NOTORNIS
is the journal of the Ornithological Society of New Zealand (Inc.)
Editor: E. W. Dawson,
P.O. Box 41-002,
EASTBOURNE

VOLUME 22 PART 4 DECEMBER, 1975

NOTES ON WHERO ISLAND AND OTHER ROOSTING AND BREEDING STATIONS OF THE STEWART ISLAND SHAG

(Leucocarbo carunculatus chalconotus)

By J. P. C. WATT

ABSTRACT

The adoption of Whero Island as a breeding station by the dimorphic Stewart Island Shag over the last 20 years is described. A review of other known breeding stations of this subspecies suggests that breeding sites are subject to periods of nontenancy. The relatively few records of the Stewart Island Shag indicate a distribution restricted to Foveaux Strait, and the Otago coast at Moeraki and near Dunedin. The total population is unlikely to exceed a few thousand birds.

INTRODUCTION

Whero (or Passage) Island at the entrance to Paterson Inlet, Stewart Island, must be one of the most intensively studied 0.2 hectares of sea bird habitat on the N.Z. coast (Richdale, 1942, c1944, 1963, 1965a, 1965b). Motivated by the scientific possibilities offered by this " unspoilt treasure of virgin New Zealand " Richdale spent an aggregate of 29 weeks camped on the island in the years 1938 to 1942, and for further periods totalling 67 weeks through to 1956-57. While largely a study that he pursued in his own time, grants from the Nuffield Foundation after 1952 enabled him to concentrate on the biology of the Muttonbird and on preparing manuscripts. The Southland branch of the Royal Society also assisted him, particularly with the provision of a hut. The absence of cats and rats on Whero, together with its compact size, made it an ideal field laboratory, and one from which predator impact on petrel populations on neighbouring islands could be gauged.

Over 3000 seabirds were estimated to be on the island in the early 1940's. Eight species were reported nesting: the Diving Petrel *(Pelecanoides urinatrix)*, White-faced Storm Petrel *(Pelagodroma marina maoriana)*, Broad-billed Prion *(Pachyptila vittata)*, Fairy Prion

(Pachyptila turtur), Sooty Shearwater *(Puffinus griseus)*, Southern Skua *(Stercorarius skua lonnbergi)*, and the introduced Starling *(Sturnus vulgaris vulgaris)* and Hedge Sparrow *(Prunella modularis occidentalis)*. In later years the Blue Shag *(Stictocarbo punctatus steadi)* and Stewart Island Shag *(Leucocarbo carunculatus chalconotus)* were added to the list. The five petrel species burrowed in 'loamy' soil of up to 0.45 metres formed under a plant cover comprising the woody tree daisy 'tete-a-weka' *(Olearia angustifolia)* which grew to 5 metres, punui *(Stilbocarpa lyalli)*, *Muehlenbeckia* sp., and sedge and *Poa* species. A description of the plant community and its relationship to nesting preferences of the various sea bird species is given by Richdale (1942, c1944, 1963).

ECOLOGIC CHANGES AT WHERO

Recent ecologic changes have greatly altered the appearance of Whero and have undoubtedly affected the nesting petrel populations. Stewart Island Shags, which during the early 1940's only roosted on the rocks to the north end of the island, were noted by Richdale to be breeding on these rocks for "some years prior to 1953-54." By 1956-57 the population had shifted and occupied about one third of

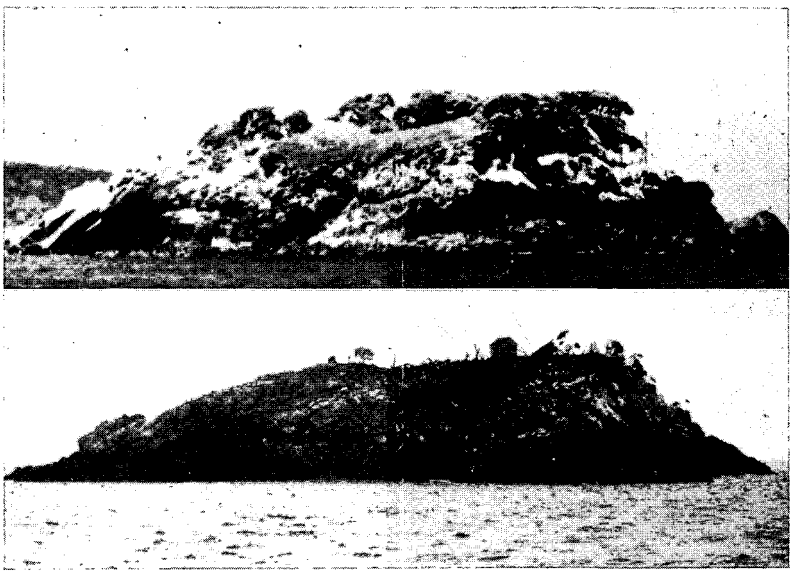

FIGURE 1 — Whero Island — north-west face. The upper figure was taken in January 1953, the lower in January 1974. Note the almost complete destruction of the tete-a-weka scrub through the actions of Stewart Island Shags. Richdale's hut, hidden in 1953, is now completely exposed. The sedge area (centre of photo) appears reduced in area.

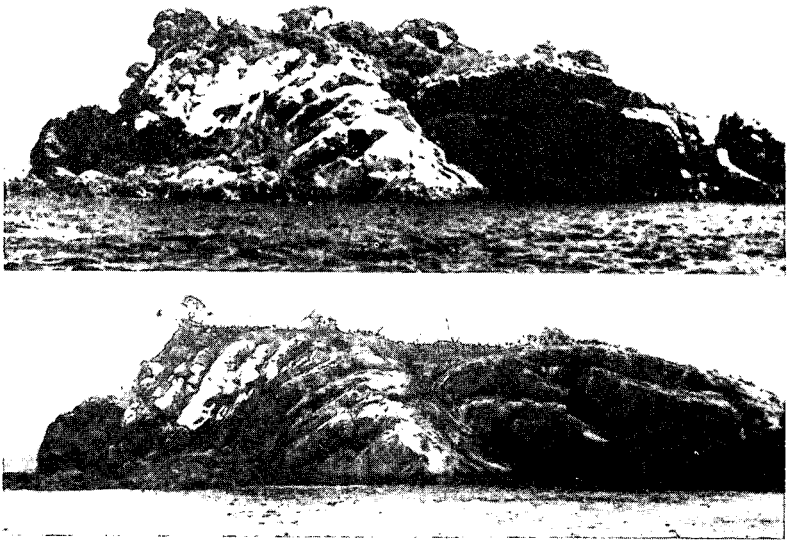

FIGURE 2 — Whero Island — east face. Upper 1953, lower 1974. Note complete occupation by shags.

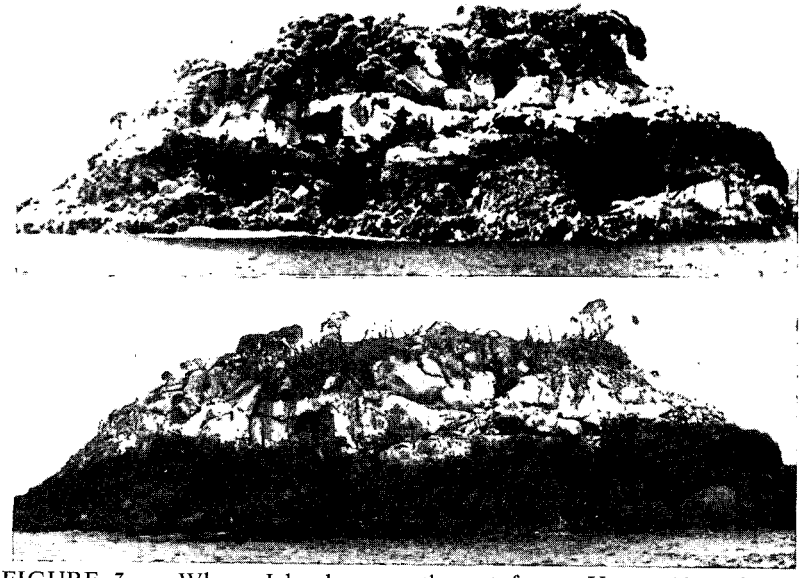

FIGURE 3 — Whero Island — south-west face. Upper 1953, lower 1974. Note sole living remants of tete-a-weka scrub cover in lower photo.

the more open sedge area on the west face with consequent serious disturbance to the nesting shearwaters (Richdale 1963). Thoresen (1969) infers greater disturbance by 1967 when on 12 January 1967 a brief visit indicated little evidence for the continued breeding of the Diving Petrel. By January 1974 the shags had completely taken over the island, killing the tete-a-weka and exposing Richdale's previously concealed hut. Figures 1, 2 and 3 show how the visual character of the island has changed in the 21 years between January 1953 and January 1974. The photos are matched pairs, being taken from essentially the same positions and showing three different aspects of the island. While the older tete-a-weka " sooner or later become riddled with the larvae of two species of beetle " (Richdale 1963), the complete destruction illustrated in the 1974 photographs is assumed to be a consequence of prolonged guano deposition at the roots which will cause eventual death of the entire organism (Gillham 1960).

DISCUSSION

There is probably no single simple reason for the invasion of Whero by the Stewart Island Shag. One or several factors may have been critical. An overall increase in the population could have contributed, but in the absence of census work this can only be a matter of conjecture. Disturbance at other breeding stations may have initiated a regrouping of the breeding birds. Stewart Island Shags at the Taiaroa Head colony readily desert their nests if there is even a mild degree of human disturbance. Dispersal from the well known (Guthrie-Smith 1914) breeding ground at Kanetetoe Island 7 km to the north-east of Whero could have been influenced by disturbance. Earlier this century ' guano ' was taken from Kanetetoe for local use as a garden fertiliser and more recently it is quite possible that the colony has been shot at or otherwise disturbed. On 2 January 1975 the author especially visited Kanetetoe to check on the nesting status of the shags and was surprised to find the rock abandoned. No landing was attempted but only 6 birds were present on the rock which is a little larger than Whero and free of any wooded vegetation. No nests were seen and the rock appeared surprisingly clean, perhaps the result of the abnormally high tides and strong seas in the spring of 1974. A photographic record was obtained which may supplement the late G. M. Turner's 16 mm film of the rock.

Adoption of new areas as breeding stations may be partly a natural progression from the use of a site for only roosting. Certainly the north end of Whero was used for some years as a roosting area before breeding commenced. Whero's location, directly in the flight path between Kanetetoe and the Paterson Inlet feeding areas, may have been fundamental to its progressive adoption as a roosting area. However, two other locations in the general vicinity of Kanetetoe have also become established as breeding sites in the last twenty years

suggesting that an apparent strategic location, such as exhibited by Whero, is not fundamental. In 1955-56 22 pairs were recorded breeding on Jacky Lee Island 6.4 km to the north of Whero, this number having built up since the 'early 1950's' when breeding was first noted (R. H. Traill pers. comm.). In 1968 breeding was also recorded on Zero Rock, 5.6 km to the north-north-east of Whero, when 19 pairs were counted (J. Cheyne pers. comm.). The current status of these two small colonies has not been checked.

Other roosting sites occur in Paterson Inlet and on the north-east Stewart Island coast. Small size and/or 'harbour' location however probably preclude the possibility of future adoption as breeding sites. Tamihau Island in Paterson Inlet, like Whero is another islet where vegetation is being killed back by roosting birds. Up to 400 birds have been recorded here, numbers increasing towards evening. Future nesting however is unlikely since Tamihau, unlike all other known breeding colonies, is not in the open sea. Other rocks frequented by roosting birds include Dirty Island, an islet near the west entrance to Glory Cove (Little Glory), Harry West Point, Bullers Rock at the Neck 1.6 km west-south-west of Whero, Fish Rock (near Mamaku Point), and Gull Rock further north near the Bungaree beaches. (R. H. Traill pers. comm. and personal observation).

Another consideration in the changes in breeding stations of the Stewart Island Shag is that change may be a quite normal event that may occur at regular intervals, say every 40 - 60 years. Prolonged use of one site may result in deterioration to the point where it becomes untenable. Sansom (1956) refers to the Papa-kaha rookery at the entrance to Bluff Harbour and notes that up to 1953 the rookery had been untenanted for many years. Reason to believe earlier tenancy however is vague. Another colony that appears to have been untenanted for a period is the Taiaroa Head colony on the Otago Peninsula. Though currently a strong colony of some 310 nests (September 1973), only attempted breeding was reported in 1940 (Richdale 1941). Records indicate a gradual build up since then. If the "large colony — built on a terrace at the foot of a small cliff on Otago Peninsula" reported by P. Seymour c. 1886 (Buller 1888: 159) was on the same site, a period of nontenancy is indicated some time prior to 1940. While Seymour's description is not an accurate one for the present location, no other site is known.

In terms of a longer time interval it is very probable that colonies have shifted from time to time as a consequence of natural factors. Richdale (1963) commented with reference to Whero that "in earlier days, judging by the large deposits of small flat oval stones regurgitated by marine birds such as penguins and shags the island was a breeding place for marine shags and was most likely bare of vegetation." Since at least some of these stones were found buried 0.3 m or so in the present soil the reference is probably to some period in the last few thousand years.

OTHER BREEDING COLONIES

With some stations showing a decline or abandonment, and with others an increase or readoption, it is appropriate to review the somewhat incomplete and inadequate knowledge of the breeding stations of the Stewart Island Shag. A list of all known breeding stations with notes on their reported status is given in Table 1. It is probable that other stations exist, especially around Ruapuke Island. The table indicates an apparent gap in distribution between the Otago Peninsula and Foveaux Strait (an exception is a report of two downy

TABLE 1

RECORDED BREEDING STATIONS OF THE STEWART ISLAND SHAG

Goat Island (Moeraki-Otago)	- 1962; breeding (1)
	- 1965; nest building, breeding unconfirmed (2)
	- 1974; 110 nests, October (3)
Taiaroa Head (Otago Peninsula)	- c. 1886; "large colony" - P. Seymour (4)
	- 1940; attempted breeding (5)
	- 1973; 310 nests, September (1) (6)
Gull Rock, Sandfly Bay (Otago Peninsula)	- 1966; c.60 nests (7)
Green Island (near Dunedin)	- c. 1959; reference to "a colony" (8)
	- 1968; 50 - 100 nests with young, November (9)
Kanetetoe Is. (Stewart Island)	- 1911; 400-500 nests (10)
	- 1932; "about 300 breeding" (11)
	- 1968; 30 birds (nesting?), December, (12)
	- 1975; found abandoned, January (6)
Jacky Lee Is. (Stewart Island)	- 1950's (early); breeding started (13)
	- 1955-56; 22 pairs (13)
Whero Is. (Stewart Island)	- 1950's (early); breeding commenced "some years prior to 1953 - 54" (14)
	- 1956 -57; population shifted and expanded (14)
	- 1960's; expanded over whole island (13)
	- 1974; c.200 - 300 birds, January (6)
Zero Rock (Stewart Island)	- 1968; 19 pairs nesting near top, December (12)
Papa-kaha (Bluff Harbour)	- prior to 1953, untenanted (15)
	- 1955; 90 nests (15)
Kuru-kuru (Centre Island)	- 1955; more than 600 nests (15)
Sealer's Bay (Codfish Island)	- 1934; c.60 nests - E.F. Stead (16)
	- 1948; "considerable nesting population" (16)
	- 1966; 64 nests (17)
	- 1972; no birds or nests seen, February (3)
The Knobbies (Codfish Island)	- 1966; "reason to believe a large colony" (17)
	- 1972; no birds or nests seen, February, (3)

(1) A. Wright (pers. comm.). (2) McKenzie (1965). (3) R. Nilsson (pers. comm.).
(4) Buller (1888). (5) Richdale (1953). (6) Author
(7) Poppelwell (1966) (8) Gillham (1960) (9) R.G. Cunninghame (pers. comm).
(10) Guthrie-Smith (1914) (11) Wilson (1959 (12) J. Cheyne (pers. comm.).
(13) R.H. Traill (pers. comm.) (14) Richdale (1963) (15) Sanson (1956)
(16) Dell (1950) (17) Blackburn (1968).

chicks at The Nuggets in March 1973 — G. Hamel pers. comm.), and no records exist for west of Centre Island. Oliver (1955: 221) quoted R. Henry reporting the Stewart Island Shag in Dusky Sound. A search of a transcript of the Records of Richard Henry's Service as Curator of Resolution Island, held by the Hocken Library, Dunedin, however, found reference only to "sea shags" which were almost certainly the Pied Shag *(Phalacrocorax varius varius)* or Little Shag *(P. melanoleucos brevirostris)*. More recent visitors to Dusky Bay and Preservation Inlet have also failed to report the species (Begg & Begg 1968, 1973, pers. comm.).

CONCLUSIONS

While certain sites appear to be favoured by the Stewart Island Shag for breeding, tenancy varies and some sites may even be abandoned for a period. Whero Island has recently been commandeered by the shags, while Kanetetoe has been apparently abandoned. Whether Kanetetoe remains untenanted for a period long enough for vegetation to reestablish and whether Whero will be abandoned at some time in the future remains to be seen. Tenancy and census of breeding stations of the species around the Otago and Southland coast deserves more simultaneous observation in the future than there has been in the past. If the recorded breeding stations are the only stations it must be concluded that there are only in the order of 1500 - 2000 nests at the moment, indicating a total population of only a few thousand birds.

ACKNOWLEDGEMENTS

The 1953 photos of Whero were taken by my father the late Dr Morris N. Watt with the cooperation of Mr Alfred Walmsley. The 1974 visit to Whero and the 1975 visit to Kanetetoe were made in the yacht *Tiercel* with the cooperation of Mr Robert Watt. I am grateful to Mrs G. Hamel and Dr L. E. Richdale for comments on an early draft of this paper, and to Mr Roy Traill of Stewart Island and others named in Table 1 I am most appreciative of the ready supply of information. Mr Ken Murray prepared the photographs for publication.

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SHORT NOTE

ROYAL ALBATROSS *(Diomedea epomophora)*

A paragraph was omitted from the section on Royal Albatrosses in Bartle (1974). This read:

" The numbers of Royal Albatrosses on trawling grounds remained relatively constant throughout autumn and at Cape Campbell between 10 and 20 birds normally came in to gutting. Some moulting individuals with distinctive plumage patterns could be seen day after day in the same area. Together with the observation of only small numbers (usually 1 or 2) seen off Point Gibson (Canterbury) where little trawling was carried out, this suggests that groups of Royal Albatrosses stay together on the trawling grounds for extended periods. It seemed likely that most of these birds were non-breeders, yet there was no seasonal decline in numbers as suggested by Robertson and Kinsky (1972)."

Recent observations by P. E. Roberts (pers. comm.) suggest that Wandering Albatrosses *(Diomedea exulans)* are more abundant than Royal Albatrosses east of the continental shelf waters of Cook Strait in autumn.