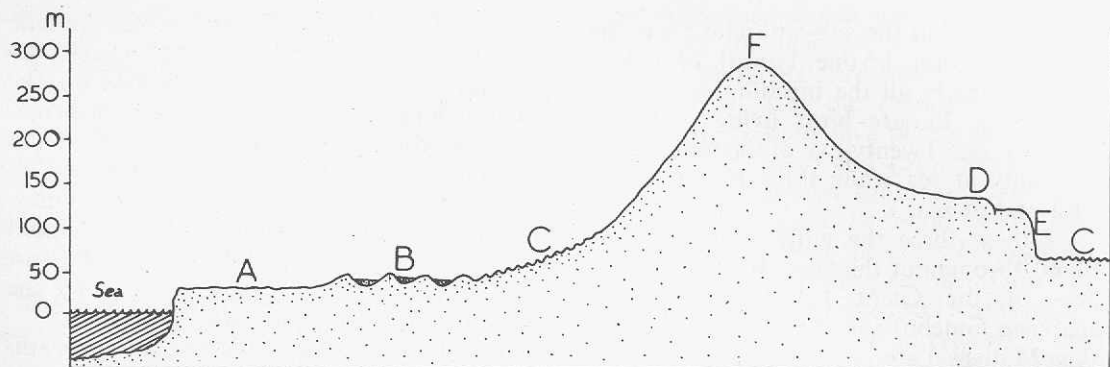


Fig. 1: Diagrammatic representation of the different bird habitats on Marion Island: A: Coastal area, B: Black lava humps with swamps, C: Uneven black lava flows, D: Undulating grey lava, E: Inland cliffs, F: Cinder Cone.

Killerwhales [*Orcinus orca* (L.)] were the only other mammals recorded as occurring naturally around the islands. Notes were kept of the days on which these marauders were seen and also on their general movements. It is evident that their activity is much greater during the seal pupping season and the female seal moult period than during the rest of the year. A certain herd seemed to patrol the area near the Meteorological Station regularly. One of the bulls had a broken dorsal fin and because of this could be recognised easily. In their hunting habits it was noticed that the big bull would stay far out to sea, outside the kelp zone, while the females, the smaller bulls, and the young would search the bays in a loose pack, closely following the coast a few yards off shore. Other whales were not seen by any of the expedition members.

Mice were accidentally introduced on Marion Island, but, as far as can be ascertained, do not cause much damage to plant and animal life. Later on cats were brought to the island to eradicate the mice and during the first months of our stay we were of the opinion that the cats, living under very poor conditions, might be important in combating the mice. Later on, especially during the breeding season, our experience was that the cats are widespread and take a very heavy toll of the birds, particularly of the smaller species.

During field trips special attention was paid to the distribution of invertebrates such as insects, worms, spiders, etc. Collembola and mites were found to be widespread from the shoreline up to an altitude of over two thousand feet.

A very remarkable community of animals and plants exists at higher altitudes where the surface is covered with pieces of scoria. The very strong wind and the extremes of temperature which occur here every day and night force the minute invertebrates and cryptogams to live underneath the cinder. Mosses, in limited quantity, are present here under very poor light conditions and a great number of Collembola, mites, beetles and spiders are seen rushing away if rocks are lifted up. The food cycle of these communities should be studied in detail. Several hundred specimens were collected.

ORNITHOLOGY

The greater part of the time spent on Marion Island from January 1965 to March 1966 was devoted to ornithological research. A comprehensive study of the birds had, in 1951/52, already been made by Rand,² while he was employed on a study of the seals. He recorded 25 species of birds, two of which were not found breeding. The author has added to this list two more breeding species and four non-breeding species.

Falling within the sub-antarctic zone, the bird population is one typical of colder regions. Nearly all the breeding species, 24 out of the 25, are birds living partly or mainly at sea. Twenty-two of the bird species feed only at sea while three feed both on land and at sea.

Of these three the gulls remain on the island throughout the year, while the numbers of the Giant Petrel (*Macronectes giganteus* Gmelin) and the Skua (*Catharacta skua* Mathews) are reduced in winter. Those which leave the island in winter do so during the time of the exodus of the penguins and seals, which are their main source of food. The only species that can be referred to as a landbird is the Sheathbill (*Chionis minor*) which does not go out of sight of land during any period of its life cycle. These figures indicate clearly that the bird population forms a link between the ecosystems of the ocean and the islands.

DISTRIBUTION OF BIRDS

Efforts were made to determine the preferences shown by most of the species for the six different habitats as nest-sites. The coastal area and the black lava humps are by far the most important habitats (Figure 1, (a) and (b)) as millions of birds breed here. Among these the four penguins found on the islands are the most abundant. Two of these species, the Macaroni (*Eudyptes chrysolophus* Brandt) and the Rockhopper (*Eudyptes crestatus* J. F. Miller) leave the islands during the winter months, May to October. A large number of King Penguins (*Aptenodytes patagonicus* J. F. Miller) also leave during winter but, owing to a long egg-laying period, adults and chicks can be found at the breeding beaches during the whole year. The Gentoo Penguin (*Pygoscelis papua* Forster) population seems to be stable throughout the year.

Since the west coast is rough with few landing places, most penguins are found along the northern and eastern coasts, but Rockhoppers occur fairly evenly distributed along the whole coast and do not seem to be

affected by stormy seas and severe climate.

The Blue-eyed Cormorant or Shag (*Phalacrocorax albiventer* Lesson) breeds on the cliffs along the coast which range in height from twenty to over a hundred feet. Colonies of ten to a hundred nests can be found although the number rarely exceeds thirty. Two chicks are reared in a nest built of mud and grass (*Poa cookii* Hook. f.). The surrounding area is entirely covered by the Composite *Cotula plumosa* Hook. f.

The only landbird of the island, the Sheathbill (*Chionis minor*) inhabits the coastal area in summer (Fig. 1 (a)) but is widespread during winter. During the breeding season in summer Sheathbills are strictly territorial and nest only along the coast in the vicinity of penguin rookeries. Here they live on penguin eggs, very young chicks, and food spilt during chick feeding. In winter they fly about in small flocks and can be seen far inland.

The few albatross species breeding on the islands each occupy distinct ecological niches. Although the Sooty Albatross (*Phoebetria fusca*) and the Light Mantled Sooty (*Phoebetria palpebrata*) are very closely related they show distinct difference in preference for nest sites. The Light Mantled Sooty prefers inland breeding places (Fig. 1 (e)), while *Phoebetria fusca* is found only along the coast (Fig. 1 (a)). However, at a number of places, isolated nests of the Light Mantled Sooty were found among those of the Sooty Albatrosses.



Photograph 5: Killerwhale (*Orcinus orca*) hunting along the coast of Marion Island. (v.Z.B.Jr.)

The Wanderer (*exulans* Linné) breeds on the plains but isolates the black lava humps. The Giant Petrel is the only non-bird species, a very similar species however, tend to breed around the big

Three species of albatrosses. Of these the Fairy Prions breed in the spray zone. The Fairy Prions are found to breed in the spray zone (e), except the far the most numerous big flocks of towards ever

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The Wandering Albatross (*Diomedea exulans* Linné) breeds mainly on the coastal plains but isolated nests are also found on the black lava humps (Fig. 1 (a)-(b)). The Giant Petrel (*Macronectes giganteus*), the only non-burrowing Procellariidae, has a very similar distribution. This species, however, tends to make concentrations around the big penguin rookeries.

Three species of Prion are present on the islands. Of these the Fairy Prion (*Pachyptilla turtur* Kuhl) and the Slavin's Prion (*Pachyptilla salvini* Mathews) were found breeding. Fairy Prions breed only along the coast within the spray zone while Salvin's Prions were found to breed in all the habitats (Fig. 1 (a)-(e)), except the scoria slopes. The latter is by far the most numerous bird on the island and big flocks of thousands can be seen at sea towards evening on some nights.

The two Laridae on the islands, the Brown Skua (*Catharacta skua*) and the Southern Black-backed Gull (*Larus dominicanus* Lichtenstein) occupy completely different habitats. Skuas breed nearly everywhere along the coastal plain and inland as long as big petrel populations, on which they mainly feed, are present. They are, furthermore, very territorial and chase is immediately given to all strange skuas. The gulls on the other hand nest singly or in small colonies and show territorial behaviour only in the immediate vicinity of the nest. While the skuas feed on all dead birds and seals, eggs and chicks as well as on smaller petrels, the gulls spend much time in the intertidal zone and on the swamps where they dig up worms and caterpillars. During the summer months, however, they are found at the penguin rookeries where they feed as scavengers.

The Brown Petrel (*Adamastor cinereus* Gmelin) and the Great-winged Petrel (*Pterodroma macroptera* A. Smith) are both winter breeding species and are absent during the summer months. Both return to their nesting sites, the one among loose boulders and the other in burrows, early in March. They breed mainly in the black lava humps (Fig. 1 (b)).

The other *Pterodroma* species, consisting of the Soft Plumage (*P. mollis*), and the Kerguelen Petrels (*P. brevirostris* or *lugens*) are distributed over the *Blechnum*-covered slopes of the swampy lava plains and along the coast (Fig. 1 (a) and (b)). Steep grey lava slopes are also used for making burrows and a colony can easily be found by looking for a concentration of the grass *Poa cookii*.

Blue Petrels (*Halobaena caerulea* Gmelin) burrow in loose well drained soil and usually have a cover of *Acaena adscendens* Vahl over their nests (Fig. 1, (a), (b), (d)).

White-chinned Petrels (*Procellaria aequinoctialis* Linné) are also very widely distributed over the island where their nests may be found from sea level to the highest vegetation point at an altitude of two thousand feet.

A very remarkable breeding site is used by the South Georgian Diving Petrel (*Pelecanoides georgicus* Murphy and Harper) which only inhabits burrows at an altitude of 3,000 feet in loose scoria slopes and plains (Fig. 1 (f)). These habitats are however scarce as most of the island above two thousand feet consists of rough lava flows and cones. Nests of the closely related Kerguelen Diving Petrel (*Pelecanoides exul* Salvin), however, occur along the coast and are not found at the high altitude preferred by *Pelecanoides georgicus*.

ETHOLOGY

Most of the time on the island was taken up by two ethological studies. One was made of the Gentoo Penguin and the other of the Sooty Albatross. Both these birds have so far received little attention in comparison with some of the other species and a full description of this part of the work will be given elsewhere. Detailed studies were made of the general behaviour, courtship, nest-building and activities during all times of the day in the rookery. The normal clutch of two eggs of the Gentoo Penguin was found in June. Adults relieved one another on the nest every twenty-four hours. The incubation period of thirty days was mainly spent in sleeping on the nest and shifting now and



Photograph 6: Marion Island. Sooty Albatross chicks on steep slope. Poa cookii surrounds the nests while Acaena adscendens may be seen in the upper and lower right hand corners. (v.Z.B.Jr.)

again. After the chicks had hatched, they were brooded by the adults for about two weeks. Thereafter, they would sleep in the nest alone, and the adult would be alongside. At the age of about one month the chicks started to form small groups, which in due course united to form one big creche for the whole rookery. During the fledging period the chicks could be found playing in the water but not swimming. Soon after fledging was completed the chicks went to sea. The young birds do not leave the island and fully fledged chicks coming from the sea are sometimes still being fed by the adults.

A totally different behaviour pattern was studied in the Sooty Albatross. Owing to its habit of breeding in summer and to the time of our arrival on the island the final stages of its cycle had to be studied first, during one breeding season, while the initial stages of it could only be investigated during the following season.

Apart from these behaviour studies a comparative investigation was undertaken to determine why the closely related Light-

mantled Sooty Albatross does not interbreed with the Sooty Albatross. The determining factors were found to be different attitudes during courtship.

An effort was also made to solve the so-called Soft Plumage Petrel complex. The Kerguelen Petrel and the Soft Plumage Petrel were never found interbreeding. They occupy different ecological habitats and the egg-laying period of the Kerguelen Petrel was found to be a few months before that of the Soft Plumage Petrel.

ACKNOWLEDGEMENTS

I wish to express my gratitude to Prof. J. M. Winterbottom for his very important guidance in the study of ornithology and to my father, Prof. E. M. van Zinderen Bakker, the leader of the expedition, for his inspiration and encouragement.

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