

# NOTES ON BALD ISLAND AND THE ADJACENT MAINLAND

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In 1959 a party from the Zoology Department visited Bald Island (30 miles east of Albany) with the primary objective of collecting live Quokkas (*Setonix brachyurus*) for departmental experiments. Opportunity was taken, however, to study the fauna and flora of the island, about which practically nothing was known. We arrived at Cheyne Beach on May 23 and, waiting for the weather to ease, spent the following week in exploring the surrounding countryside. On May 30, D. H. Edward, R. M. Sadleir, B. R. Wilson and the writer crossed to Bald Island and made camp in Barker Bay near the base of the Peninsula, A. R. Main staying behind at Cheyne Beach, where he maintained radio contact with us during the six days spent on the island.

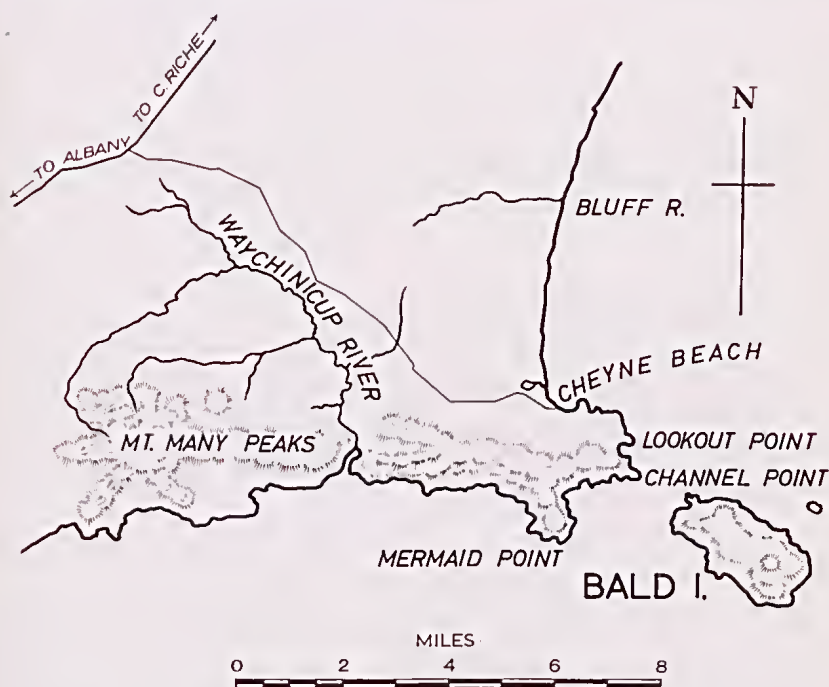


Fig. 1.—Map of the Cheyne Beach-Wayehinieup River area.

Bald Island is a precipitous mass of granitic gneiss rising to 1,020 feet above the sea. It is about three miles long and one mile wide and has an area of 1,900 acres. The strait between it and the mainland at Channel Point is a little less than a mile wide and has

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a maximum depth of 18 fathoms. The gneiss is exposed over large areas of the island; elsewhere it is covered with sand, and on the northern side it is shallowly capped with aeolian limestone. Owing to the steep slopes, water is quickly shed from the island.

The annual rainfall is probably a little less than at Albany, i.e., about 30 inches. North-east from here the coast lies in a rain-shadow and precipitation rapidly declines; and one must go 200 miles further east (to Cape Le Grand) before encountering a similar rainfall. Hence the vicinity of Bald Island constitutes the eastern limit of several South Coast moisture-loving plants and animals.

Owing to the difficult terrain and to our pre-occupation with Quokkas, it was only possible to explore the western half of the island. The following notes should therefore be treated as no more than a preliminary account of the vegetation and vertebrate fauna. Brief comparisons are made with the opposite mainland.

### VEGETATION

The vegetation of Bald Island, or at least its north-western half, is divisible into six major types. Their distribution is shown in Fig. 3, and they are described below in the sequence they would be met with in a S.W.-N.E. transect of the island. Authors are cited only for names that do not appear in Gardner's *Census* (1931).

#### Succulent Mat

Covering the granitic rocks of the Peninsula is a dense mat of low spreading succulent herbs and shrubs belonging to the Aizoaceae



Fig. 2.—Contour map of Bald Island.

and Chenopodiaceae. The dominant species are *Carpobrotus aequilaterus* (Haw.) N.E.Br., *Disphyma australe* (Sol.) N.E.Br., *Rhagodia baccata* (prostrate, succulent form) and *Threlkeldia diffusa*. Minor components include *Enchylaena tomentosa*, *Atriplex cinerea*, *Tetragonia implexicoma*, *Kochia oppositifolia*, and the grasses *Sporobolus virginicus* and *Poa caespitosa*. Elsewhere the community occurs sporadically in a narrow zone between highwater and the tussock-land, into which it merges.

### Tussock-land

The formation takes its name from the habit of its dominants, *Poa caespitosa* and *Scirpus nodosus*. Associated with them are *Rhagodia baccata* (bushy form), *Lepidosperma gladiatum* and, less frequently, *Hibbertia cuneiformis* and a small goodeniaceous shrub. Tussock-land occurs almost continuously around the coast but, except for tongues up eroded gullies, it is narrow on the sheltered northern and north-western slopes of the island. It is much more extensive on the exposed south-western slopes and plateaux and ascends in one locality almost to the 400 ft. contour.

### Heath

Occupying a broad zone along the windward slope of the island is a dense shrubbery interspersed with considerable areas of bare rock, which for want of better name is designated "heath," the formation being too low (usually less than four feet) to be aptly described as "scrub." It is emphasized that this formation bears little resemblance to the rich sandplain vegetation of the South Coast mainland. The island heath is composed of but few species, among which myrtaceous shrubs are overwhelmingly dominant, viz., *Melaleuca parviflora*, *M. microphylla* and *Thryptomene saxicola*. The Proteaceae are represented only by *Hakea suaveolens*, *H. elliptica* and *Banksia praemorsa*, individuals of which are so few and scattered as to contribute nothing to the physiognomy of the formation. The only other shrubs are *Eutaxia obovata*, *Gastrolobium bilobum*, *Leucopogon* spp. (including *capitellatus*) and an *Andersonia*, low-wind-pruned masses of the last being conspicuous around outerops.

### Peppermint Scrub

Between the 400 and 500 ft. contours the slopes become gentle as the "backbone" of the island is approached, and a considerable depth of sand lies over the gneiss. A scrub grows here consisting mostly of Peppermint (*Agonis flexuosa*). *Agonis marginata* is common round rocks that protrude through the sand. Everywhere the scrub is broken by small glades carrying a dense tangle of *Thomasia solanacea* and *Acacia ulata*.

There are more extensive breaks in the scrub along the main ridge of the island, where the gneiss may be exposed in broad flat sheets or thinly covered with soil. The dominant plants here are sedges, rushes and grasses: *Lepidosperma* spp. (including *angustatum* and *drummondii*), *Scirpus nodosus*, *S. antarcticus*, *Juncus pallidus*, *Danthonia caespitosa* and *Stipa variabilis*. Other herbaee-



ous species include *Cheilanthes tenuifolia*, *Staekhouisia pubeseens*, *Dichondra repens* (on mats of lichen), *Stylidium glaucum*, *S. fasciculatum* and *Traehymene eompressa*.

### Bushy Yate Forest

On the leeward slope of the island Peppermint scrub gives way not to heath but to a forest of Bushy Yate (*Eucalyptus lehmanni*). Among boulders it is a small, twisted tree 10-20 ft. high; in damp gullies its bole is straight and twice as tall. Associated with the Bushy Yate is *Callitris preissii*, which here and there forms pure stands of straight trees up to 50 ft. high, under which grow only lichens and moss. At higher levels the forest is mixed with *Agonis flexuosa* and *A. marginata*, at lower levels with *Melaleuca pubeseens* and *Templetonia retusa*. The lianas *Sollya fusiformis* and *Clematis microphylla* are uncommon away from gullies.

### Teatree Forest

The steep calcareous slopes above the northern and north-eastern coasts support a fine forest of *Melaleuca pubeseens*. Undergrowth is sparse and consists mainly of *Poa eaespitosa*, *Rhagodia baeuta* (scandent form), *Threlkeldia diffusa* and *Parietaria debilis*. On spurs of residual limestone *Templetonia retusa* appears, associated commonly with *Spyridium globulosum*, more rarely with *Westringia dampieri* and *Boronia alata*. In some of the steeper gullies the limestone capping has been eroded through to the gneiss by small watercourses lined with thickets of *Trymalium spathulatum* and *Thomasia solanacea*. The fern *Asplenium pruemorsum* grows

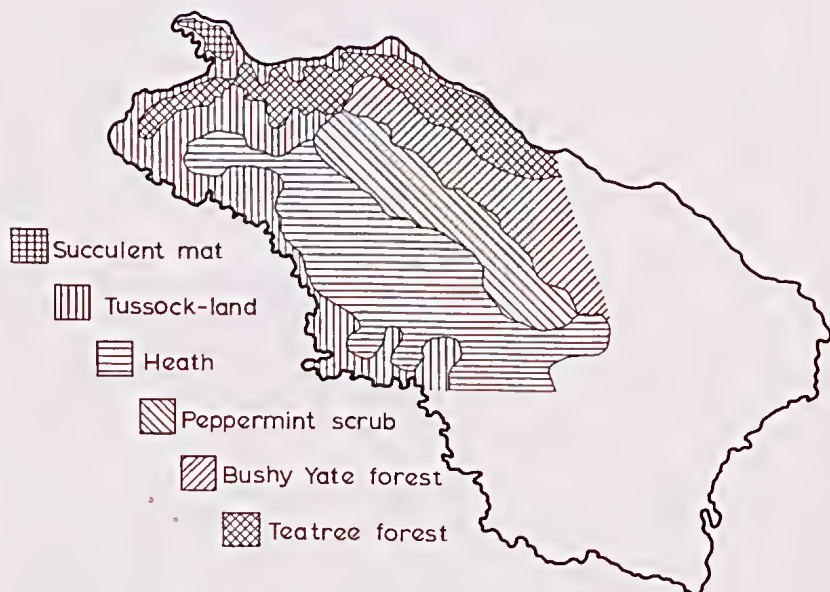


Fig. 3.—Vegetation map of Bald Island.

profusely on shaded rocks. Other species especially found in gullies include *Myoporium serratum*, *Phebalium rude*, and *Pimelea clavata*.

Some excessively steep slopes have been denuded of vegetation; the burrowing of petrels, if not its cause, is certainly contributory. These denuded areas have been partially recolonised by *Solanum simile*, *Olearia axillaris*, *Scirpus nodosus*, *Lepidosperma gladiatum*, *Vittadinia triloba*, *Carduus tenuiflorus* and *Urtica urens*.

The following calciphilous herbs occur sporadically in tussock-land as well as tea-tree forest: *Senecio lautus*, *Oxalis corniculata*, *Apium australe*, *Pelargonium littorale*, *Geranium molle*, *Erythraea centaurium* and *Anagallis arvensis*.

### Comparison with Mainland

One's first impression on Bald Island is of a lush, well-wooded environment; the vegetation, however, is soon found to be floristically poor. Compared with the several hundreds occurring on the adjacent mainland, only 63 species of perennial plants were observed on the island. Exploration of its south-eastern end would no doubt raise this figure, but a final count exceeding one hundred is scarcely to be expected.

This contrast in floristic wealth can be partly explained by the greater variety of habitats on the mainland. Sandy coasts in the Cheyne Beach area have the usual suite of dune and fore-dune plants. Behind the dunes damp peaty depressions carry such characteristic South Coast species as *Banksia occidentalis* and *Oxylobium capitatum*. Various Cyperaceae and Restionaceae cover the beds of interdunal swamps. Then come the "sandplains" and their amazingly rich heath vegetation, prominent among which are numerous genera and species of Proteaceae, Leguminosae and Epacridaceae. Inland the country rises and as the sand becomes more mixed with laterite, new elements appear, especially shrubby and stunted eucalypts. Finally, on the heavier soils a few miles east of the town of Many Peaks a tall forest of Jarrah and Marri begins. Along the lower Wayhineup River there are even patches of Karri Loam, on which grow many of the components of the Karri forest (but not Karri itself); some of these species are at or near the eastern limit of their distribution, e.g., *Eucalyptus mcgaurca*, *E. cornuta*, *Agonis juniperina*, *A. parviceps*, *Trymalium spathulatum* and *Boronia gracilipes*.

But variety of habitat only partly accounts for the differences in vegetation between mainland and island. For the contrast remains even if we confine our attention on the mainland to the far western end of the Mt. Many Peaks range, which is physiographically and pedologically identical with nearby Bald Island. The myrtaeous trees and *Callitris* that dominate much of the island are here absent or rare. On the other hand the siliceous sands of the country above the limestone zone carry typical South Coast heath, including many Proteaceae, a family which is represented on the island by only three species and few individuals.

When Bald Island was joined to the mainland, 10,000 years ago, the vegetation of the two areas must have been similar. If it is the

island, as the writer believes, that has retained more of its original character, one can appreciate the tremendous change that has taken place on the mainland in recent times, times which saw the arrival of aboriginal man and his firestick. It will also be appreciated how the study of a relict vegetation, such as Bald Island seems to have, may throw light on that controversial subject, the origin and antiquity of southern Australian heaths.

## REPTILES

Only five species (a gecko and four skinks) were collected on the island. Although further collecting, especially in summer, should increase this total, there is little doubt that the fauna is impoverished compared to the adjacent mainland. The island has been separated long enough from the mainland for at least one species (*Ctenotus labillardieri*) to have developed a distinct insular race.

### Gekkonidae

*Phyllodactylus marmoratus* (Gray). Abundant on Bald Island, where 33 (including 11 juveniles) were found under slabs of gneiss. Only two specimens were collected at Cheyne Beach and two at Waychinicup River.

### Scincidae

*Tiliqua rugosa* (Gray). According to Mr. Norman Price, a local fisherman, Bobtails occur sparingly at Cheyne Beach.

*Tiliqua occipitalis* (Peters). A mummified specimen was found in the dunes at Cheyne Beach in December 1959, when D. H. Edward and the writer briefly revisited the area.

*Egernia kingi* (Gray). We saw only a few on Bald Island, mostly sheltering under slabs of gneiss. In summer, however, the species is conspicuous in open country (S. Barker, pers. comm.). Two specimens were taken from under rocks towards the mouth of the Waychinicup River.

*Egernia nitida* (Gray). Very plentiful on Bald Island, less so on the mainland at Cheyne Beach and Waychinicup River. All specimens were taken from under slabs of gneiss.

*Egernia pulchra* Werner. Plentiful at Cheyne Beach in the vicinity of rock outcrops.

*Egernia bos* Storr. Abundant at Cheyne Beach in the sandplains.

*Ctenotus labillardieri* (Duméril & Bibron). Abundant under slabs of gneiss on Bald Island and the opposite mainland. Good series from both localities allowed detailed comparison of the two populations. Island animals were found to have a considerably higher mid-body scale count than specimens from Cheyne Beach (and elsewhere on the mainland) and to differ slightly in coloration. A much higher proportion of the island animals (87%) had broken or regenerated tails than those from Cheyne Beach (35%). The reason for this is unknown, although it is partly related to the fact that the island series contained a much higher proportion of adults.



*Omolepida australe* (Gray). One was found under rubbish at Cheyne Beach.

*Hemiergus peroni* (Fitzinger). Two were found under slabs of gneiss on Bald Island and nine at Cheyne Beach and Wayehinieup River under rubbish, fallen timber and rocks.

#### Boidae

*Python spilotus* (Lacépède). Mr. Price informed us that he had killed a Carpet Snake in the settlement at Cheyne Beach.

#### Elapidae

*Denisonia coronata* (Schlegel). Two were found under rubbish at Cheyne Beach.

*Denisonia eurta* (Schlegel). One was collected by Mr. N. E. Milward at Cheyne Beach in February, 1955.

*Notechis scutatus* (Peters). Not long before our visit Mr. Price killed a female Tiger Snake containing 17 embryos.

### BIRDS

The 21 species of birds observed on the island are listed below with an additional four species from adjacent seas. Subtracting the marine and littoral species and a further three that are possibly visitors (*viz.*, the kestrel, lorikeet and euekoo), there remains a minimum estimate of 13 land-birds resident on Bald Island.

Little Penguin (*Eudyptula minor*). Throughout our sojourn on the island the weather was squally, and hundreds of penguins remained ashore, sheltering in petrel burrows or huddled under boulders beside the sea.

Brown Quail (*Synoicus ypsilophorus*). A large dark quail flushed by B. R. Wilson in *Poa-Seirpus* tussock-land probably belonged to this species, which was plentiful in the vicinity of Cheyne Beach.

Brush Bronzewing (*Phaps elegans*). These pigeons were observed only in open grassy areas in the teatree forest above Barker Bay.

Great-winged Petrel (*Pterodroma maeroptera*). From just above the sea to an altitude of 600 ft. petrels were nesting wherever the sand was deep enough for burrowing. Burrows were most dense in *Poa-Seirpus* tussock-land and teatree forest. Even the dense Peppermint scrub did not deter the birds; though fatalities were not uncommon here, several corpses being found in branches of trees. The only place where burrows were unexpectedly absent was beneath the tall *Callitris* groves above the north coast.

At the time of our visit the petrels were sitting on their large white egg. Incubation had only begun, as indicated by accidentally broken eggs. The breeding season here is thus the same as at Eelipse Island, 35 miles to the south-west.

As the remains of the Fleshly-footed Shearwater (*Puffinus carneipes*) and White-fronted Storm-Petrel (*Pelagodroma marina*) were found on mainland beaches opposite the island, we expected to find evidence of their breeding on Bald Island. However, none

was discovered; all of the many corpses later found in island rookeries were of *Pterodroma*.

Black-browed Albatross (*Diomedea melanophrys*), Gannet (*Sula serrator*), Great Skua (*Catharacta skua*) and Crested Tern (*Sterna bergii*). These four species were observed over the sea between Bald Island and the mainland.

Silver Gull (*Larus novaehollandiae*) and Sooty Oystercatcher (*Haematopus fuliginosus*). A few individuals of these were the only shorebirds observed on the island coast. Their paucity was due to the entire lack of sandy beaches, reef flats and mud flats.

White-breasted Sea-Eagle (*Haliaeetus leucogaster*). One pair, possibly, two, were stationed on the island. They were usually seen in the vicinity of Eagle Point, and occasionally they crossed the strait to the mainland. They were promptly attacked by the Wedge-tailed Eagles whenever they encroached on their territory.

Wedge-tailed Eagle (*Aquila audax*). A pair of these huge eagles had their eyrie high above the northernmost point of the island at the foot of a granite pinnacle, which we accordingly named Eagle Rock. From here they patrolled the open country to the south-west, presumably in search of petrels, which in the daytime were often seen sitting outside their burrows. I am informed by D. H. Edward, its discoverer, that the eyrie contained the remains of several Quokkas.

Nankeen Kestrel (*Falco cenchroides*). A single kestrel flew over the *Poa-Scirpus* tussock-land west of the Pips.

Purple-crowned Lorikeet (*Glossopsitta porphyrocephala*). On one occasion a small flock flew over the Bushy Yate forest near the centre of the island.

Kookaburra (*Dacelo gigas*). Two were seen separately in tea-tree forest half a mile east of Eagle Point.

Fan-tailed Cuckoo (*Cacomantis prionurus*). Its trill was heard on one occasion in Peppermint scrub.

Welcome Swallow (*Hirundo neoxena*). Uncommon.

Grey Fantail (*Rhipidura fuliginosa*). Abundant in wooded country, especially teatree forest.

White-breasted Robin (*Eopsaltria gorgiana*). Plentiful in densely vegetated gullies on the north side of the island. This population is the easternmost of the species.

Golden Whistler (*Pachycephala pectoralis*). Occurs in the more heavily wooded parts of the island.

Brown Thornbill (*Acanthiza pusilla*). Very plentiful in wooded country, especially in Peppermint and Bushy Yate.

Spotted Scrub-Wren (*Sericornis maculatus*). Not quite so numerous as the preceding species but wider spread.

New Holland Honeyeater (*Meliornis novaehollandiae*). Uncommon and largely confined to heath and to clumps of *Agonis marginata* around outcrops.

Western Silveryeye (*Zosterops gouldii*). A few flocks in wooded country.

Red-eared Firetail (*Zonaeginthus oculatus*). Commonly observed in the same places as the White-breasted Robin.



### Additional species on the adjacent mainland

The mainland, with its greater area and variety of habitat, supports a considerably richer avifauna. Species recorded, additional to those on Bald Island, are listed as they first appear in the several habitats from east to west.

**Littoral**, Cheyne Beach: Pacific Gull, Pied Oystercatcher, Red-capped Dotterel.

**Lagoon**, Cheyne Beach: Little Grebe, White-faced Heron, White Egret, Little Grass-bird.

**Coastal Scrub and Heath**, Cheyne Beach: White-tailed Black Cockatoo, Sacred Kingfisher, Black-faced Cuckoo-Shrike, Field Wren, Tawny-crowned Honeyeater, Pipit, Squeaker, Grey Butcher-bird.

**Albany Blackbutt Scrub and Heath**, west of Cheyne Beach: Brown Hawk, Spotted Nightjar, Red Wattle-bird.

**Yate-Bullieh Forest**, Waychinicup River: Twenty-eight Parrot, Boobook Owl, Golden Bronze Cuckoo, Tree Martin, Western Shrike-Thrush, Emu-Wren (actually in a nearby swamp), Red-tipped Pardalote, White-naped Honeyeater, Little Wattle-bird.

**Jarraah-Marri Forest**, Many Peaks: Frogmouth, Searlet Robin, Dusky Wood-Swallow.

**Farms**, Many Peaks: Swamp Harrier, Whistling Eagle, Willie Wag-tail, Magpie Lark, Raven, Magpie.

### MAMMALS

At least two species of land mammal occur on Bald Island, the Quokka and a bandicoot. Both of these and an additional six species were recorded from the adjacent mainland. With systematic collecting the mainland list should be considerably enlarged, for the Waychinicup valley constitutes one of the best mammal habitats in south-western Australia. This area is quite unspoilt, fires are infrequent, and those introduced pests, the fox, rabbit and *Rattus rattus*, are apparently absent from it.

#### Marsupialia

*Sminthopsis* sp. Among the bones collected by A. R. Main from a small cave in the granitic range west of the Waychinicup estuary were a few fragments assignable to this genus.

*Isoodon obesulus*. The skull of a juvenile Quenda was found by A. R. Main in the above-mentioned cave. Bandicoot diggings, possibly of this species, were common along the lower Waychinicup and in the *Poa-Scirpus* tussock-land on Bald Island.

*Setonix brachyurus*. Quokkas were abundant on Bald Island. They occurred everywhere from sea-level to the peak, though their density varied greatly with habitat; it seemed highest in the *Poa-Scirpus* tussock-land, least in heath and Bushy Yate forest. At night many animals descended to the coast to feed on the succulent vegetation.

Although no Quokkas were seen or snared on the opposite mainland, there was abundant evidence of their occurrence in the swampy valleys draining into the lower Waychinicup. The dense beds of sedges were intersected by a maze of runways littered with the characteristic faeces of the species.

*Macropus irma*. The Brush Wallaby does not occur in the sandplain country immediately behind Cheyne Beach but it is not uncommon according to a local farmer (G. A. Dixon) in the forest country towards Many Peaks. In December a dead Brush was found on the road near the Cape Riche-Cheyne Beach fork.

*Macropus ocydromus*. Grey Kangaroos were plentiful on the mainland in heath as well as forest, though uncommon in the immediate vicinity of Cheyne Beach. In the past Mr. Jack Westerberg has seen mobs of up to 60 at the Bluff. He believed there had been a movement towards the west, the kangaroos being attracted to the newly established pastures in the Many Peaks district.

### Carnivora

*Canis dingo*. According to residents there were still Dingoes in the Cheyne Beach area.

*Vulpes vulpes*. Foxes were formerly plentiful at Cheyne Beach. On one occasion Mr. Norman Price towed a dead dolphin to the beach a little north of the settlement and trapped 11 foxes around it. Their recent decline may be related to a similar decline among the rabbits, which in 1959 were reduced at Cheyne Beach to one or two small warrens near the settlement.

*Neophoca cinerea*. Hair seals were common at Cheyne Beach and disliked by the salmon fishermen for their habit of biting through nets to get at the enclosed fish. Only one was seen on Bald Island, a sub-adult male.

### Redentia

*Rattus fuscipes*. This native rat was plentiful in the sandplain at Cheyne Beach where three were caught by R. M. Sadleir in box-traps. A fourth was trapped in a Quokka swamp on the lower Waychinicup. Mandibles of this species were the commonest item among the bones collected by A. R. Main in the eave. The abundance of *fuscipes* in this area was a pleasant surprise, and was apparently due to the absence of *R. rattus*. House Mice, however, have been trapped by residents of Cheyne Beach in their homes.

### Chiroptera

Small unidentified bats with fast erratic flight were observed on the lower Waychinicup during our December visit.

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