TECHNIQUES FOR OBSERVING SUBANTARCTIC BURROWING PETRELS AT THE NEST

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INTRODUCTION

It is difficult to study the breeding activities of nocturnally active petrels which nest in long winding burrows, often in moist or wet ground. While preparing for a study of burrowing petrels at Marion Island (46 54S, 37 45E) in the southern Indian Ocean between October 1978 and April 1979, I found little information on techniques of studying petrels in the literature. Published studies of the breeding biology of petrels seldom give information on techniques of study (e.g. Warham 1956, Richdale 1963) and most workers apparently studied birds in more accessible burrows (Richdale 1965). My study had two aims : observation of adults and chicks in the burrow and determination of burrow occupancy in areas where several species bred. This note describes successful and unsuccessful techniques used in this study.

TRAPPING ADULTS AT THE NEXT ENTRANCE

Simple walk-in traps of different dimensions were constructed from 12 mm chicken mesh and baling wire (Figs 1 & 2). Selected occupied nests of Whitechinned Petrel *Procellaria aequinoctialis*, Kerguelen Petrel *Pterodroma brevirostris* and Salvin's Prion *Pachyptila vittata salvini* were trapped over a four week period on 20 trap nights. The traps were placed halfway inside the tunnel entrance to ensure that a petrel either entering or leaving the tunnel would be caught. The traps were set an hour before sunset and checked at 24h00 and again at sunrise. Of the 20 traps used over the four week period (in October-November) only one was successful. The birds apparently avoided any visual obstruction to the tunnel entrance but did not desert. The birds dug new entrance tunnels which gave them access to the original nest chamber. Larger petrels simply forced the traps aside and in one instance an adult Whitechinned Petrel completely flattened the wire trap.

During the same trapping period, copper wire nooses which were attached to wooden stakes were set in the entrances of occupied petrel burrows. The nooses could not close completely and did

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This paper constitutes part of the commemoration of the 21st anniversary of the establishment of the Percy FitzPatrick Institute of African Ornithology.

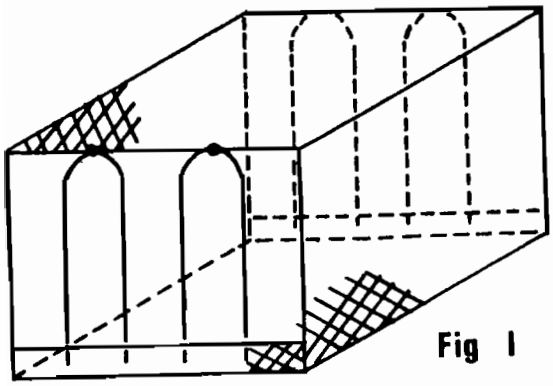

Fig 1

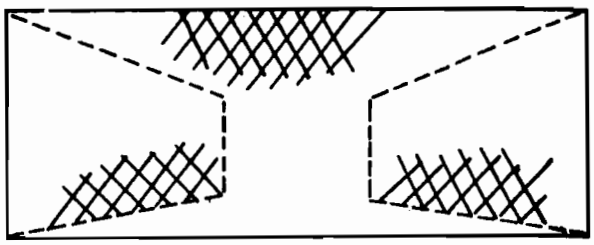

Fig 2

WALK-IN TRAPS

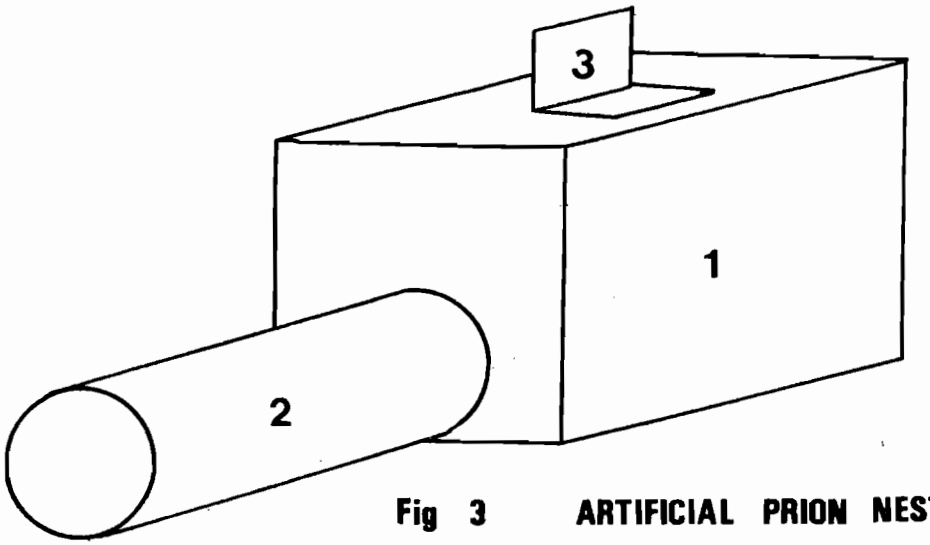

Fig 3 ARTIFICIAL PRION NEST BOX

1 NEST CHAMBER

2 P.V.C. PIPE

3 INSPECTION HATCH

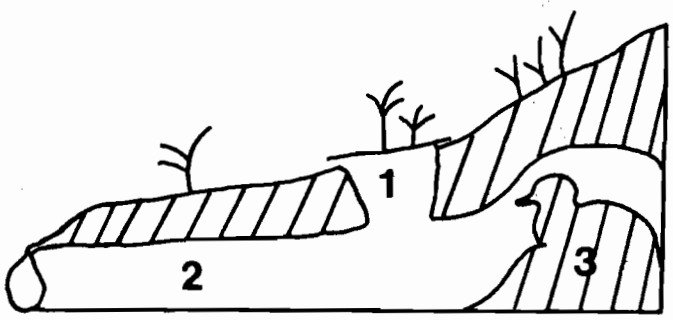

Fig 4 TRAPDOOR

1 TRAPDOOR EXCAVATION

2 TUNNEL

3 NEST CHAMBER

not injure the birds. In one night, nooses set at five nests of Salvin's Prion and five nests of Whitechinned Petrel caught five and four birds respectively within three hours of sunset. However, the disturbance and trauma of this technique caused five of these nests to be deserted and the technique was discontinued. Another disadvantage is that the nooses need constant vigilance because of the threat of predation from feral Domestic Cats *Felis catus* and Subantarctic Skuas *Catharacta antarctica* which would find a trapped petrel easy prey.

ARTIFICIAL NEST TUNNELS AND CHAMBERS

Ten nest boxes were constructed from large wooden crates for Whitechinned Petrels and from smaller metal tins for Salvin's Prions (Fig. 3). A circular hole was cut in the side of the metal tin for the artificial tunnel (PVC 100 mm pipe) and an examination hatch was cut on the upper surface. The Whitechinned Petrel artificial tunnel was made from chipboard planks and fixed to the artificial nest chamber which had an examination hatch cut in the upper surface. Occupied nest chambers and tunnels were completely opened up and the occupants caught and held in bags. The bottom of the artificial nest chamber was liberally packed with soil from the original nest chamber. The artificial chamber and tunnel were placed in position and covered with soil and growing vegetation. The birds were then banded and released directly into the artificial tunnel from which they scrambled into the artificial nest chamber. The prions had difficulty in scrambling along the slippery PVC piping, particularly in sloping tunnels. To overcome this problem the inside bottom of the pipe was packed with soil to give the birds a better foothold. However, heavy rain and the birds' activities soon washed the soil from the pipe. It is suggested that artificial tunnels for prions should be made of asbestos piping of 200 mm diameter. The rough texture of asbestos piping would prevent the birds slipping on the inside surface of the artificial tunnels. Only one of the 10 artificial nest chambers and tunnels (five built for Whitechinned Petrels and five for Salvin's Prions) remained occupied. A Salvin's Prion laid and incubated an egg for seven days. This pair apparently deserted because a Subantarctic Skua partially excavated the top-soil covering the nest chamber (Sinclair 1980). However, these artificial nest chambers may be used in future breeding seasons.

LOCATING NEST CHAMBERS

The exact position of the nest chamber proved difficult to locate since the tunnels took a winding subterranean course before ending in the nest chamber. Initially, a spade was used to tap the ground around the tunnel and the nest chamber was located by the hollow sound. A better and quicker technique was to probe the surrounding area with a 1 m metal rod and to follow the path of the tunnel until it ended in the enlarged nest chamber. Locating the nest by this method saved time and energy by avoiding digging and excavating the burrows which were sometimes 2 m long. Vegetation concentrations also indicated the whereabouts of the nest chambers. Because of the nutrients in faeces deposited by breeding petrels in the nest chamber and along the tunnel, better growth of grasses appear directly over the nest chamber and along

the path of the tunnel.

TRAPDOOR EXCAVATIONS

Forty trapdoors were placed at Whitechinned Petrel, Kerguelen Petrel and Salvin's Prion nest chambers (Fig. 4). Initially, trapdoors were placed directly over four nests of Whitechinned Petrels. However, two of these pairs deserted, while the other two pairs dug further back along the tunnel and constructed a new nest chamber, apparently because of the greatly increased seepage of water directly on to the nest resulting from disturbing the topsoil. Thereafter, a plug of earth was removed from the tunnel within 0,5 m of the nest. The hole was then covered with an overlapping piece of wood and covered with plastic sheeting to prevent water from entering the burrow. This was covered in turn by surrounding soil and vegetation. To inspect the nest chamber the wooden trapdoor complete with plastic sheet and covering vegetation was simply lifted from its position over the excavation hole which then allowed access to the nest.

EFFECT OF HANDLING ADULT PETRELS

In study burrows, both adults were captured, banded, measured and weighed. Five pairs were handled daily for weighing purposes. Kerguelen Petrels and Salvin's Prions deserted their nests after being handled there for two to three days, whereas Whitechinned Petrels would tolerate five to six daily handlings before deserting. For rapid daily nest inspection to determine which adult or adults were present on the nest, one adult of a pair was marked with white paint on the dark forehead. I could quickly inspect the bird on the nest with the aid of a torch. This method caused no further desertion from study burrows. Handling the chicks daily for growth did not cause desertion or destruction of the nest chamber, although my activities attracted the attention of Subantarctic Skuas which excavated several study chambers (Sinclair 1980).

DETERMINING BURROW OCCUPANCY

Various techniques were used with varying success to determine whether burrows were occupied, and by what species. Flour and sawdust sprinkled at the burrow entrance showed up petrel footprints and at times the tracks were clear enough to determine whether the birds had entered or left the burrows. This method was only good in fair weather because rain washed away petrel tracks, sawdust and flour. Knockover obstacles, e.g. small twigs, stuck into the ground at the burrow entrance, successfully showed if a petrel had entered or left the burrow. This method worked well but was time-consuming when large numbers of burrows were studied.

It was found that adult petrels frequently called from nest chambers during daylight hours. Petrels in nest chambers responded to tape recorded calls played back during daylight hours. This did not work with *Pterodroma* species which have very vocal aerial displays and normally remain silent in the nest

burrow. Playing tapes of petrel calls into burrows was by far the most successful technique for identifying the species occupying each burrow and for determining burrow occupancy in large sampling areas. I eventually learnt to mimic the individual petrel calls and then dispensed with carrying a tape recorder and tapes on long field trips. M. Schramm (pers.comm.) at Marion Island in 1980 found that the Grey Petrel *Procellaria cinerea* and Salvin's Prion in nest burrows only responded to taped calls during the display and early incubation periods.

To determine occupancy of *Pterodroma* nest chambers by adults or chick, a 2 m length of flexible hose of 20 mm diameter was pushed into the tunnel as far as it would reach. If an adult or chick was present in the nest chamber they would peck and tug on the hosepipe and utter short screams. This momentary disturbance caused no desertion by adults nor casualties among chicks.

Mist netting was greatly assisted by playing taped petrel calls near the erected nets. The taped calls when played at full volume attracted birds, including *Pterodroma* species, flying over breeding colonies at night.

SUMMARY

Techniques used to study nocturnal petrels at their nesting burrows at Marion Island in the summer of 1978-79 are described and evaluated. Capture of adults on the nest leads to desertion by smaller species but may be done occasionally with the large Whitechinned Petrel. Artificial nest sites are not effective with the methods tried but asbestos piping seems likely to be successful with smaller species. Nest chambers are best located by looking for patches of richer vegetation and then probing with a 1 m rod. Trapdoors are effective provided that they are placed in front of, not over, the nest chamber. Determining burrow occupancy is best done with a tape recording of the species' call or by mimicking the call. Paint marking the dark forehead allows quick inspection with a torch to determine which adult is present in the nest chamber.

ACKNOWLEDGEMENTS

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