SHORT COMMUNICATIONS

AVIFAUNAL AFFINITIES OF MACQUARIE, NORFOLK, PHILLIP AND LORD HOWE ISLANDS

Secker (1971, RAOU Newsletter No. 9) has queried the tendency for authors of books on New Zealand birds to treat the avifauna of Macquarie Island as part of that of New Zealand. His criticism rests on two objections: that Macquarie Island is politically part of Tasmania and that the avifaunas of Norfolk and Phillip Islands are illogically not treated as part of that of New Zealand. We believe the first to be irrelevant, because political boundaries are not avifaunal boundaries, and the second to be only partly correct. Though we recognize that Macquarie Island is separated by an oceanic deep from the geological complex of New Zealand and its islands, we shall nevertheless argue that Macquarie Island should be regarded avifaunally as part of New Zealand. Also, we shall argue that the avifaunas of Norfolk, Phillip and Lord Howe Islands have been influenced by those of Australia, New Zealand and New Caledonia, and ought not to be considered purely as part of the New Zealand avifaunal region.

Macquarie Island has 29 native species of plants, of which three are endemic (B. W. Taylor 1955, ANARE Rep. Series B, 2 (Botany): 1–192). The nearest subantarctic islands—Campbell, Auckland and Antipodes—each share 24 species of plants with Macquarie Island. New Zealand shares 19 and Australia only 11. Clearly then, Macquarie Island is floristically part of the New Zealand region.

It does not necessarily follow that it is avifaunally so. Macquarie has no native passerines, and had only one native landbird, the New Zealand Red-crowned Parakeet *Cyanorhamphus novazelandiae erythrotis*. *Cyanorhamphus* is not represented in Australia or Tasmania. Macquarie also had the Banded Rail *Rallus philippensis*, but this is widespread throughout the south-western Pacific region.

Four self-introduced species of European birds now breed regularly on Macquarie Island. The Redpoll *Acanthis flammea* is an obvious stray from New Zealand, because it does not occur in Australia or Tasmania. The Blackbird *Turdus merula* and Starling *Sturnus vulgaris* occur in Australia, Tasmania and New Zealand. However, they are self-introduced on all other subantarctic islands of New Zealand. We presume that they reached Macquarie Island through these islands rather than from Australia or Tasmania. A similar case could be argued for the Mallard *Anas platyrhynchos*, which in the wild in New Zealand is relatively far more common than in the wild in Australia and Tasmania. For these reasons we regard Macquarie Island as a part of the New Zealand avifaunal region rather than of the Australian.

On the other hand, the avifaunas of Norfolk Island and nearby Phillip Island as well as of Lord Howe Island are best regarded as mixtures derived from Australia, New Zealand and the tropical Pacific. Norfolk, which possesses (or possessed) the characteristic New Zealand genera *Hemiphaga* and *Cyanorhamphus*, shares (or shared) the Pacific genera *Petroica*, *Gerygone* and *Rhipidura* with Australia and New Zealand. Phillip Island, with the genus *Nestor* otherwise endemic to New Zealand, probably had an avifauna like that of Norfolk. Norfolk also has the Pacific genus *Pachycephala* which is unknown in New Zealand. Lord Howe, lying much closer to Australia, has the genus *Strepera* otherwise endemic to Australia as well as *Pachycephala*, and formerly had *Rhipidura*, *Gerygone* and *Cyanorhamphus*. Both islands also have tropical Pacific species of *Turdus* and *Aplonis* that are absent from New Zealand and south-eastern Australia.

In our opinion, Norfolk, Phillip and Lord Howe Islands cannot be regarded as part of the New Zealand avifaunal region, though their avifaunas have been influenced from New Zealand. We hope that future publications on New Zealand birds will continue to treat Macquarie Island as part of the New Zealand avifaunal region.

I. J. Abbott,
K. N. G. Simpson, *Department of Zoology, Monash University, Clayton, Vic. 3168.*
22 December 1971.

THE NEW ZEALAND LONG-TAILED CUCKOO: NEST PARASITE OR PREDATOR?

In a paper dealing with the behaviour of parasitic cuckoos at nests, Marchant (1972) emphasizes the paucity of documented evidence for the widely held belief that adult cuckoos remove or destroy whole clutches or young birds in the nests of hosts. Evidence would, of course, be difficult to obtain as such behaviour would require only a few seconds. But with many photographers interested in birds' nests, and ornithologists in detailed studies of breeding biology, surely these habits, if regular at all, should have been described a number of times.

During the Field-Outing of the RAOU to New Zealand in 1971 I made an observation that might have relevance to the question raised by Marchant. At 11:20 on 6 November several members of our party were trying to see a Long-tailed Cuckoo *Eudynamis taitensis* that was calling from the edge of a pine plantation in Kangoroa Forest, 40 km south-east of Rotorua. When I approached the place a few minutes later, the bird was silently foraging and working its way high into a pine tree. It then flew about 70 m north-west to a pine branch 8 m above the ground. I followed it. In a few minutes a series of five flights, varying from roughly 30 to 80 m, took it almost in a straight line deep into the plantation. The pines *Pinus radiata* were uniform in height, about 15 m. The ground in places was covered with sphagnum, and there was a well-developed and moderately dense understorey of ferns and shrubs, usually between 2 and 3 m high. Before each flight I sighted the Cuckoo briefly. Each time, it flew and landed at the same height as before. After the fifth flight I had more difficulty finding the bird and more or less stumbled upon it by following the path it had been taking. Again, I saw it only briefly before it flew. This time it was standing on the ground over the bright blue-green egg of a Song Thrush *Turdus philomelos*. The egg was cold, and had not been pecked or damaged. It proved to be fresh without trace of development. I was unable to find a nest nearby. The Cuckoo, which had not gone far, was being mobbed by a small group of Whiteheads *Mohoua albicilla*.

The relation between this egg of the Song Thrush and the Long-tailed Cuckoo is the vital point and, unfortunately, the one on which I have no evidence whatever. Three explanations seem feasible. First, the egg had been laid on the ground or from a branch above. Though I can find no ready reference in the literature to deposition of eggs outside the nest, perhaps by inexperienced birds or those prevented in some way from reaching the nest when about to lay, there can be no doubt that this occurs quite commonly. The Cuckoo, as I followed it, then discovered the egg by chance and flew down to investigate. Or perhaps it had discovered the egg previously and had returned to it. Secondly, while I followed it, the Cuckoo removed the egg from a nest and carried it to the ground. The Cuckoo was most definitely not carrying the egg when I first sighted it, nor at any other time I saw it, so that the nest must have been close to the place of deposition and the Cuckoo very swift in its actions. That the egg was cold suggests that incubation had not begun, and that there was no evidence of Thrushes nearby suggests that the clutch had not been completed. Thirdly, the egg had been removed from a more distant place previously and the Cuckoo returned to it or discovered it by chance when returning to a locality previously visited. The very direct flight of the bird ending at an egg some 350 m distant supports the suggestion that the bird was returning to it.

In searching for an explanation of this peculiar behaviour I discovered that little indeed has been published recently on the habits of the Long-tailed Cuckoo in New Zealand or elsewhere. The Song Thrush is not among the four hosts listed in the New Zealand checklist (OSNZ 1970). One must be cautious that recorded hosts are species in whose nests eggs have been found, not just those observed feeding fledged cuckoos. In the most complete account of *Eudynamis taitensis* (Fulton 1904) seventeen species are listed as foster-parents. From these lists there is reasonable evidence that the following species may actually be used as egg-hosts: Brown Creeper *Finschia novaeseelandiae*, Whitehead, Yellowhead *Mohoua ochrocephala*, Fantail *Rhipidura fuliginosa*, Tit *Petroica macrocephala*, Robin *P. australis*, Silvereye *Zosterops lateralis* and Bellbird *Anthornis melanura*. Oliver (1955) adds the introduced Greenfinch *Chloris chloris* and the Song Thrush. On checking his references I find that the latter species has been recorded twice as an egg-host (Stead 1937). Falla *et al.* (1966) present essentially the same list of 'victimized' species as Oliver. Bogert (1937) includes the native thrush *Turnagra capensis* as a host, but I suspect this is an error and should refer to Oliver's 'introduced Greenfinch and Thrush'.

All other species recorded as egg-hosts are slightly to considerably smaller than the Song Thrush, and their eggs are all smaller than its (Oliver 1955). Cuckoos generally lay small eggs proportional to the size of their bodies, and by this strategy are perhaps more successful with smaller hosts. The eggs of *Eudynamis taitensis* seem to be fairly large, ranging from 21.2 to 23.9 mm by 15.9 to 18 mm (Ramsay 1865; Stead 1937; Oliver 1955), and although similar

or slightly larger than listed hosts are considerably smaller than the Song Thrush's, 28 by 21 mm (Oliver 1955). The only other suggestion of a host with eggs larger than the Cuckoo's is from very weak evidence that on the Gilbert Islands they may parasitize the Noddy *Anous stolidus*, a bird with an egg twice the length of their own (North 1896). However, this report may be largely fiction, because the Long-tailed Cuckoo is known to breed only in New Zealand (Bogert 1937).

The Song Thrush differs uniquely from all recorded hosts in laying a blue-green egg, and perhaps because of this may not be a satisfactory host. In fact, I was unable to find any record of a young Cuckoo being successfully raised or even fed by a Song Thrush. The absence of records of parasitized Thrush's nests might reflect that the species is rarely if ever used as a host or that eggs are detected and ejected too quickly by the parent to yield any record. A much better documented and perhaps analogous situation exists in the extremely rapid removal of eggs laid by the parasitic American Cowbird *Molothrus ater* in nests of the Catbird *Dumetella carolinensis*, which lays a plain blue-green egg (Nickell 1965: 473).

Fulton's (1904) account is of relevance in suggesting an alternative explanation not directly related to parasitic behaviour: the Long-tailed Cuckoo might be highly predatory in its feeding habits. In fact he quotes a correspondent: 'Only last year I noticed one come out of a willow-tree from a Thrush's nest carrying a Thrush's egg in its mouth, the adult Thrush chasing it'. Marchant (*op. cit.*) discusses destructiveness by cuckoos in terms of behaviour developed accidentally in the normal course of its parasitic breeding habits, and states: 'Though undoubtedly rare, this destructiveness by cuckoos is puzzling'. Destructiveness certainly seems prominent in the recorded behaviour of *Eudynamis taitensis*. Marchant (pers. comm.) did not see Fulton's paper, in which were reviewed reports of Long-tailed Cuckoos eating eggs and young birds, seen with fresh yolk smeared over beaks and necks, carrying objects [young birds?] in their beaks, and collected as specimens with eggs or nestlings in their gullets. Young birds are apparently taken more often than eggs: 'There are very few instances of egg-robbing recorded, and those only since the introduction of English birds.' From Fulton's carefully documented account of *Eudynamis taitensis* in New Zealand, one gains the impression that although primarily insectivorous it is highly rapacious. Perhaps many of the cuckoos are equally so and their parasitic habits are merely superimposed on behaviour that we would not consider unusual in other non-specialized feeders such as we find, for example, among the corvids.

I would like to thank Mr C. Corben for his assistance in searching the literature on this subject.

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DR DOUGLAS D. DOW, *Department of Zoology, University of Queensland, St. Lucia, Q 4067.*
8 January 1972

CATTLE EGRETS IN THE GIPPSLAND AREA

Cattle Egrets *Ardeola ibis*, formerly found only in Eurasia and Africa, were introduced into Australia in 1933 in the Kimberley region when 18 were released there, though apparently they did not become established (Serventy and Whittell 1948, Birds of Western Australia). However, in 1948 large numbers were reported in the Oenpelli area, Arnhem Land (Deignam 1964, Rec. Am. Aust. scient. Exped. Arnhem Ld). Since then the species has spread widely, and now there are at least three known breeding colonies in Australia, including one of about 10,000 birds on the Adelaide River, NT (Frith and Davies 1961, Emu 61: 97–111). The spread of the species may have resulted from natural immigration rather than from the proliferation of the original releases (Hewitt 1960, Emu 60: 99–102).

TABLE I

Summary of observations of Cattle Egrets at Sale, Bairnsdale and Maffra

Sale	1965	1966	1967	1968	1969	1970	1971
First sighting	May	—	—	3 May	29 Apr.	29 Apr.	1 Apr.
Last sighting	—	—	—	7 Nov.	1 Nov.	Nov.	1 Nov.
Maximum observed	6	18	40	70	140	223	250
Nuptial plumage first seen	—	—	—	13 Sept.	7 Sept.	1 Sept.	3 Sept.
Bairnsdale							
First sighting	—	—	—	—	—	12 Apr.	9 Apr.
Last sighting	—	—	—	—	—	10 Nov.	—
Maximum observed	—	2	—	—	—	6	61
Nuptial plumage first seen	—	—	—	—	—	28 Oct.	31 July
Maffra							
Maximum observed	(Two birds seen in area in 1958)			80	76	81	68

Since 1949, when the species first appeared in Victoria at Cororooke, near Lake Colac (Brown 1949, Emu 49: 25), individuals have been seen at various places throughout the state (Wheeler 1967, A Handlist of the Birds of Victoria). In May 1965 six Cattle Egrets were seen in a shallow swamp at Longford, near Sale, and since then records of numbers, movements and habits of the species have been maintained, particularly near Sale. Additional information has been provided by Mrs N. Vincent for the Bairnsdale district and Mrs T. M. Noble for the Maffra area. Egrets have also been observed at Rosedale and Orbost, and since 1970 at Traralgon and Yanakie.

Table I summarizes the first and last sightings for the roost on an artificial island in Lake Gutheridge, Sale (1965–71), and for Bairnsdale (1966–71), and the dates of appearance of birds bearing nuptial plumes are also shown, as are maximum counts at each location as well as at Maffra (1968–71). At Sale, Cattle Egrets have generally appeared towards the end of April or early May (except in 1971 when six birds were seen on 1 April) and leave the area in early November.

On first return to the Sale district, Cattle Egrets markedly prefer to feed in shallow swamps, but by June such areas are almost entirely ignored, and the birds move to low-lying flood-plains. The vegetation of these areas, subject to flooding only during wet periods, is dominated by *Paspalum distichum*, though *Echinochloa* sp, *Lolium perenne* and *Trifolium subterraneum* also occur. In October the Cattle Egrets move to higher ground with improved pastures, lucerne paddocks and crops. However, most of my sightings have been on the pastures dominated by *Paspalum*. (Some 170 birds in breeding plumage, seen on the Clarence River flood-plains near the Ulmarra colony in New South Wales on 16 November 1970, were feeding in habitat closely resembling that used in the Sale district).

The birds roost in *Salix babylonica* and *Comprosma retusa* at Lake Gutheridge and move out before sunrise in small flocks of up to 20 birds. They feed on the flats of the La Trobe River during mornings and tend to congregate in small flocks in the afternoon. Such flocks coalesce towards evening, and three or four large flocks return to the roost. Movements in the Sale district have varied little during the years of observation and birds can nearly always be found at certain places at different times of the day.

Numbers of Cattle Egrets at Sale have shown a steady increase since 1965 to the maximum in 1971 of about 250. However, the Maffra total declined in 1971 while the Bairnsdale total substantially increased. There could be some interchange between these areas, with perhaps an original flock being established in the Maffra district where a small flock was first sighted about 1958. This flock increased steadily until 1968 when 80 birds were seen in the area (records for the intervening period are not available). The number has remained fairly static since then.

Although almost all birds develop nuptial plumage by early September while in the Sale area, no evidence of breeding has been obtained. It would be interesting to establish whether the build-up of numbers in the Gippsland area is the result of local breeding or whether the birds originate from colonies further north. Certainly when they return, the plumes have been moulted.

C. E. Chalmers, *Fisheries and Wildlife Department, PO Box 247, Sale, Vic. 3850.*
10 March 1972.

BREEDING SEABIRDS OF THE SOLITARY ISLANDS, NSW

The Solitary Islands, off the northern coast of New South Wales, consist of North, North-west, South-west, South and Split Solitary Islands. These five islands are widely dispersed (Fig. 1); the southernmost, Split Solitary, is some 8 km north-east of Coff's Harbour and the northernmost, North Solitary, a further 40 km in the same direction. There are also four rocks or islets in the group, named North-west Rock, North Rock, Stack Rock and Black Rock. These rocks are very barren and devoid of, or almost devoid of, soil or vegetation. I have not landed on them but they are probably not used regularly by seabirds for breeding. Silver Gulls *Larus novaehollandiae* and Crested Terns *Sterna bergii* may breed on them rarely.

The islands generally are steeply sloping, rocky and rugged; where present, the soil is shallow and supports a minimum of herbaceous vegetation such as grass, creepers and small plants. The following were identified from samples collected from North Solitary Island: Pigface *Carpobratus glaucescens*, *Senecio* sp, sedges *Xerotes* and *Juncus* sp, Couch Grass *Cynodon dactylon*, Summer Grass *Digitaria sanguinalis*, Wandering Jew *Tradescantia albiflora*, Coast Morning Glory *Ipomoea carcia*, Yellow-flowered Oxalis *Oxalis corniculata* and Saltbush *Ragodia hastata*.

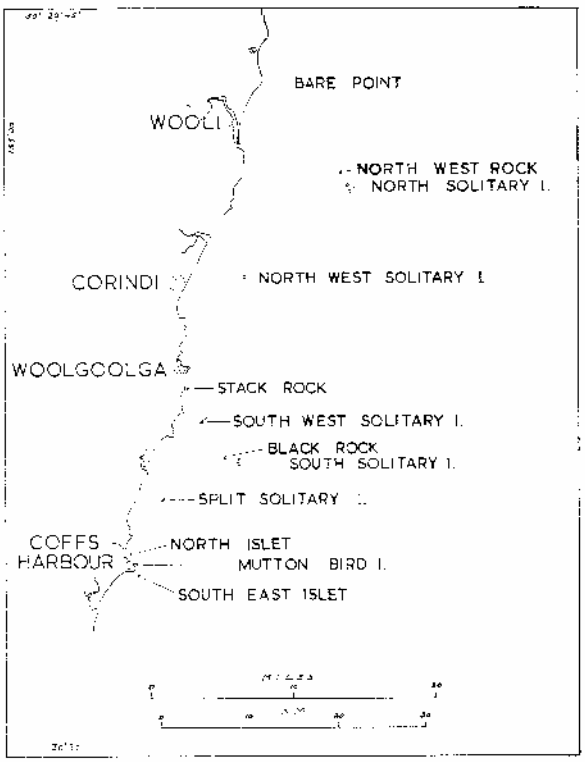

Figure 1. Map of the Solitary Islands.

Little has been written of the bird life of the Solitary Islands. Hindwood (1948) stated that 'the only New South Wales Islands of any size that have not been reported on ornithologically are the well-named Solitaries, excepting South Solitary, whereon is a lighthouse and which is the breeding place of the Wedge-tailed Shearwater'. E. S. Rohu (Hindwood *op. cit.*) was said to have visited 'all but one of the Solitaries in 1914' but Hindwood was unable to trace any specimen collected by Rohu on these islands. No other record of Rohu's visits to the Solitaries has been found.

Basset Hull, who contributed so much of the early ornithological information on offshore islands of New South Wales, did not land on the Solitaries. He stated (1916) that 'North Solitary is practically inaccessible and landing on South Solitary is only possible in finest weather'. The latter part of that statement is certainly correct and it applies generally to most, if not all, the islands of the group.

McKean (1961) recorded brief details of a visit to North Solitary Island on 2 December 1960 accompanied by Mr D. Dent; they banded 400 Wedge-tailed Shearwaters *Puffinus pacificus* but gave little other information about the visit and did not record any other species in the report. One of the Shearwaters banded by McKean during that visit was recovered in 1971 in the Philippines (Anon. 1971).

On South Solitary Island Hull (1916) obtained information and specimens from D. Gow, principal lighthouse-keeper at that time on the Island. He recorded that Gow 'had made an extensive search over the island and could not find any other species breeding there'. During 1966–67, another lighthouse-keeper, Mr R. Dyball, (pers. comm.) recorded, in addition to Wedge-tailed Shearwaters, nestling Fairy Penguins *Eudyptula minor* 'in three or four burrows', Crested Terns and Silver Gulls breeding, and a few Short-tailed Shearwaters *P. tenuirostris*. Unfortunately Dyball did not record the details at the time and is not sure if the Shearwaters were in fact breeding. If Short-tailed Shearwaters do breed on South Solitary Island, their breeding range would be extended some 270 km north from Broughton Island (Lane 1970).

Most nesting observed by Dyball was on the separated northern island of South Solitary Island, to which access is now extremely difficult. A 'flying-fox' bridge, connecting the two islands when Dyball was there in 1966–67, has since been destroyed by bad weather.

As far as we know, Mr H. Battam and I made the only other ornithological visits to the Solitary Islands as follows:

South-west Solitary Island

1 December 1969 with Mr B. Jones from 08:00 to 13:00. The Wedge-tailed Shearwater was the only species found breeding and 199 adults were banded; nearly all were brooding the single egg. Rising wind caused a hasty departure. Other species seen on the island were two Feral Pigeons *Columba livia*, a few Silver Gulls, two Sooty Oystercatchers *Haematopus fuliginosus*, a Reef Heron *Egretta sacra* and numerous Pipits *Anthus novaeseelandiae*.

Split Solitary Island

3 December 1969 with B.J. from 04:55 to 05:55. Weather conditions had prevented getting the launch off the beach the previous day and a rising north-easterly wind allowed little time on the island. Only Wedge-tailed Shearwaters were found breeding and 53 adults were banded. Other species seen were three Sooty Oystercatchers, a few Welcome Swallows *Hirundo neoxena* and some Pipits.

North Solitary Island

6–8 December 1971 with Mr A. K. Morris. With B.J. we had planned to visit this island during December 1970, but cyclonic conditions prevented small vessels putting to sea at that time.

This is the largest of the Solitary Islands. Like South Solitary, it consists of two islands, separated by a channel some 25 metres wide. Together they are about 1,200 m long, and about 380 m wide and 55 m high at maximum. The two form a rather long narrow, somewhat rugged, ridge, more than half of which is bare rock.

The purpose of the visit was to determine what seabirds were nesting on the island, to band Shearwaters and to carry out a survey of the Shearwater colonies. Four areas, 10 m square, were marked with pegs; every burrow within each area was checked; each bird banded, measured and weighed, and the egg measured. In two other marked areas, one on the northern island and one on the southern, weights and measurements were not taken but burrows were recorded, the birds banded and the status noted. The ranges and averages of the weights and measurements are set out in Table I.

TABLE I

Measurements (mm) and weights (g) of 100 Wedge-tailed Shearwaters on North Solitary Island

Detail	Wing	Tail	Cul-men	Tar-sus	Wgt	Egg Lcn.	Egg Width
Largest	306	146	41.0	52.0	425	66.2	44.6
Smallest	281	123	35.0	46.0	310	52.5	29.9
Average	294	134	37.9	49.0	369	60.4	40.3

Two birds banded on 2 December 1960 by McKean and Dent were recaptured on 7 December 1971. Each was incubating an egg and was recaptured in like circumstances. During our visit we banded 153 adult Shearwaters in burrows in marked areas, 218 adults in other burrows and 49 adults, caught on surface at night (total 420).

Three birds were found in a burrow without an egg and two burrows were too deep to determine whether there was an egg, as often happens on many islands off the coast. A second egg was found in or near the entrance to many burrows, apparently from a deposed bird, because a female Shearwater is able to produce only one egg in a season. In one burrow a bird was found with two warm eggs, one of which must have belonged to a deposed bird but had not been discarded. It seems that there is a keen demand for suitable burrows in the shallow and limited soil-cover on North Solitary Island. A few birds were found brooding an egg in exposed or partly exposed situations among rocks.

On the northern island numerous eggs were found in the open and very few were damaged in any way. On most other coastal islands exposed eggs are usually eaten promptly by gulls or Ravens *Corvus coronoides*, but here the few gulls seen confined themselves usually to the southern island and no ravens or crows were seen.

During a short visit to the southern island on 7 December, 103 Wedge-tailed Shearwaters were banded including 18 in a marked area. A colony of some 7,000 to 8,000 pairs of Crested Terns brooding eggs provided a spectacular sight. Twelve Silver Gulls were counted, a few new and recently used nests were found and one large young bird was seen.

McKean during his visit to North Solitary Island recorded seeing Fleshy-footed Shearwaters *P. carneipes* 'in thousands on the surrounding waters'. None was seen during our visit nor during the visits to the other Solitary Islands in 1969.

The species seen on or over North Solitary Island during our visit were:

Wedge-tailed Shearwater	many breeding
Black Cormorant *Phalacrocorax carbo*	5 (incl. 2 imm.)
White-faced Heron *Ardea novaehollandiae*	3
White-breasted Sea Eagle *Haliaeetus leucogaster* (flew from mainland, disturbed terns and flew back)	1
Banded Landrail *Rallus philippensis*	1
Sooty Oystercatcher	2 pairs, 1 large young
Turnstone *Arenaria interpres*	1
Tattler *Tringa* sp	1
Silver Gull	*c.* 12, some nesting
Crested Tern	*c.* 8,000 breeding pairs
Welcome Swallow (nest, not in use, in cave)	4

The finding of a white-phased or white-breasted Wedge-tailed Shearwater during this visit is discussed below (Lane 1972).

I wish to acknowledge the assistance given in various ways by the other members of our party, with whom I have shared numerous island visits. Without Mr Jones's boat and his unfailing enthusiasm these trips would not have eventuated. Mr Morris collected and had the botanical specimens identified. The surveys were carried out with the co-operation and approval of the National Parks and Wildlife Service of New South Wales and the Australian Bird-banding Scheme.

S. G. LANE, *65 Wood Street, Lane Cove, NSW 2066.*
10 March 1972.

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WHITE-PHASED WEDGE-TAILED SHEARWATER ON NORTH SOLITARY ISLAND, NSW

In the Pacific Region, the white or light phase of the Wedge-tailed Shearwater *Puffinus pacificus* is regularly found north of the equator. King (1967) stated that 'light phase birds predominate in the Hawaiian Islands and Johnston Atoll (97 per cent light phase), in the northern Marshalls (93 per cent light phase), in the Bonin and Volcano Islands (nearly 100 per cent light phase) and at sea south to 10° N. latitude in the Central Pacific. South of these latitudes nearly all birds observed are dark phase birds. Dark phase birds move north to 15° N. latitude during the northern summer.' A detailed review of the geographical status of the dark and white phases was made by Murphy (1951).

In Australia the white phase of the Wedge-tailed Shearwater is found in the area of Shark Bay, WA, where 'a small proportion have pure white underparts' (Serventy and Whittell 1948); this proportion has now been established by Serventy (1972) to be about 20–30 per cent. Previously the white phase has not been recorded from eastern Australia, but there is one record of a beach-washed bird from Makara, NZ (Falla 1962). Falla contended that 'on the evidence of specimen comparison as distinct from theoretical possibilities the Makara specimen appears to be from a north Pacific stock'. He also stated that Bourne had drawn attention to the occurrence of white-breasted birds in the area of Shark Bay, WA, and that Bourne had suggested 'that other South Pacific populations nearer New Zealand may yet prove to have a few white-breasted individuals'. Murphy (1951) suggested likewise.

From 6 to 8 December 1971 I visited North Solitary Island (Lane 1972) with Messrs H. Battam and A. K. Morris to investigate the birds and to band shearwaters. At dusk on the first evening at about 20:00 (summer time), the first shearwater that we observed flying over the Island had white underparts. A little later, after climbing to the breeding area, a white-breasted bird was seen in the lantern light on the surface and was quickly captured. Examination revealed it to be a white-phased Wedge-tailed Shearwater.

The bird was collected and the skin is now in the Australian Museum (Reg. No. O.43971). It was a male in breeding condition, its stomach was almost empty, and it weighed 305 grams. The details follow: Upper parts and tail dark brownish black; underparts white; sides of neck pale ashy grey; upper side of wings brownish black with pale-greyish leading edge; underside of wings with blackish grey flight-feathers, coverts mainly white with some ashy brown mottling; axillaries pale-whitish with ashy brown markings; legs and webs pink; claws pinkish white; top of culmen grey, blackish at tip; sides of lower culmen grey, tinged brown; iris dark-brown; obvious brood-patch; no moult. Measurements (mm): total length 449; wing-span 1,050; wing 305; tail 140; tarsus 50.5; culmen 37.9; testes right 11.9 x 10, left 12 x 9.

The evidence, particularly the almost empty stomach and the obvious brood-patch, indicates that this bird had completed or nearly completed its initial period of incubation and had left its burrow to wait the return of its mate, The bird first seen flying over the island was very probably another individual.

There is previous published reference to a white-breasted shearwater in eastern Australia. Basset Hull (1916) writing of a visit to the Five Islands off

Wollongong, NSW, on 23 February 1913, recorded that E. S. Rohu had 'found one young bird which had a whitish breast, and he also shot and secured an adult white-breasted bird on the water in the vicinity. These birds were disposed of by Mr Rohu as *Puffinus gavia*'. Hindwood (1948) stated that the adult *P. gavia* referred to above is in the American Museum of Natural History, but that there is no trace of a white-breasted nestling petrel. The Fluttering Shearwater *P. gavia* has never been found nesting on any off-shore New South Welsh islands and although many ornithologists have visited the Five Islands since 1913 to investigate the breeding seabirds, no other white-breasted shearwater has ever been reported on any of them. It seems that the precise identification of Rohu's young bird with the whitish breast must remain unsolved.

On present evidence the white-phased birds must represent only a minute proportion of the breeding stock in eastern Australia and may be confined to the Solitary Group. The New Zealand bird discussed by Falla can be explained most rationally as a straggler, possibly from this population.

I wish to thank Mr H. J. de S. Disney and Dr D. L. Serventy for helpful comments and assistance during preparation of this paper.

S. G. LANE, *65 Wood Street, Lane Cove, NSW 2066.*
10 March 1972.

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USE OF TOOL BY ORANGE-WINGED SITTELLA

The following observations were made on 27 November 1971 in the Canberra Botanic Gardens by Mr K. Thaler and myself in clear and sunny weather. At the time of the observation brief notes, concerned mainly with identification of the birds, were made in a field-notebook. These notes were expanded the following day.

At approximately 11:50 a party of six to eight Orange-winged Sittellas *Neositta chrysoptera* was seen feeding on what appeared to be wood-borers in the branches of *Eucalyptus rossii, E. macrorhyncha* and *E. mannifera maculosa.* Neither of us then had binoculars, but throughout the period of observation the birds were always between four and eight metres above us. They were flying from tree to tree and feeding typically, travelling zig-zag along horizontal branches and down upright trunks and branches. After about ten minutes one bird, about 5 metres above us, seemed to be having trouble with a grub until we realized that it was using a small twig or strip of woody material about 30–40 mm long and about as thick as a match. Apparently the bird was repeatedly probing a hole with the strip which it held in its beak, not lengthwise but at an angle of about ten degrees. Finally it put the strip under its left foot and took a grub from the hole with its beak. After eating the grub it picked up the strip in its beak, moved along the branch for a short distance and repeated the performance. The birds were watched for five minutes and two others in the party were seen to do the same thing with what appeared to be twigs of similar size. The grubs that the birds were eating appeared to be 10–20 mm long. Observations then stopped as we had to attend to our duties as rangers.

A party of four birds was located later at 14:00 in a *Eucalyptus macrorhyncha.* This time I was alone and observed through 8 x 20 binoculars. I could watch the birds for only about three minutes before having to attend to my duties. I saw only one bird with a stick.

Mr Thaler located three birds at about 16:00, again in *E. macrorhyncha.* This time he used 8 x 40 binoculars and saw that the birds were using twigs.

Although the Sittellas carried the twigs in their beaks along the branch of the tree while they were hopping, they never carried the twigs when they flew, always dropping them before taking off. Birds were never seen to break off twigs before using them.

The above observations were made in good conditions and the birds were quite near us. Unfortunately lack of binoculars at the time of the first sighting, the interruptions in sightings and the fact that the birds were not seen to break off or pick up

twigs that they used tend to detract from the value of the observations. However, as a whole the observations seem acceptable enough.

The most interesting points are that the birds were watched for about ten minutes before the details of their behaviour became apparent, and that, once we realized that they were using twigs, several birds were noticed to be doing so. Perhaps this behaviour is more than a local trait handed on by example from one bird to another.

There is now a growing list of birds known to use tools. Birds that have been recorded using twigs or bark in their beaks to obtain prey are the Galapagos Woodpecker Finch *Camarhynchus pallidus* (Lack 1947, Darwin's Finches), the Galapagos Mangrove Finch *C. heliobates* (Curio and Kramer 1964, Z. Tierpsychol. 21: 223–234), the Brown-headed Nuthatch *Sitta pusilla* (Morse 1968, Wilson Bull. 80: 220–223) and the Eastern Shrike-Tit *Falcunculus frontatus* (Richards 1971, Aust. Bird Watcher 4: 97–98). The Satin Bowerbird uses a twig as a paintbrush (Chisholm 1954, Ibis 96: 380–383). Other birds use a hard surface to break open their food by banging or dropping the hard surface on the food or vice versa. Examples of the first are the White-winged Chough *Corcorax melanorhamphus*, which uses a mussel-shell as a hammer (Hobbs 1971, Emu 71: 84–85) and the Egyptian Vulture *Neophron percnopterus* and possibly (still not fully established) the Black-breasted Buzzard *Hamirostra melanosternon*, which drop or throw stones on eggs. Examples of the second are the Buff-breasted Pitta *Pitta versicolor* and the Song Thrush *Turdus philomelos*, which bang prey on anvils, and the Herring Gull *Larus argentatus* and the Lammergeier *Gypaetus barbatus*, which drop it on rocks.

It must be stressed that these observations need confirmation from other areas if this use of tools by the Orange-winged Sittella is to be accepted as one of its usual habits.

[Just before this note was sent to the printers, Chisholm published an interesting paper (Aust. Bird Watcher 4 (1972): 156–159) discussing the use of tools by birds generally, with pertinent comments on this use by Sittidae and Neosittidae.—Ed.]

C. GREEN, *Canberra Botanic Gardens, Clunies Ross Street, Canberra, ACT 2601.*
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