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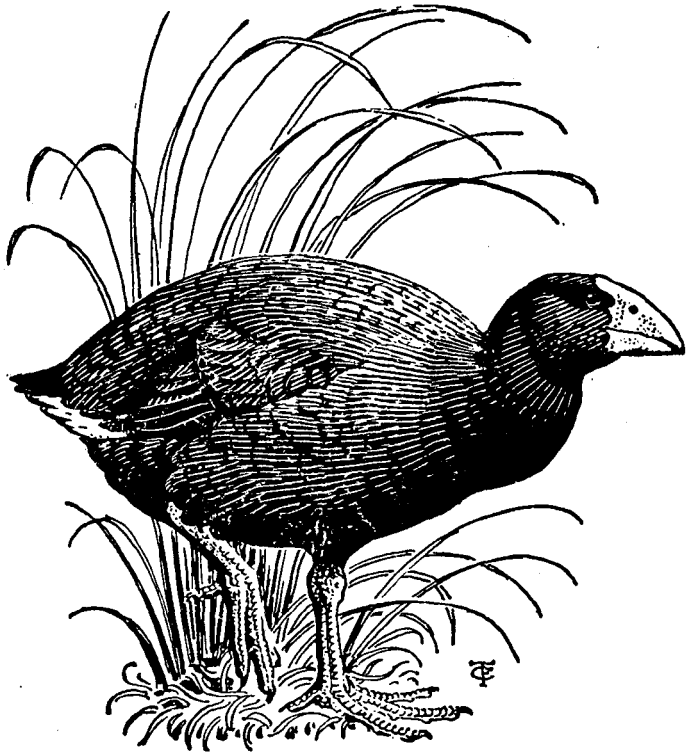

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NOTORNIS

In continuation of New Zealand Bird Notes

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(Incorporated)

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NOTORNIS

VOLUME TEN, NUMBER ONE - JUNE, NINETEEN SIXTY-TWO

A VISIT TO THE MERCURY ISLANDS

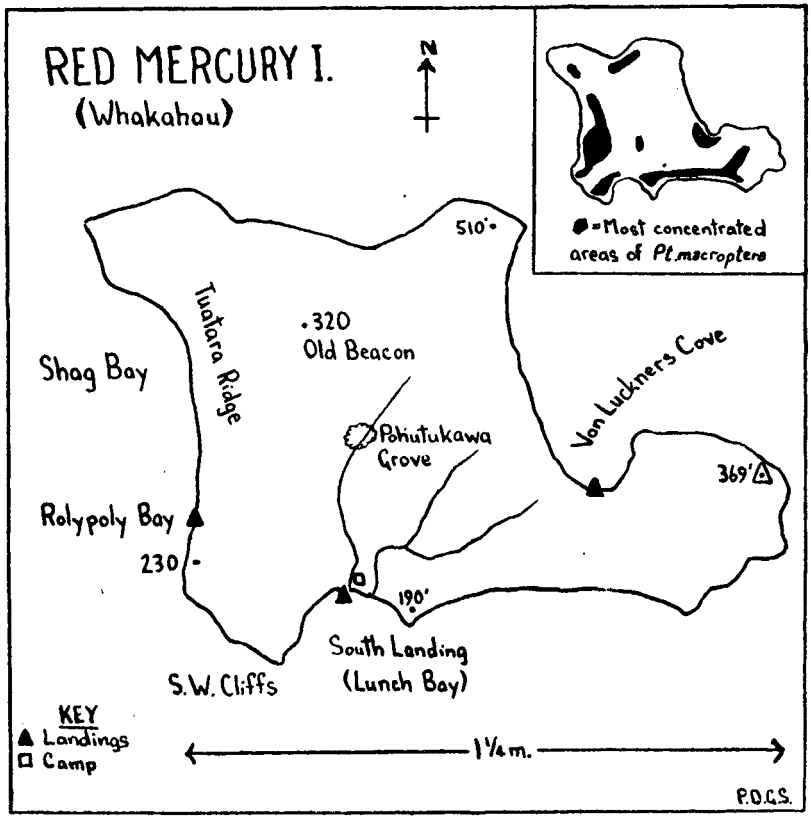
By A. T. EDGAR

The Mercury Islands were visited from 29th August till 12th September, 1961. The party was led by B. D. Bell, Wildlife Branch, Department of Internal Affairs, and included D. V. Merton and R. T. Hutchinson (Wild Life Officers); R. K. Blackburn, C. G. Cathie, D. G. Fenwick, M. J. Hogg, N. J. Ledgard, R. H. Sibson and P. D. G. Skegg (King's College Bird Club); A. Blackburn, R. B. Sibson, and A. T. Edgar (O.S.N.Z.). Transport from Auckland to and from Red Mercury, and from Red Mercury to Korapuki Island was provided by R.N.Z.F.A. Arataki. This account would be incomplete if it did not place on record our appreciation of the kind assistance given to the party by the Captain and ship's company of Arataki, and by Mr. J. Butterworth of Whitianga.

The Mercury Group consists of seven islands contained in a rectangle eleven miles by six miles (latitude 36°S, longitude 175°E) and lying off the east coast of the Coromandel peninsula. The southern shore of Great Mercury, the largest island, lies about four miles north of Tokorahu, the northern point of the peninsula which juts out between Mercury Bay and Whangapoua harbour, and the western point of the island lies about 12 miles east of Waikawau Bay; the relative positions of the other islands are shown on the sketch map. Mercury Bay was so named by Captain Cook, it being in this area that he observed the transit of Mercury in 1769. The Mercury Islands derive their name from their proximity to Mercury Bay; their alternative name, Iles d'Haussez, was recorded after they had been mapped by M. Lottin, who sailed under the command of Dumont d'Urville in the Astrolabe (1827).

Sailing from Auckland about 9.30 a.m., Arataki proceeded direct to Red Mercury, arriving there about 5 p.m. The plan was to camp on Red Mercury for about nine nights and on Great Mercury for five nights, working part of the group from each base. Apart from a few showers and dull periods, weather was fine for the first ten days, but a heavy swell ran for much of this period and on several days prevented launchings or landings. It was not till 8th September that a move could be made to Great Mercury; on that day the first two boat-loads got away in the morning without undue difficulty, but the swell worsened when the boat returned from its second trip and the rest of the party had to stay on Red Mercury till 11th September. The advance party took its tents, billies and part of the food, but the eating utensils were to go in the third boat and so did not arrive at Great Mercury for three days. Skilful improvisation dealt with this problem, but 36 hours of almost continuous and sometimes very heavy rain brought all operations on both islands to a standstill while everyone concentrated on keeping a fire going and the bedding dry. As a result of these unavoidable interferences to the planned programme, Middle and Green Islands were not visited, only a limited area of Great Mercury was covered, and no night work was practicable except on

Red Mercury, which island however was worked more thoroughly than would have been possible under the original plan. Besides study of bird life which was the main object, the less experienced members of the party had a good opportunity to improve their knowledge of plants, under the guidance of A.B., B.D.B., and R.B.S. The results of the expedition, though necessarily incomplete, provide a good basis for further study of a group which has in the past received less attention than most of the offshore islands. An unpublished report by Mr. L. C. Bell, who visited the group in February/March, 1951, was kindly made available by the Department of Internal Affairs, and proved most helpful.



Red Mercury (Whakahau) is about one mile from north to south and about 1.3 miles from east to west at its broadest point. There are cliffs round most of the coastline except behind South Landing (Lunch Bay) which provides an excellent camp site watered by two streams. The boulder beach offers a reasonably good landing when the wind is northerly, but can be difficult or impossible in fresh or strong winds from other quarters. On several occasions no more than a moderate swell obliged parties to embark from rock ledges at

the western end of the bay, and at all times transport of stores and gear over the boulders was an arduous task. On the evening of our arrival a southerly swell prevented landing at Lunch Bay, and for that night temporary camp was made at Southwest Landing (Rolypoly Bay), another boulder beach with a narrow strip of flat land between the beach and a steep hillside, but no water. On the east coast Von Luckner's Cove provides an anchorage sheltered from southerly and westerly winds and in suitable weather a reasonable landing, but only drip water from the cliff face appeared to be available. The island is undulating, rising to 320 ft. at the site of an old beacon, 369 ft. at the eastern point and 510 ft. at the north-east corner. On the northern side of the island the cliffs are relatively bare of vegetation but elsewhere pohutukawa has a good hold, with flax, ngaio and taupata on the lower slopes. The valley of the western stream is wooded, with a good variety of secondary growth trees, tree ferns and creepers, and a forest floor green with ferns; at the head of the valley there is a grove of old pohutukawas, and there are other groves on the steep slope behind Rolypoly Bay and to the west of Von Luckner's Cove. Karo is not common, but a few trees near the camp were a regular haunt of parakeets and bellbirds. There are a few kowhai trees in the wooded valley and many more on the banks of the eastern stream and on the scrub-clad slopes of the valley which it drains. The greater part of the island is covered in dense scrub, mainly mapou, mingi-mingi, hange-hange, tauhinu, maori broom and tough akepiro, not a great deal of manuka, which appears to be on the decline, suppressed by the vigorous growth of other species. Movement through the scrub is a slow and difficult operation. A good track was cut from Lunch Bay to Rolypoly Bay and this proved of great value for night banding work. The party spent one day east of the camp, working along the cliff edge to start with, then through thick scrub to the grove behind Von Luckner's Cove; down the cliff to the cove, up again across a big slip of bare earth and boulders to a small grassy slope on the headland, out to the eastern point and back along the boulders and undercliff of the southern shore. Another day the party worked from Lunch Bay to Rolypoly Bay, along the western shore, up the cliff and along the cliff top nearly to north-east point, thence back through scrub to the pohutukawa grove and down the western stream to camp.

The south-east point between Lunch Bay and Rolypoly Bay was well worked, and the greater part of the island was thus fully covered.

Double Island lies less than a mile to the west of Red Mercury, and consists of two small islands, rising steeply to 290 ft. and 360 ft. and joined by a boulder isthmus which is covered at high water. An attempt to land on 1st September was unsuccessful owing to the heavy swell, but on 6th September wind and sea were more favourable; a landing was made on the boulders and some hours spent ashore. The eastern island is well wooded, especially on the southern face; the western island has steep cliffs on the north, but the southern slopes are easier and under a cover of pohutukawa, taupata, rangiora and tawapou; some manuka on the high ridge, and on one steep slope a grassy patch is so honeycombed with Grey-faced Petrel burrows that it is difficult to walk over.

Stanley Island (Kawitihu) lies about $\frac{3}{4}$ mile south east of Double

Island, measures about 1 x ½ mile, and rises to 460 and 465 ft. at the two eastern corners, with red cliffs all round the coast, steepest on the northern side. On 3rd September a good landing was made on a shingle and boulder beach on the eastern side, where there is a continuous drip of fresh water; some pools of stagnant water were found on the northern cliff top. At the northern end of the island there are a few patches of thick scrub and one large slip of bare soil towards the west, but most of the area is under mahoe. Most of the southern end is under thick scrub, with a pohutukawa fringe and mahoe in the gullies. It was interesting to note that whereas on Red Mercury hangehange is very common and mahoe much less so, on Stanley mahoe is the dominant plant in suitable situations.

Middle (Flax) Island and Green Island (not visited) are steep well wooded islets lying between Stanley and Great Mercury. Logan Bell states that landing on Green Island is difficult except when the sea is calm, and the best time is at high water.

Korapuki (Rabbit Island) lying about a mile south of Green Island, is irregular in shape, about ½ mile long and less than ¼ mile wide, and rises to 245 ft. at the northern end. On 30th August a good landing was made on a stony beach on the western shore. Logan Bell quotes Dr. Falla and Mr. Sladden as stating that in 1925 much of the island was under grass and manuka, and reports that by 1951 there had been considerable regeneration of pohutukawa, flax, karo, mahoe and ngaio, with some grassland remaining at the northern end and scrub along the beach. Regeneration has continued during the last ten years; the steep slopes are covered with flax and young pohutukawas, mahoe is spreading quite strongly in sheltered positions but with the growing tips much browned off by wind on the ridge; kawakawa, poroporo and hymenanthera were also noted, and besides the ordinary manuka which persists on the ridges there were in a fairly sheltered area in the southern part of the island a few plants of a low growing and spreading habit, considered by A.B. to be *L. sinclairii*. Patches of grass remain on the ridges particularly at the northern end, and are heavily cropped by rabbits, which had also nibbled inkweed plants.

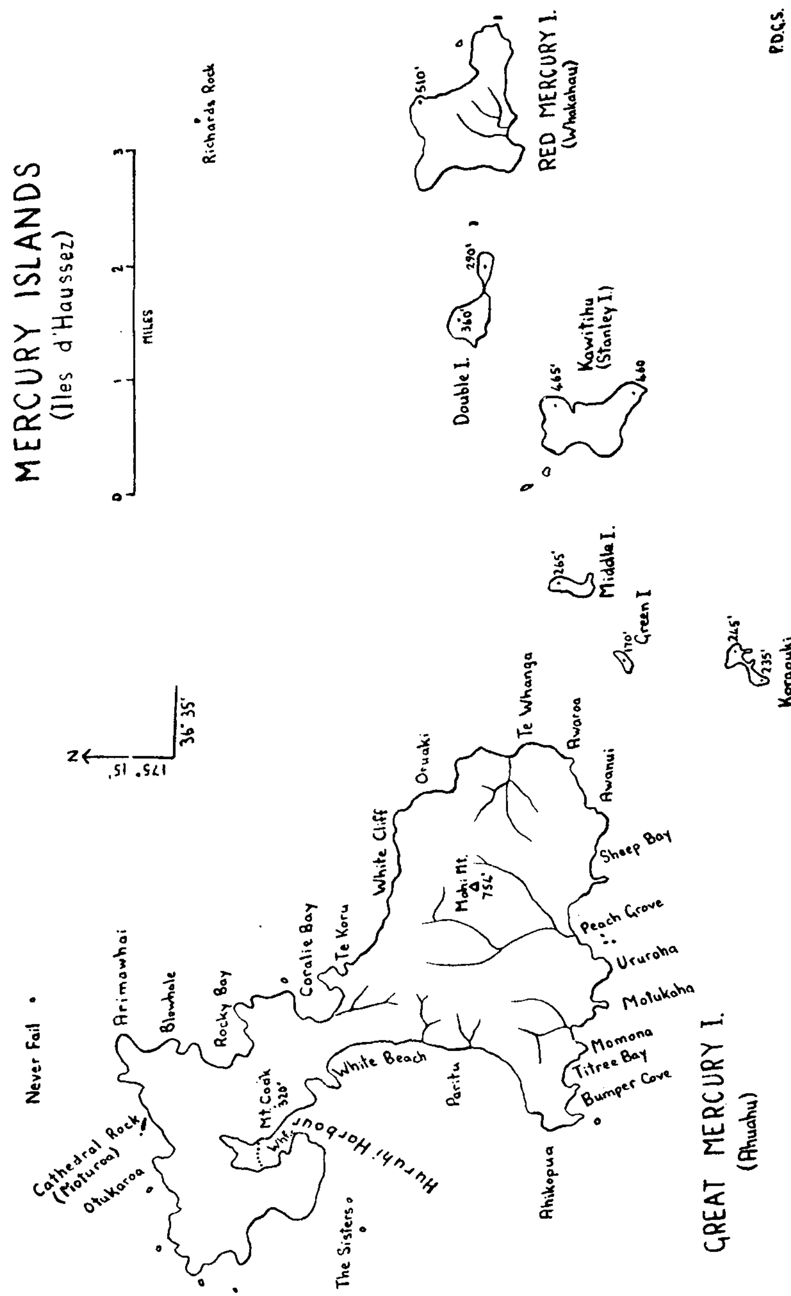
Great Mercury is owned and farmed by the Mizen and Delamore families and is partly under pasture, with considerable areas of scrub and gorse. Camp was made in a sheltered pohutukawa grove some distance inland from and at a higher level than the sandy beach of Sheep Bay, on the south coast of the island; for any future visit permission will be sought to camp further west in the bay known as Peach Grove, where there is an abundant supply of good stream water.

EVIDENCES OF PREVIOUS OCCUPATION

A collection of very old human bones was found under a large rock near the camp at Red Mercury. Fragments of obsidian were picked up on Red Mercury, Stanley, Korapuki and Great Mercury. Logan Bell records built up stone terraces on Double Island; we found the remains of small stone walls in the wooded valley on Red Mercury, and heaps of large grey stones on the ridge at Stanley.

MAMMALS

The Maori rat or Kiore *(Rattus exulans)* is common on Red Mercury. A number were seen during night banding operations, and


MERCURY ISLANDS
(Iles d'Haussez)
0 1 2 3
MILES
Richards Rock
RED MERCURY I.
(Whakahau)
510'
P.D.C.S.
Double I.
360'
290'
Kawitihu
(Stanley I.)
465'
660
Middle I.
265'
Green I
170'
Korapuki
245'
235'
175° 15'
36° 35'
N
Never Fail
Arimawhai
Blowhole
Rocky Bay
Coralie Bay
Te Koru
White Cliff
Oruaki
Te Whanga
Awaroa
Awanui
Sheep Bay
Mohi Mt.
756'
Peach Grove
Ururoha
Motukaha
Momona
Titree Bay
Bumper Cove
White Beach
Paritu
Ahikopua
Mt. Cook
320'
Whf.
Huruhi Harbour
Cathedral Rock
(Moturoa)
Otukaroa
The Sisters
GREAT MERCURY I.
(Ahuahu)

they became rather troublesome around camp (one night five were found in the bread box); a total of 27 were trapped. Logan Bell recorded rat droppings on Korapuki, and found on Double Island (as did our party) tawapou seeds of which the kernels had been eaten. We found a "store" of tawapou seeds on Red Mercury, in the rotten wood at the base of a small tree which had been cut or died back and then grown a double stem. Scattered damage to bark of taupata and mahoe at Stanley and Red Mercury was attributed to rats. Small squares of taupata bark had been eaten; the bark damage to young mahoe trees was of various types — one small sapling had been skinned up to about three feet from the ground, a fairly large patch at the base of an 8-inch circumference sapling had been eaten, small branches were found partially ringed, and small vertical or horizontal strips and small squares had been eaten on larger branches, up to 6 ft. from ground level.

Rabbits are present on Korapuki and on Stanley; as far as was seen they were not causing any significant damage to the vegetation, but may be holding back some regeneration, particularly on Korapuki.

On the afternoon of September 8th a big sea was running off Lunch Bay. A school of dolphins moving eastwards crossed the bay well out to sea and shortly afterwards three much larger creatures rounded the point closer inshore and followed the dolphins; from their large size and shark-like dorsal fins they were identified as Killer Whales.

REPTILES AND FISH

Only one Tuatara *(Sphenodon punctatus)* was seen. It was about 12 inches long, thought to be a female, and was found in a burrow, one of many in that part of the wooded valley on Red Mercury. A gecko was seen, and several brown skinks were observed among the boulders on the beach at Red Mercury. Logan Bell mentions black skinks living among dark brown dried seaweed on the beach at Korapuki.

A 9-inch native trout or Kokopu *(Galaxias fasciatus)* was found in the western stream and freshwater eels (Tuna) in both the streams on Red Mercury. Welcome additions to camp rations were gifts of crayfish and hapuka from Mr. Butterworth and snapper, red moki, rock cod and conger eel caught by members of the party.

BIRDS

Dr. R. A. Falla (The Distribution and Breeding Habits of Petrels in Northern New Zealand, Records of the Auckland Institute and Museum, Vol. I, No. 5, July 1934) records breeding on the Mercury Islands of petrel species *Pelagodroma marina, Puffinus carneipes, P. gavia* and *Pterodroma macroptera.* To these can now be added *Puffinus assimilis* and *Pelecanoides urinatrix.*

The banding record is as follows:—

P. macroptera	800
P. gavia	24
P. assimilis	42
Total Bandings	866

About 150 birds were banded around the camp area at Lunch Bay, the balance mostly on the steep wooded slopes behind Rolypoly Bay; on the first night of our stay this very productive area gave 200 *P. macroptera* plus 6 *P. assimilis* bandings.

Bellbirds, Red-fronted Parakeets, Fantail, Grey Warbler, Silver-eye, Kingfisher, Morepork and Harrier were observed on all the islands. No pipits were seen but no doubt these occur on Great Mercury. Tuis were scarce or absent, but probably occur in greater numbers when the pohutukawa is in flower. No Pigeon were seen, but Mr. Butterworth states that they sometimes visit the smaller islands.

Distribution of Parakeets, Owls and Passerines

Native Birds	*Red Mercury*	*Double Island*	*Stanley*	*Korapuki*	*Great Mercury*
N.Z. Parakeet	x	x	x	x	v
Morepork	a	v	v	–	v
Fantail	x	v	x	a	v
Grey Warbler	x	v	v	v	v
Bellbird	x	v	x	v	v
Tui	2	–	–	1	v
White-eye	x	v	v	v	v
European Birds					
Skylark	–	–	–	–	v
Song Thrush	–	–	–	–	v
Blackbird	a	a	a	v	v
Dunnock	a	v	v	–	v
Redpoll	–	–	–	–	v
Chaffinch	a	v	–	–	v
Yellowhammer	–	–	–	–	v
House Sparrow	–	–	–	–	v
Starling	v	v	v	–	v

Legend: x = population estimated at over 20 pairs
a = less abundant, probably 5 - 10 pairs
v = observed, but no estimate of numbers made.

The ornithology of Great Mercury will repay further investigation. Only a small part of the island was covered on this visit, and it is fairly certain that many additions could be made to the list of species if the island was thoroughly worked. It appears that some of the passerines may breed rather later on Great Mercury than on the mainland; Skylarks, White-eyes, Chaffinches and Yellowhammers were still in flocks on 12th September. Around Auckland flocks had generally begun to break up by the end of August.

NOTES ON SPECIES

(Including those observed from the ship on outward and homeward passages)

NORTHERN BLUE PENGUIN — Numerous and breeding. Tracks and droppings were found on all islands visited, and about 9 p.m. on 10th September 49 birds were counted clambering over the boulders on a 250-yard stretch of beach near the camp at Red

Mercury; this was by no means the total number coming in from the sea on this small part of the coast as when a bird was caught for examination its squawks were answered by many birds which from the direction of their cries would not have been included in the visual count. One bird came into the camp on 31st August and waddled right up to the entrance of a tent, apparently undisturbed by the light of an oil lamp burning within. At Von Luckner's Cove there is a broad, clearly defined penguin track leading up to the top of the cliff, and burrows were found far up other hillsides, in scrub, as well as close to the beach. A burrow on the cliff face at Lunch Bay was empty when examined on 30th August, but contained an egg when re-examined the following day.

NELLY — Single birds were seen offshore from Double Island (1st September) and Red Mercury (6th September); one in Auckland harbour mouth on the outward journey; two off Cape Colville and two young birds in Hauraki Gulf on the return journey.

CAPE PIGEON — One in Hauraki Gulf on the outward journey; on 30th August a single bird followed Arataki from off Red Mercury as far as Korapuki; it sailed around, settled on the water close alongside, and accepted bits of bread thrown to it from the ship.

BROAD-BILLED PRION — A corpse was found on the beach at Great Mercury, in a condition which indicated that it had probably been cast up in the June, 1961, gales.

BULLER'S SHEARWATER — None seen on the outward passage or around the islands, but on the homeward passage (12th September) c. 17 birds (8 in a party) were noted in Hauraki Gulf between Waiheke and the Noises, together with numerous parties of Fluttering Shearwaters. Logan Bell mentions that Buller's Shearwater nests on the north shore of Red Mercury but it is understood that this statement needs confirmation, being based on sighting of a large concentration offshore by Dr. Falla and Mr. Sladden.

FLUTTERING SHEARWATER — Small and large parties in Hauraki Gulf on the outward and return journeys were sometimes alone, sometimes associating with White-fronted Terns and on the return journey, when over 1000 were seen, with Buller's Shearwaters also. Parties off Red Mercury and Korapuki associated with Red-billed Gulls feeding offshore; on 31st August after a day of strong north-east winds and high seas the wind changed to north-west in the afternoon, and of a great congregation of petrels wheeling far out to sea but visible from the shore, roughly 30% were Fluttering or Allied and 70% probably Grey-faced.

P. gavia and *P. assimilis* came in from the sea rather later than did *P. macroptera,* and the first *P. gavia* calls were heard between 53 and 68 minutes after sunset, when it was quite dark. The normal full call sounded like "ka-how ka-how ka-how ka-how kehek kehek kehek kehek errr"; the "kehek" is sharper, faster and slightly higher pitched than the "ka-how," and the final "err" tails off as a rather drawn-out note, at a lower pitch. Another version sounds like "ka-how ka-how ka-how ka-how ke-errr ke-errr." The birds were noisiest on 4th and 5th September, much quieter on 6th September when the main call heard was the usual series

of "ka-how . . ." followed by a short series of "errr . . ."; in some cases the "ka-how . . ." series was omitted. Morning departure was spread over the period between 3.30 and 5 a.m. (a few laggards as late as 5.30 a.m., sunrise at this time being around 6.35 a.m.) and though quite a lot of calling was heard, was much less noisy than the period of arrival. On the morning of 5th September some of the outgoing birds produced yet another call which sounded like "ke-hoo oo-oo." All the above calls of *P. gavia* have a disyllabic quality by which we considered we could distinguish them from the multisyllabic calls of *P. assimilus;* on the night of 7th September, just before a spell of bad weather, we heard a new call, a rapid "kuk-kuk-kuk" or "kuk-kuk-kuk-kuk"; this is probably the "sound resembling the cackling of a fowl, especially before bad or wet weather" (Oliver, quoting Reischek). To our ears it was vaguely reminiscent of the sound of distant short bursts of automatic fire.

We were too early for eggs, but unoccupied burrows with white breast feathers identified as those of *P. gavia* were found on the slopes of Korapuki. On Red Mercury similar burrows were found on the western cliff and elsewhere, frequently near or actually under rocks. A proportion of the birds banded were caught at Rolypoly Bay, the balance at Lunch Bay mostly not far above boulder level on the taupata/ice plant slopes, two actually on the boulders. Although the full breeding population may not yet have been coming ashore, the number of birds heard coming in was still greater than the small number of bandings (24) would indicate; this is probably because most of the banding operations took place in the wooded areas where the population of *P. macroptera* was greatest, but which situations were less favoured by *P. gavia.*

ALLIED SHEARWATER — On Red Mercury 15 birds were banded in Lunch Bay and 27 in Rolypoly Bay, in the wooded areas which also carried the greatest numbers of *P. macroptera* burrows. Unoccupied burrows with small entrance holes and scattered feathers thought to be those of *P. assimilis* were also found at the top of the northern cliff, in an area thinly occupied by *P. macroptera.* An adult bird was found in a burrow on Korapuki, but none on Stanley or Double Islands. Burrows were generally 3-4 ft. long, the chamber usually lined with a few leaves (pohutukawa, karamu, mahoe or rangiora); one nest also contained some penguin feathers and breast feathers of *P. assimilis.*

Although the species is normally classified as a winter breeder it is evident that the season on Mercury Islands is considerably extended. A young bird (estimated age 21 days) was found in a burrow on September 5th; on three occasions (September 1st, 4th and 5th) burrows inspected at night were found to contain two birds and in each case a third bird was sitting outside the burrow; the bill of the Korapuki bird (August 30th) was caked with soil as if it had recently been burrowing; one bird taken from a burrow was considered from the condition of the cloaca to be a hen which would shortly lay; and on September 3rd near Western Stream an unlined burrow was found to contain a fresh egg.

Like *P. gavia, P. assimilis* came in from the sea about an hour after sunset and departed about two hours before sunrise; both species are much more active on the ground than the sluggish *P. macroptera* and therefore less easily caught for banding. The *P. macroptera; P. assimilis* banding ratio of 800: 42 is probably much more closely related to actual population than the *P. macroptera; P. gavia* ratio 800: 24. Unlike *P. macroptera* and *P. gavia* which appear on coming in from the sea to pass through the canopy of foliage and land directly on the ground, quite a number of *P. assimilis* were seen in branches of trees up to 20 ft. above ground; there was no indication that these birds were distressed and it seemed that they were merely making the descent in two stages, first landing in the foliage, later dropping from the branches to the ground. All birds seen in such situations were observed during the early part of the night, so it is unlikely that they had climbed the trees for the purpose of take-off.

The normal call is a rapid "kakakakakakak urrr," repeated; it reminds one of the cackle of a hen after it has laid an egg, the "urrr" sounding as if uttered while drawing breath. On the outward flight a slightly modulated call "hek hok how hek" repeated once or twice with pauses between series, was sometimes heard and attributed to this species.

GREY-FACED PETREL — Found breeding on all islands visited, and by far the most abundant species on the smaller islands of the group. On Great Mercury (Sheep Bay) a few birds were heard calling, a few burrows were found, also one dead bird partly plucked (perhaps by a Harrier); we were told that burrows can also be found in other parts of the island. On Red Mercury the greatest concentration of burrows was on the steep wooded slope behind Rolypoly Bay; numerous burrows were also found behind Lunch Bay and Von Luckner's Cove and all the way up the valley of the western stream; there were scattered burrows on top of the northern cliffs but very few in the areas of dense scrub. The same preference for wooded areas with a relatively bare floor was noted on other islands; on Double Island however an open grassy patch was so honeycombed with burrows that it was difficult to walk over. The burrows of *P. gavia* and *P. assimilis* had smaller entrance holes and were generally longer than those of *P. macroptera,* often with a bend in the tunnel; *P. macroptera* burrows had a large entrance hole, were usually about arm's length and straight. Two burrows were longer (about 5 ft.); one was straight, the other so curved that in plan the egg chamber was only a little forward of the entrance hole.

The main hatching apparently took place in the last week of August and the first week of September. Numerous chicks, estimated to have been hatched between August 21st and September 4th were in sooty grey down with black bills and dark grey feet. A number of addled eggs found lying on the ground had probably been laid "wild." and a number of broken eggshells had probably been cast out from burrows. Writing of the Manx Shearwater, Lockley (1942) states that when two eggs were laid in a nest, neither would hatch. On September 6th we found a burrow containing two eggs; one of these was stone cold and apparently addled, but the other was fertile, and just chipping.

A ten-day-old chick when handled spewed its oily stomach contents all over the handler; a sample contained the remains of an euphausid shrimp and the eye of a small fish. It was noted that burrows containing chicks sometimes had a quantity of sticks and leaf litter in the entrance, which had the appearance of having been placed in position. We were informed that some mutton-birding is done on Red Mercury.

Grey-faced Petrels began to assemble fairly close inshore some time before dusk, earlier on dull cloudy days. The species is seldom seen near the coast except when arriving at or departing from its breeding ground, but on four days of strong winds large dark petrels, which could only have been this species, were seen during the early afternoon wheeling and careening well out to sea but within the limit of visibility, in numbers estimated from 3 - 5000; during the north-easterly storm of September 9th birds were seen closer inshore throughout the day, tearing past the bay low over the waves.

P. macroptera came in from the sea earlier than did *Puffinus* sp. The first birds were timed as arriving at sunset plus 23 - 28 minutes, and often circled round for a time before the final descent (unlike the shearwaters which appeared to fly in more directly to their point of landing). Departure took place about two hours before sunrise. For the first four nights (August 29 - September 1) incoming birds were very noisy; on August 29 - 30 calling continued through most of the night, but lessened progessively thereafter and by September 5th the volume of calling was greatly reduced. Our stay on the islands coincided with a waning moon (full moon August 26) so the light factor would not have affected the number of birds coming in from the sea. The progressive decrease in numbers banded at Rolypoly Bay (August 29th, 200; 31st, 165; September 3rd, 148; 4th, 110; 6th, 62) may indicate that with increasing age of the chicks decreasing numbers of adults came ashore on successive nights.

The call of the Grey-faced Petrel is well expressed by its Maori name Oi. In the early part of our stay calls were loud and long drawn out (oooo-ii) but became shorter as the time went on, and less noisy. The calls of incoming birds were answered from the burrows by softer "*oii*" notes and a variety of squeaks and creaks; as the days passed a number of the incoming birds modified their calls to something not very different from the normal response notes of birds already ashore.

P. macroptera moves less easily on land than do *Puffinus* sp., and is easier to catch for banding but capable of inflicting some damage to the hand of the catcher, if not grasped so that it cannot twist its neck around to peck. Less mobile than the smaller species, it often sits for a long time in one place, on the ground or on a rock, not necessarily near the entrance to a burrow. One bird sat still for 20 minutes apparently unworried by being twice approached to within three feet with torchlight and camera. The camp fire had an unfortunate attraction for one or two birds.

An attempt was made to estimate the *P. macroptera* population. A calculation based on the banding records from Rolypoly

Bay (estimated as 50% of the population of this well worked block) and on the estimated area of that block plus the areas of other blocks in which the number of burrows indicated a population of similar density, and making allowance for the population of scattered burrows in less favoured areas, gave an answer of c. 5000 pairs on Red Mercury. Comparative calculations made for Stanley, Korapuki and Double Islands, all of which have proportionately larger areas suitable for *P. macroptera* nesting, brought the total estimated population for the four islands to c. 13000 pairs.

WHITE-FACED STORM PETREL — About a dozen of these delightful little petrels were seen at sea in ones and twos, skimming just above the waves, banking steeply till one wing tip almost touched the water, then with a patter of feet and a little bounce swinging over as if to balance on the opposite wing tip. After dark on 2nd September c. 100 birds flew around the light of Mr. Butterworth's boat from which a party was fishing, off the west coast of Red Mercury. Falla (1934) records breeding at Mercury Islands, eggs in the last ten days of October.

DIVING PETREL — About a score were seen in ones and twos on the outward journey, flying with hurried wing beats, and diving. One bird which surfaced from a dive just ahead of the ship made a great effort to take off but apparently could not quite manage it in time so took avoiding action by diving again. A few birds were seen at sea between Red Mercury and Korapuki, and one flew to the light of Mr. Butterworth's boat on the night of 2nd September. Feathers attributed to this species were picked up on Korapuki and two birds which came ashore at Rolypoly Bay were seen in the beam of a torch but scuttled off before they could be caught. On Stanley Island a dead bird was picked up on the beach, and a colony of over 100 burrows was found on a steep grass/taupata/ice-plant slope just south of the eastern landing, the lowest burrows being about 30 ft. above high water mark; probably because of the very shallow soil layer many of the burrows had been constructed so that they lay parallel to the cliff face. Several burrows examined contained an egg; some burrows were open at both ends — when a hand was inserted at the entrance the sitting bird shot out at the exit.

GANNET — Numerous birds were seen offshore from Bush Island and Horuhoru gannetries and on the homeward voyage a string of birds flew along offshore from Coromandel Peninsula as if making for Mahuki; one bird was trailing a long piece of brown seaweed. Off Red Mercury from two to ten birds were seen almost daily, flying past the bay or fishing off shore.

BLACK SHAG — A single bird off Red Mercury, 5th September.

PIED SHAG — Sighted off Double Island, ten birds on a rock stack at Korapuki. Colonies at Stanley Island (four nests on pohutukawas at the foot of the western cliff, one probably still containing chicks as both parents set up a clamour when a Black-backed Gull flew past); Red Mercury western shore, five nests, one still occupied, in a pohutukawa grove a little way back from the boulder beach; Great Mercury (Peach Grove) 53 nests in seven pohutukawa trees

about 200 yards upstream; some well grown young had left the nest, nestlings were seen in all stages of growth, and a few nests probably still had eggs; the adults were surprisingly unafraid and allowed themselves to be approached and photographed at close range.

LITTLE SHAG — In the Peach Grove Pied Shag colony were also six White-throated and two Little Pied Shags, sitting alongside nests. They had apparently not yet laid, and were very wary. Only two sightings on the outer islands, probably the same bird, an immature in dark plumage which had wandered far from home.

GREY DUCK — Five seen at Great Mercury.

HARRIER — Three sightings of single birds on Red Mercury, one at Korapuki, two birds at Double and three birds at Stanley; three birds at Great Mercury. Two of the Stanley birds were uttering short calls and may have been courting. Harriers probably move about between the islands; on the outward passage a bird was seen flying from Great Barrier to the mainland.

VARIABLE OYSTERCATCHER — One bird at Peach Grove Beach on 11th September (C.G.C.).

BANDED DOTTEREL — Six birds at White Beach, Great Mercury.

NEW ZEALAND DOTTEREL — One pair at White Beach.

ARCTIC SKUA — Three dark phase birds chasing White-fronted Terns between Waiheke and the Noises, September 12th.

BLACK-BACKED GULL — Scattered throughout the islands in small numbers. No evidence of breeding, but probably individual pairs have established territory on all the islands, and we were told by J.B. that nests have been seen near the boulder beach on Double Island.

RED-BILLED GULL — Off Red Mercury the daily tally of birds fishing offshore varied from a dozen to 200, and parties were seen off Double and Korapuki. At Sheep Bay there is a bird with a club foot.

CASPIAN TERN — Odd birds seen off Red Mercury, Double, and Sheep Bay.

WHITE-FRONTED TERN — Large numbers in Hauraki Gulf on the return voyage, often with Fluttering Shearwaters; Great Mercury, parties of up to 40 birds seen offshore and a few birds on rocks at Long Beach; the only sightings at the outer islands were three birds off Red Mercury on 3rd and again on 10th September.

RED-FRONTED PARAKEET — Ranking third in order of abundance among land-birds on Red Mercury, after Bellbird and Grey Warbler, Parakeets were always first to announce their presence in the morning, chattering among the karo and pohutukawa trees just before sunrise. They were relatively more plentiful on the small but heavily wooded Korapuki and Double than on the larger Red Mercury and Stanley, where there are extensive areas of scrub; present but rather scarce on Great Mercury. Small flocks were seen on the outer islands but it seemed that pairing was starting; one dead bird was found.

MOREPORK — Probably about 5-6 pairs on Red Mercury. A bird seen on Double Island was sitting near what seemed to be a nest hole in a pohutukawa branch about 15 ft. above ground. In Red Mercury woods two Moreporks were perched just above the corpse of a Blackbird; after watching us for a minute or two first one, then the other, flew silently away in different directions; shortly afterwards one was heard calling (about 3 p.m.) as if to attract its mate. Although we did not see a Morepork on Korapuki we did find a dead Blackbird, partially plucked as was that mentioned above. Present on Great Mercury.

KINGFISHER — Present in small numbers on all islands visited.

SKYLARK — Absent from the outer islands. Individuals and a flock of 10 birds on Great Mercury, where it is common.

FANTAIL — Inquisitive and conspicuous in woods and scrub on all islands; frequently seen flycatching over the boulders at the edge of the tide. Two old nests were found.

GREY WARBLER — Singing freely, the first morning song starting after Parakeets and Bellbirds. Usual song was as around Auckland, with a "dropped" note between series of trills, but one of a pair which appeared to be courting uttered a quick succession of trills with short pauses between but omitting the "dropped" note.

SONG THRUSH — Present on Great Mercury in small numbers but apparently absent from the outer islands.

BLACKBIRD — Blackbirds on the outer islands were shy, and from the number of corpses found (5 on Red Mercury, one on Korapuki) appear to lead rather a hard life. Two corpses (one found at the entrance to a burrow) were more or less intact; one had the brains eaten, the others were partially plucked. Moreporks are probably partly responsible for the mortality. Two old nests were found, one with a parakeet feather in the construction; two fighting males at Sheep Bay, Great Mercury.

DUNNOCK — Song heard daily on Red Mercury, and Great Mercury: seen on Double Island.

BELLBIRD — The most common passerine on Red Mercury, relatively more numerous on Stanley, quite plentiful on Korapuki and Double, scarce on Great Mercury. On Red Mercury the poulation was not so dense as to produce a morning chorus, but two pairs around the camp provided good melody; most of the song was in modulated 4-7 note phrases. Birds were seen feeding on the flowers of kowhai and karo.

TUI — Only three birds sighted, but Tuis probably visit the islands when pohutukawas are in bloom.

WHITE-EYE — Small parties on the outer islands and a flock of 40+ on Great Mercury. Song heard at Red Mercury on 31st August; an old nest was found on Stanley. Birds were feeding on kowhai and ngaio.

LESSER REDPOLL — Two separate sightings on Great Mercury (R.B.S.).

CHAFFINCH — Birds seen on Red Mercury and Double Island, but no song heard. Common on Great Mercury, flocks of up to 15 birds.

YELLOWHAMMER — Common on Great Mercury (one flock of 23 birds) but not seen on outer islands.

SPARROW — None seen on outer islands; 15 in a flock at Great Mercury.

STARLING — Common on Great Mercury (one flock c. 50 birds); small parties on and around Double Island and Red Mercury, seven birds on the cliff at Stanley (according to J.B. much larger numbers are sometimes seen there). A good deal of movement takes place between the islands, and flocks of 30-40 birds were seen offshore on several occasions. One flock seen near Stanley included an albino bird. Some birds use the outer islands as a roost; one evening a flock of 40 flew along the south coast of Great Mercury heading for Red Mercury, and c. 20 were seen leaving the western shore of Red Mercury at first light on 30th August.

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EXTINCTION AND THE LAND AND FRESHWATER-INHABITING BIRDS OF NEW ZEALAND

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The depletion of New Zealand's avifauna since the first impact of European man on these islands is often cited as a melancholy example of the results to be expected from the ever-increasing effect of modern man upon natural ecosystems. But unfortunate though these results may have been, the degree to which they have hastened the extinction of various species is frequently overemphasised. Early local authors were understandably pessimistic at a time when rapid changes were occurring and wholesale exterminations seemed imminent (Buller 1873, 1888, 1905) and this mood has been echoed by many other authors since. Even the following cautious statement by Lack (1954: 202) seems to imply widespread extinction: "A casual impression would suggest that the native birds have been largely driven out by Palaearctic introductions." (It also implies a competition that has not yet been shown to occur, as does the comment by Hesse, Allee and Schmidt (1951: 113) that "the endemic birds of New Zealand give way before the buntings, starlings and goldfinches.") These statements no doubt originate from such influential local authorities as Buller (1905: xxxiii) and Oliver (1930). A healthy scepticism about such assumptions, for example that of Myers (1923) is seldom quoted. Great though the diminution in numbers has been since European settlement, only a few species have become totally extinct, in spite of the extensive changes that have taken place in the environment and in spite of the introduction and establishment of a comprehensive new fauna of mammals, birds and insects. The number of bird species dying out before 1800 far exceeds that vanishing since; though when

New Zealand is considered as a whole, the obvious changes in the environment over the last 160 years appear, superficially at least, to have been greater and more sudden than those of the previous 1600 or so.

A start has been made in the study of the historical changes in the patterns of distribution of rare New Zealand birds and of their population ecology (Turbott 1957, Williams 1956, 1960b) but this is in only a preliminary stage. By careful study of the changes in the distribution of species that have become extinct or near-extinct, it may be possible to decide whether there is any common pattern. Should one be found it might offer a clue to causes, either pre- or post-human.

In this paper I deal only with land- and freshwater-inhabiting birds (in which groups by far the greatest number of extinctions of New Zealand birds has occurred) and my definition of "New Zealand" includes only the North Island (44,000 sq. m.), South Island (58,000 sq.m.), Stewart Island (670 sq.m.) and the Chatham group (370 sq.m.). Unless otherwise stated, the small offshore islands of each of these major subdivisions will be considered part of the nearest mainland. The North Island is separated from the South by Cook Strait which has a minimum width of 15 miles. Foveaux Strait, 20 miles wide, separates the South Island from Stewart Island. The Chathams lie 400 miles ESE of the South Island.

Other islands generally included in the New Zealand faunal area: the Kermadecs, Bountys, Antipodes, Snares, Aucklands, Campbell and Macquarie, have not been included in this paper on the grounds that in most instances a great deal more needs to be learned about their early avifaunas and the changes that have taken place in them in historic times.

The extinct species are listed in some detail and there is a brief account of the status of each of those apparently in danger of extinction. The data at present are such that speculation about causes cannot be usefully advanced much beyond what has already appeared (Williams 1956, 1960b). That is, briefly, that a too-ready acceptance of theories suggesting human interference (direct or indirect) as the prime cause is unjustified. Extinction is a common natural process which can occur in a number of ways. (For the final stages of the process genetical theory offers some attractive explanations involving the Sewall-Wright effect, population size and variations in selection pressure.)

PRE-EUROPEAN EXTINCTIONS

Relying mainly upon Oliver (1955), the Checklist of New Zealand birds (Fleming *et al.* 1953), Dawson (1958, 1959, 1960) and Scarlett (pers. comm.), I find that approximately 40 full species have become extinct in Recent times before European settlement. How many of these have vanished since the arrival of Polynesian man in New Zealand approximately 1000 or more years ago cannot at present be decided, but it is safe to say that a number have. Fleming (1953) thinks most have. Eventually many of the remains may be dated by radioactive techniques and light may then be thrown on the order in which the species became extinct and the rate at which the process took place; but it is important to point out that the finding of bones in middens with a frequency of occurrence that diminishes as the end of the 18th or 19th century is approached is no proof that human predation has been an important cause of this diminution. The process could well have been going on independently of either hunting or habitat

destruction; and the point has already been made (Williams 1956, 1960b) that there must have been very extensive sparsely-populated or mountainous areas which remained virtually unmodified or unexploited by the moderate pre-European Polynesian population of these islands. Yet even in such areas diminutions and extinctions occurred and especially would this be true of the South Island.

The extinct forms consist of about 25 species of moa (the number depending upon the system of classification adopted), at least six species of rail (a number of new species have yet to be described — Scarlett, pers. comm.), five of waterfowl, a hawk, an eagle, two snipe and a crow. Nearly all of these are endemic genera, the moas being also an endemic order. Distribution is as follows:—

NORTH ISLAND (about 23 species)

Moas (about 15 species of the genera *Pachyornis, Euryapteryx* (which includes *Zelornis* — Scarlett, pers. comm.), *Anomalopteryx, Dinornis*);

Rails: the Cave Rail *Capellirallus karamu,* N.I. Takahe, *Notornis m. mantelli,** aptornis, *Aptornis otidiformis* (= *A. defossor* — Scarlett, pers. comm.); waterfowl: N.I. Goose, *Cnemiornis septentrionalis* (= *C. gracilis*), Chatham Island Swan, *Chenopis sumnerensis* (? = *C. chathamicus*); Large N.Z. Harrier, *Circus teauteensis*† (? = *C. hamiltoni*, ? = *C. eyelsi*) (Dawson 1958), N.Z. Eagle, *Harpagornis moorei;* N.Z. Crow, *Palaeocorax moriorum.*

SOUTH ISLAND (about 31 species)

Moas (about 19 species of the genera *Pachyornis, Euryapteryx, Anomalopteryx, Dinornis, Emeus, Megalapteryx*); the Little Weka, *Gallirallus minor,*† N.Z. Gallinule, *Pyramida hodgeni,* aptornis, N.Z. Coot, *Palaeolimnas chathamensis;* Finsch's Duck, *Euryanas finschi,* S.I. Goose, *Cnemiornis calcitrans,* Chatham Island Swan, Auckland Island Merganser, *Mergus australis;* snipe, *Coenocorypha ?aucklandica** (Scarlett, pers. comm.); N.Z. Eagle (I accept Oliver's suggestion that *H. moorei* and *H. assimilis* may be conspecific), Large N.Z. Harrier; N.Z. crow.

STEWART ISLAND (3 species)

Moa *Euryapteryx gravis, Euryapteryx* n.sp. (Scarlett 1957); Little Weka (Scarlett pers. comm.).

CHATHAM ISLANDS (12 species)

Giant Rail, *Diaphorapteryx hawkinsi,* N.Z. Coot, Little Weka (Falla 1960), Weka, *Gallirallus australis;** Chatham Island Swan, C.I. Duck, *Pachyanas chathamica.* Extinct C.I. Snipe, *Coenocorypha chathamica;*† Kakapo *Strigops habroptilus,** Kaka, *Nestor meridionalis;** N.Z. Falcon, *Falco novaeseelandiae;** Laughing Owl, *Sceloglaux albifacies;** N.Z. Crow.

This list will no doubt have to be modified as our knowledge increases. Even now, little is known of the early avifauna of sparsely-settled Stewart Island or of much of the west coast of the South Island. Some of the species represented by midden remains may not be truly native to the area where these remains have been found.

I have not accepted the Pink-eared Duck *Malacorhynchus* (see Oliver 1955) or the Musk Duck *Biziura* (see Dawson 1958) as natives because both could have been Australian vagrants; and the claim for

* Species still extant elsewhere in New Zealand
† Genus still extant elsewhere in New Zealand

a local species of the Cape Barren Goose *(Cereopsis novaehollandiae)* cannot at present be maintained (Dawson 1960). Phillips (1959) has proposed that the North Island Takahe may have lingered on until the end of the 19th century, though I consider the evidence unsatisfactory. It is likely that the moa *Megalapteryx* may have survived into European times in the South Island.

EXTINCTIONS OCCURRING IN EUROPEAN TIMES

Over approximately the last 160 years, five full species and five subspecies have become totally extinct — perhaps rather fewer than might be expected when one considers the great changes that have occurred in New Zealand environments during this period. In addition, two subspecies have become locally extinct in the South Island and three full species locally extinct in the Chathams. Distribution and the approximate dates of extinction, or of the last official record, of these birds are as follows:—

NORTH ISLAND (5 species)

N.Z. Quail *Coturnix n. novaezealandiae*
1860-70 (Buller 1883, 1905)

Little Barrier Snipe *Coenocorypha aucklandica barrierensis**
1870 (Oliver 1955)
(Turbott 1961)

N.I. Kakapo *Strigops habroptilus innomminatus**
1930 (Williams 1956)

N.I. Laughing Owl *Sceloglaux albifacies rufifacies**
1890 (Williams unpubl.)

Huia *Heteralocha* (=*Neomorpha*) *acutirostris*
1907 (Oliver 1955)

SOUTH ISLAND (4 species)

N.Z. Quail
1875 (Buller 1883)

Eastern Weka *Gallirallus australis hectori***
1920 (Oliver 1955)

S.I. Saddleback *Philesturnus c. carunculatus***
1925 (Williams unpubl.)

Stephen Island Wren *Xenicus lyalli*†
1894 (Buller 1905)

STEWART ISLAND (none)

CHATHAM ISLANDS (7 species)

All dates from Fleming (1939)

C.I. Fernbird *Bowdleria punctata rufescens**	1900
Brown Teal *Anas castanea chlorotis***	1915
Shoveler *Anas rhynchotis variegata***	1925
C.I. Rail *Rallus modestus*†	1900
Dieffenbach's Rail *R. dieffenbachi*†	1840
Bittern *Botaurus stellaris poiciloptilus***	1910
C.I. Bellbird, *Anthornis melanura melanocephala**	1906

There have been unconfirmed reports of sightings of the Fernbird

* Species still extant elsewhere in New Zealand
** Subspecies still extant elsewhere in New Zealand
† Genus still extant elsewhere in New Zealand

and Bellbird in recent years (Lindsay *et al.* 1959); but B. D. Bell, who made an ornithological survey of the Chathams in 1961, thinks it extremely unlikely that either species still survives.

The Eastern Weka, which may have been the race of *Gallirallus australis* native to the Chatham Islands, was established there by an introduction from the South Island in about 1905 (Oliver 1955). Since then it has become extinct in the South Island but was reintroduced in 1961 from the now-abundant Chatham Island stock. It is not yet known whether re-establishment has been successful.

Greenway (1958) listed approximately six full species and four subspecies as becoming extinct in New Zealand in a period about equivalent to my European. "Approximately" because some are given as extinct in one part of his book and as small populations in danger in another, e.g. the Huia and North Island Laughing Owl. Though his lists differ appreciably from mine, the general impression he gives of the extent to which extinction has actually occurred is closer to the mark than most.

SPECIES AT PRESENT IN SOME DANGER OF EXTINCTION

A list of birds considered to be threatened or near-extinct must, to some extent, be subjective. The one given here contains seven full species plus nine (perhaps 10) subspecies. Three (perhaps four) subspecies are such that should they disappear the species becomes extinct with them; so in effect 10 species are in danger. Should the remaining six subspecies fail to survive, the species to which they belong would not be under any immediate threat of extinction:—

Full species endangered or reduced to low numbers:

Orange-fronted Parakeet *Cyanoramphus malherbi*
Chatham Island Robin *Petroica (Miro) traversi*
Stitchbird *Notiomystis cincta*
Saddleback *Philesturnus carunculatus* (both subspecies)
Kokako *Callaeas cinerea* (both subspecies)
Piopio *Turnagra capensis* (both subspecies)
Bush Wren *Xenicus longipes* (all three subspecies)

Species reduced to a threatened and/or rare subspecies:

S.I. Takahe *Notornis m. hochstetteri*
S.I. Kakapo *Strigops h. habroptilus* (including "*S.h. parsoni*" and a possible new subspecies from Stewart I., Williams 1960a).
S.I. Laughing Owl *Sceloglaux a. albifacies*

Subspecies endangered or very reduced:

Brown Teal *Anas chlorotis*
Stewart Island Snipe *Coenocorypha aucklandica iredalei*
C.I. Snipe *C.a. pusilla*
C.I. Pigeon *Hemiphaga novaeseelandiae chathamensis*
Forbes Parakeet *Cyanoramphus auriceps forbesi*
C.I. Tui *Prosthemadera novaeseelandiae chathamensis*

DISTRIBUTION AND NOTES ON STATUS

North Island (6 species)

BROWN TEAL: Once widespread, this duck is now found only in a few localities in Northland and on Great Barrier Island. Only locally common and very demanding in its habitat requirements of swamp, forest and intertidal creeks, the future of the Brown Teal

is unsafe though it does occur in some hundreds on Great Barrier. (Bell, in press). A flightless race *A.c. aucklandica* persists at the Auckland Islands 200 miles south of New Zealand.

STITCHBIRD: A small but apparently stable population persists in no obvious immediate danger on Little Barrier Island in Hauraki Gulf (Turbott 1961), though cats are also present. Stitchbirds once occurred fairly widespread on the North Island mainland and on Great Barrier Island but they are now regarded as being extinct except on Little Barrier. However there have been occasional unconfirmed reports of them still occurring in the Ruahine Ranges and perhaps elsewhere in remote parts of the North Island, where they would in any event be extremely rare. (Williams, unpubl.). Reports of Stitchbirds at Ngugnuru near Whangarei in 1936 could refer to birds blown from Little Barrier some 50 miles to the south-east.

N.I. SADDLEBACK: *P.c. rufusater:* Broadly distributed last century, the northern subspecies of the saddleback is now regarded as being confined to Hen Island (or Taranga) of the Hen and Chickens Group where it is common over the area of approximately 1000 acres (Turbott 1940). The race's hold on existence depends upon the island remaining in its present state. That part of the vegetation modified by early Maori settlement has now reverted virtually to its primitive condition and the only mammal present is the harmless Polynesian rat, *Rattus exulans.* Oliver (1955) stated that saddlebacks still occur in the Raukumara Range near East Cape, but this report as well as a few recent ones from the Urewera Country (Williams, unpubl.) await confirmation.

N.I. BUSH WREN: *Xenicus longipes stokesi:* Only two specimens have ever been taken of this subspecies and those in 1850 (Oliver 1955). Though it must be very rare, recent records by reliable observers (e.g. Edgar 1949) indicate that it still exists in the Lake Waikaremoana area. It is important to be sure that those who claim to see this bird do not confuse it with the Rifleman.

N.I. KOKAKO: *C.c. wilsoni:* This is certainly the most widespread and perhaps the most numerous of the five rare North Island forms though it is much less common than formerly and never seen except singly or in pairs. It has been occasionally recorded from a number of localities: the Hunua Range, the Rotorua Lakes district, western Urewera, Bay of Plenty, East Cape district, the Coromandel Peninsula, Northland and inland Taranaki. It is interesting that its South Island cogener, inhabiting more remote areas, is much closer to extinction. The Kokako was reported as becoming rare in the North Island at least as early as 1877 (Wilson 1877) and the same author is one of a number who remarked on the (temporary) great scarcity of Bellbirds about this time.

N.I. PIOPIO: *T.c. tanagra:* Rare reports of this bird in recent years (Fleming *et al.* 1953, Sopp 1957) have not been confirmed and this once widely distributed species may now be extinct in the North Island. Buller (1888) remarked that it had already become very scarce, and this early decrease can hardly be ascribed to the establishment of mustelids (which did not occur until the mid-1880's; Wodzicki 1950) nor to the extensive destruction of the North Island forests which began about the same time (Cumberland 1944).

SOUTHERN CRESTED GREBE: *Podiceps cristatus australis:* Never common anywhere in New Zealand, this species has not been reported from the North Island for many years. The only records seem to be one by Buller (1888) from Lake Waikareiti near Lake Waikaremoana in 1879 and another by Vaile (1939: 156) who claims to have seen one near Lake Taupo about 1920. This grebe may therefore be reasonably regarded more as a vagrant to the North Island from the South Island, or even Australia, than as a true native of this part of New Zealand.

South Island (8 species)

BROWN TEAL: Just as in the North Island, this species once occurred much more widely in the South Island than at present (Buller 1888, Oliver 1955). Now it is rarely reported and only from Fiordland (e.g. Bull & Falla 1951). However, as it is mainly nocturnal it may be a little commoner than at present believed.

S.I. TAKAHE: Now known only from the Murchison and Kepler Mountains of Fiordland, to which compass it had been reduced before European times from an earlier distribution over the whole of the eastern side of the South Island, the Takahe at present numbers well under 500 (Williams 1960b). However, as long as its very limited habitat can be preserved the species seems assured of an indefinite survival.

S.I. KAKAPO: This is another species once found over much of the South Island but whose range was decreasing before European settlement. Rarely encountered, it occurs in apparently very small numbers in scattered parts of the West Coast — especially in northern Fiordland (Williams 1956).

ORANGE-FRONTED PARAKEET: There is no indication that this bird was ever common in European times. Reports of it are few (Buller 1883, Tily 1949, Oliver 1955, Breen 1956, 1959) and most of them unconfirmed. Though smaller than the other two parakeets and rather differently coloured, this predominantly-alpine species would usually be hard to distinguish from them in the field. Thus it is not possible to estimate the degree of its rarity.

S.I. LAUGHING OWL: Once well-distributed over the eastern part of the Island and in places fairly common, this owl suffered a reduction in numbers and range which had already become very marked by the end of the 19th century. There have been no official reports over at least the last 25 years (Williams, unpubl.) though one or two unconfirmed reports from southern Canterbury and northern Fiordland during this time deserve investigation (Oliver 1955).

S.I. BUSH WREN: There is little doubt that *X.l. longipes* is now rare and only sporadically distributed over the great expanse of the higher mountain-forests that were previously its range. Seldom reported and superficially similar to the S.I. Rifleman *Acanthisitta c. chloris* which is common, most reports of it are doubtfully correct. Buller (1905) quoted observations which imply that the Bush Wren noticeably decreased in numbers after 1880.

S.I. KOKAKO: Though once, apparently, locally common (Smith 1888, Buller 1888, Pascoe 1959), the Kokako does not seem to have been

widely distributed during European times. It is now certainly very rare indeed and there are few recent reliable records. One of the first for many years is of one being seen in the Wilkin Valley, north-western Otago, in 1958 (Chapman 1959).

S.I. PIOPIO: Just as the North Island race of the Piopio became scarce at a time too early to blame forest destruction and predation by mustelids, so too did the South Island race (Potts 1872, Buller 1888, Pascoe 1959). There have been only two reports in recent years — one from near Lake Hauroko in 1947 (Dunckley & Todd 1949), the other from north-west Nelson in 1948 (Moor 1949). Both are unconfirmed. Confirmation is necessary because the Piopio bears a strong resemblance to the wide-ranging European Song Thrush.

Stewart Island (6 species)

BROWN TEAL: This duck occurs on Stewart Island and its two largest adjacent islands: Codfish (Dell 1950) and Big South Cape (Bell, pers. comm.) but it is only rarely recorded, partly no doubt because of its retiring habits. However, Mr. R. Traill has recently informed me that it has become scarcer over the last few years. Oliver (1926) mentioned it and assumed that Cockayne's report (1909) of the New Zealand Scaup *Aythya novaeseelandiae* referred to the Brown Teal instead. This is reasonable as Cockayne remarked that the ducks he saw were in the rivers, a habitat far more characteristic of teal than scaup which are lake- or lagoon-dwellers.

STEWART I. SNIPE: Unknown from the main island itself and now found only on the South Cape Islands, this snipe once occurred on at least one other island off the east coast. Its extinction there has been attributed to the introduction of Wekas. (It is strange that snipe are virtually unknown, so far, from the two main islands of New Zealand. Fragments have been found only in three South Island localities (Scarlett, pers. comm.) and Oliver's (1955) report of an unconfirmed sight record from near Auckland early this century is probably erroneous (Turbott 1961)).

KAKAPO: A Kakapo was last seen in 1949 and feathers found in 1951 (Williams 1956). Kakapo are said to have been liberated on the island at about the end of last century but this is unconfirmed. Specimens labelled "Stewart Island" and apparently belonging to the Temminck Collection imply because of the date, early 19th century, that the birds are probably indigenous. If so, the local population may comprise a new subspecies (Williams 1960a).

STEAD'S BUSH WREN: Buller (1905) reported seeing one of these on Stewart Island itself; subsequent records are few (e.g. Dawson 1950, Tily 1951). However, the Bush Wren does still occur on the South Cape islands and is the race *variabilis*. The same race is assumed to be, or to have been, the one inhabiting the main island.

S.I. SADDLEBACK: Not officially recorded from Stewart Island proper for many years, the South Island Saddleback still exists on some of the South Cape islands. The persistence of this species, as well as the Bush Wren and Snipe, on these islands has been attributed to the absence of *R. rattus* and *R. norvegicus*. As well as this, the islands are almost unmodified by man. Taranga, upon which the N.I.

Saddleback persists, is in a similar condition; and it may well be significant that the Brown and Black Rats are the only two introduced mammals that have been established long enough in New Zealand to be regarded as possible culprits for the very early reduction or disappearance, of some species of birds (Williams 1956).

S.I. KOKAKO: The most recent record — a secondhand one (Martin 1950) — suggests the South Island Kokako was last seen on Stewart Island in the 1940's. If it still occurs it must be scarce indeed.

YELLOWHEAD *Mohoua o. ochrocephala:* Though assumed to have occurred on Stewart Island at one time (Cockayne 1909, Oliver 1955) it is unlikely that the species has ever done so. The only direct statement I can find is that of Cockayne who said: "The native canary is fairly common, flocks of six to twelve or more being met with in the higher forest or alpine scrub, but never coming to the lower country." However, as he was apparently unable to distinguish between Scaup and Brown Teal, this report cannot be accepted, especially as Yellowhammers occur on the island and were introduced about 1879 (Oliver 1926). Furthermore, there do not appear to be any specimens of Yellowheads from Stewart Island in New Zealand museums. The species should therefore be deleted from the Stewart Island list.

Chatham Islands (5 species)

C.I. SNIPE: Once occurring on other islands in the group, this snipe is now confined to South-East Island which was farmed till 1961 (Fleming 1939). In 1938 Snipe were common on the island, but in January 1953 L. C. Bell (1955) reported that there had been a marked decrease in the population and much destruction of the remaining habitat since 1938 and that the Snipe was very scarce. During his 1961 survey, B. D. Bell found it once more abundant, but obviously under continuing threat from fire or the introduction of cats or rats.

C.I. PIGEON: B. D. Bell reported this species very rare in 1961 and his party saw none during a 2½ month stay. Its greatest chance of survival appears to be in the southern forest block on the main island and on Pitt Island. However both habitats are becoming less and less favourable because of stock grazing and consequent wind damage. Bell considers this subspecies to be the most vulnerable of the Chatham Island birds at present.

FORBES PARAKEET: From a wider distribution in the group, this parakeet has now had its breeding range reduced to Little Mangare Island where there were approximately 100 birds in 1938 (Fleming 1939). The preservation of this species and the one following is precariously bound up with that of the island's tall vegetation which covers an area of between two and three acres (Bell, pers. comm.).

C.I. ROBIN: Also now occurring only on Little Mangare, this robin appears to be in even more dire straits than Forbes' Parakeet. At the time of Fleming's visit there were approximately only 20-35 pairs. Both these species appear to be threatened with extinction through the operation of the Sewall-Wright effect even if their habitats remain unaltered (Mayr 1942).

C.I. TUI: This was by no means common during Bell's visit in 1961. Only a few Tuis occurred on the main island, they were probably more abundant on Pitt, but South-East Island supported only 10 - 12 pairs. However, the subspecies does not seem to be in any immediate danger.

There are two species about which I have had considerable difficulty in deciding whether or not they should be included in this paper. They are the Black Stilt, *Himantopus novaezealandiae* and the Shore Plover, *Thinornis novaeseelandiae,* especially the former. One could argue, for example, that the two New Zealand species of stilt are in much the same category as the Brown Teal — inhabiting both fresh and salt water. Such species make it difficult to draw up consistent standards of exclusion. However, I will deal with the dilemma by giving a brief account of both birds without including them in the general discussion which follows:

The taxonomic status of the Black Stilt is in some doubt though it is officially regarded as a full species at present (Fleming *et al.* 1953). Always rarer than the pied form in European times, it has become very much rarer in recent years, especially in the North Island. Fleming (1958) has suggested that the disruptive pattern of the pied stilt now gives it a selective advantage over the melanistic form.

The Shore Plover once had a fairly widespread distribution over the main islands of New Zealand. Now it is restricted to the Chathams and is known to breed only on South-East Island in that group. Fleming (1939) estimated there to be about 70 pairs in 1937 and Bell (pers. comm.) considered the population to be holding its own in 1961 and that it may breed in small numbers on some remote islets of the Chathams.

	A Species extinct in pre-European era	B Species present at start of European era	C A as a percentage of A + B	D Species becoming extinct in European era	E Species at present threatened or in small numbers	F D + E as percentage of B	G Species* arriving & breeding in European era
North Is.	23	44	34	5	6	25	5
South Is.	31	52	37	4	8	23	7
Stewart Is.	3	34	8	0	6	18	1
Chatham Is.	12	24	33	7	5	50	1

* Waxeye, White-faced Heron, Welcome Swallow, Spur-winged Plover, Royal Spoonbill, Australian Coot, White-eyed Duck (temporarily). From Fleming *et al.* (1953), Oliver (1955), Notornis (1956-1962).

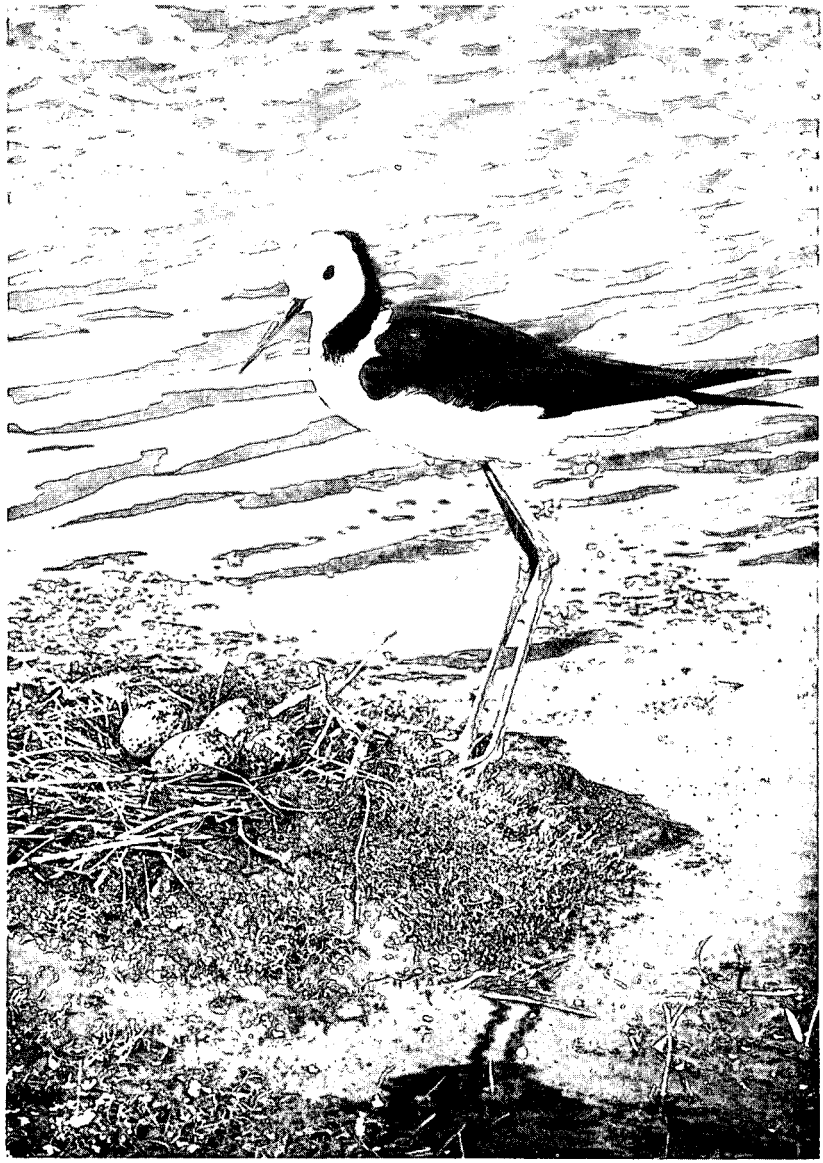
LAND AND FRESHWATER BIRDS IN NEW ZEALAND (excluding shags, stilts and shore plover throughout, see text).

[C. Reginald Ford

I — This photograph, which shows Black-browed Mollymawks **(D. melanophris)** — note the pattern of the underwing — in the south Atlantic, is of historic as well as ornithological interest. It was taken about October, 1901, by Mr. C. R. Ford, who is still living, when he was on board the 'Discovery' as a member of Scott's First Antarctic Expedition.

[M. F. Soper

II — A trio of Crested Penguins **(E. pachyrhynchus)** at Jackson's Bay. This distinctive penguin has a somewhat restricted breeding range, centred on Fiordland. Other strong subspecies breed at Snares **(atratus)** and at the more southerly subantarctic islands of New Zealand **(sclateri).**



[M. F. Soper

III — Pied Stilt **(H. leucocephalus)** at a typical nest in swampy ground. This familiar bird nests in a variety of habitats from coastal beaches to c. 2500 ft. a.s.l. It is still colonizing new areas.

[F. C. Kinsky

IV — Over recent years the Blue Penguins of Cook Strait have been closely studied. They show some affinities with the White-flippered Penguins of Bank's Peninsula; and differ both in colour and size from the northern and southern forms of Blue Penguin. This pair is nesting in a cave on Somes Island.

DISCUSSION

If we wish to compare the degree to which extinction has gone in each island it is not enough to compare the number of species affected but rather to compare the proportions. These cannot be obtained accurately for the pre-European era because, for example, we do not know how many species were present before extinction began nor how many species from outside became newly-established between this time and beginning of European settlement about the year 1800. However the totals of species extinct before European times when added to those of species present at the start of the European era (see table) will probably give a reasonable approximation to the total land and fresh-water faunas of pre-European times. If the pre-European extinctions are calculated as percentages of these the results given in the table are obtained. With the exception of Stewart Island there is close agreement and though this may be to some extent fortuitous, it does suggest that the differences between the three islands in the extent to which extinction had gone before 1800 are small. This is in spite of the fact that the pre-European human population of New Zealand — about 250,000 — was overwhelmingly concentrated in the North Island, where it was evenly spread, instead of being peripheral and scanty as in the South (Metge *et al.* 1959). On the Chathams the population density was much closer to that of the North Island than that of the South (Buck 1949:13). As remarked earlier, we cannot at present estimate what proportion of the pre-European extinctions antedate the arrival of man in New Zealand some time before 1000 A.D.

There appear to be two alternative explanations for the low percentage of extinctions on Stewart Island. The first is that because it was the least settled and modified of the four main islands its avifauna has been the least affected. The second is that because so little is known of its early avifauna (even now the island is still only very sparsely settled and almost entirely covered with native vegetation) a number of extinct species have yet to be recorded. This appears to be the more likely explanation. Since Moas, Little Wekas and Kiwis reached Stewart Island there seems no reason why some other early species did not do so, too. Additions of this kind to the avifauna would bring not only the percentage of pre-European extinctions, but also the total number of species, more into conformity with what would be expected from size and proximity to the South Island.

When we come to compare the extent to which extinctions have occurred in New Zealand during European times our task is easier for we have a far more accurate idea of the numbers of species present initially. Once again, the difference between the North and South Island is small, though the number of actual extinctions is proportionately higher in the former than in the latter (see table).

The Chatham Islands have certainly suffered the most severely and it is likely that they have proportionately been more modified by burning and clearing since European settlement than either North, South or Stewart Islands (Bell 1955). Nearly all of the feral browsing and grazing animals found elsewhere in New Zealand are absent (except feral domestic stock) and mustelids have not been introduced though cats, "European" rats *(R. rattus* and *R. norvegicus),* Australian possums and hedgehogs are established, as in most other parts of New Zealand.

Both endemic rails soon became scarce during the period under

discussion (Oliver 1955) and very few specimens of either are known; in fact, there is only one that is complete of Dieffenbach's Rail. The waterfowl possibly could have had their extinction accelerated by human predation and Fleming (1939) considers that predation by cats has played an important role in reducing the numbers of the local Fernbird and Robin. The range of Forbes' Parakeet apparently has always been almost entirely restricted to Mangare and Little Mangare, but deforestation has now confined it to the latter for breeding, though it does visit Mangare and possibly even Pitt Island (B. D. Bell, pers. comm.). Fleming calls the extinction of the local subspecies of Bellbird "mysterious" and "difficult of explanation." He does not comment on the Bittern.

Stewart Island birds have suffered least in European times, there being no known extinctions and only 18% of the species list have been seriously reduced in range and numbers. Because it is separated from the South Island by a strait bridged to some extent by islands, there is only a small degree of isolation and this is reflected in the number of recent species present (35), most of which are only slightly different taxonomically — if at all — from the South Island forms. Five of the six diminished species are also rare in the South Island; the sixth, the Snipe has long been extinct there. The Stewart Island mainland supports a number of introduced browsing, grazing and carnivorous mammals but, as on the Chathams, mustelids are missing.

To Summarise: Approximately 40 species of land and freshwater-inhabiting birds had become extinct before the arrival of Europeans. One cannot say what proportion of these were already extinct before the arrival of man a thousand or more years previously. Three of the four major island groups suffered proportionately about equal losses. even though the amount of change of the environment consequent upon Polynesian settlement varied with each, and in spite of the fact that the density of the human population of the South Island was very small and was concentrated on the coasts. Stewart Island with only three known extinctions was on first sight, the least affected: however little is known of its earlier avifauna.

Hunting or habitat destruction do not seem adequate explanations of pre-European extinctions.

In spite of the rapid and extensive changes in New Zealand since European settlement, only five full species and five subspecies have died out. Ten more species and three subspecies are in danger and, in fact, one or two of these may have already disappeared. Once again, in spite of the differences in the degree of exploitation of the North and South Islands, the amounts of serious damage to their avifauna are approximately equal (about 24%). The Chatham Islands have suffered most with about 50% of the species present on the arrival of Europeans either extinct or in danger of extinction. Stewart Island has suffered least with no extinctions and only 18% of the species seriously reduced. However, if relict populations of certain species on offshore islands were not included, the number of extinctions occurring during the European era on the North Island and Stewart Island would be increased.

Within European times it appears that damage is least where there has been little or no settlement or modification of vegetation and

no introduction of mammals. These conditions are found on only a few small offshore islands.

Though the extinction of species is of great interest scientifically and economically and is a fate eventually almost as certain as the death of individuals (though the brevity of human history and the human lifespan masks the truth of this generalisation), its study has been greatly neglected except perhaps in laboratory populations. In the wild, as we have just seen, extinction has all too often been an accomplished fact before it has prompted attention, and as a result, the study of the phenomenon has become one that is *a posteriori* and deductive rather than *a priori* and inductive. The former approach is unlikely to yield a satisfactory answer; and as extinction is so common and so important, the need for it to be studied intensively *as a process* is obvious. There are plenty of opportunities for this:— firstly, in threatened species where admittedly the task is made difficult by the very scarcity of the animals themselves and by the time sometimes necessary for the process to go to completion; and secondly, in well-established species subject to temporary local extinctions, particularly near the limits of their range.

No all-embracing principle is likely to emerge from such studies, but any addition to the sparse archipelago of facts in what has hitherto been a gradually-widening sea of speculation should be welcome.

"To admit that species generally become rare before they become extinct, to feel no surprise at the rarity of the species, and yet to marvel greatly when the species ceases to exist, is much the same as to admit that sickness in the individual is the forerunner of death — to feel no surprise at sickness but when the sick man dies, to wonder and to suspect that he died of some deed of violence." — Charles Darwin (1895), *The Origin of Species.*

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DO KEAS ATTACK SHEEP?

By J. R. JACKSON

For nearly a hundred years it has been widely believed among runholders and shepherds of the South Island high country that Keas attack and kill sheep. Consequently during much of this period a bounty has been paid for Keas. In 1886 the Government bounty was £1 and to-day many runholders pay about the same amount.) After studying Keas I have concluded this destruction is not justified.

The whole subject is part of the folklore of New Zealand. It has been collected by Benham (1906) and by Marriner (1906 and 1908) and to-day most of the tales told can be matched by what these authors put on record. One variant, not to be found in these authors, is described below.

The discovery of Keas attacking sheep is lost in confusion. Marriner traced the first published account back to 1868 and attacks to 1867. I have been unable to check Marriner's 1868 and indeed Benham gives a different source for a newspaper article which Potts (1871) refers to a "local paper." Also Benham points out how two men on neighbouring stations, J. McDonald on Wanaka Station in 1867 and J. Campbell on West Wanaka Station in 1870 both claim to have first discovered Keas attacking sheep. Beattie (1936, 1937 and 1938) mentions a third independent discovery. Possibly the dislike of the Kea is older; perhaps it is a transmuted hatred of cockatoos brought to New Zealand by Australian shepherds, the "shagroons." Certainly Mr. D. A. Cameron, the original runholder of Nokomai and one of Marriner's correspondents, was from Australia, and Beattie (1936, 1937 and 1938) makes apparent the large Australian element among the early Otago and Southland settlers.

The year 1867 is of interest for, as Barker (1870) describes from 29th July to 6th August was the first heavy and persistent snowfall experienced by the runholders. Losses of sheep were very large. Yet in the early accounts as Potts (1871) no mention is made of Keas feeding on carrion with which they were so well supplied in 1867. They are mentioned feeding at the gallows and a theory built on this basis. The heavy snowfall in August was followed in February 1868 by record floods (Brown 1940).

This account is largely an internal analysis of the folklore and it is my purpose to show:—

1. The accounts differ greatly;
2. Several accounts contain inaccurate descriptions. The authors may have had difficulty in describing what they saw but even so public policy should not be based on faulty accounts;
3. A geographic variation of account.

DIFFERENCES

A. Difficulty of Witnessing Attack

As Marriner points out when he began collecting evidence there were no first-hand descriptions of Kea attack. He says he obtained thirty descriptions and it is possible by comparing his accounts and Benham's to identify twenty witnesses. Benham has ten descriptions, four in common with Marriner. Since 1906 this topic has been discussed

in the newspapers every few years and usually one or two more witnesses write their descriptions. It is notable that there have been few witnesses; yet four of Marriner's twenty and five of Benham's ten witnesses claimed to have seen Kea attack two or more times. Typical is J. Sutherland of Benmore (Marriner 1906) who claimed "on several occasions I saw them attack sheep."

Also a common tale is of scoffing shearers being convinced by a runholder who knew where to ride to get a sheep killed the previous night.

B. The Loss of Sheep caused by Keas.

Most observers believe that one or two sheep are killed at a time and perhaps a dozen in a season. Like R. McKenzie, Birchwood Station (Benham) they regard large losses as "gross exaggerations." He says, "On one occasion, during a snow storm, when two or three hundred sheep had been hemmed in for a few days, I found three or four sheep killed. . . ."

On the other hand, A. Watherston of Rees Valley Station (Marriner 1908) describes how a flock of 40 Keas killed 38 wethers from a camp of 300 to 400 sheep overnight. Watherston also claimed 700 sheep were lost from a flock of 1300 during a summer; and E. Cameron (Benham) tells how 200 from 400 were lost in winter up the Matukituki Valley.

Cautiously Marriner (1908) reckons that overall "5 per cent. would well cover the annual loss due to Keas." It is interesting to compare this estimate with some figures given by Clarke (1960). Clarke found that prior to 1950 annual losses on Mount Hay Station, McKenzie Country, were 12%. This was reduced to 4% by various improvements. He records that on Mt. Cook Station winter snow losses were 2%.

Now it is possible to estimate the severity of Kea attack and the evidence shows the rate must be very low. This bird normally feeds on nectar, berries, grub and beetles, roots and buds. It has learnt to recognise carrion as food and, it is alleged, became a predator, preying on an animal much larger than itself, all within the last one hundred years. It would be expected to be an inefficient predator. It would make many more unsuccessful attacks than successful. These unsuccessful attacks would more or less severely wound the sheep. There are several descriptions of wounded sheep being found on the run and scarred sheep being noticed at shearing. They were noticed at shearing in 1867 on Wanaka Station, but as Benham describes by 1906 they were seldom noticed for the character of attack had changed. To-day few men with a lifetime experience would claim to have seen at shearing more than a dozen sheep bearing healed Kea wounds. Perhaps the rate is one sheep that has severe Kea wounds in twenty-thousand shorn.

For a year I worked in G. L. Bowron and Co. Ltd.'s tannery and we handled many sheep pelts. During the year nearly 2000 dozen sheep skins of all grades from Canterbury and Otago were tanned and if we use the fraction 1/10 (given me by the Canterbury Frozen Meat Co. Ltd. in 1959) as the ratio of high country to low country sheep killed, then approximately 2000 high country sheep were tanned. None of these bore scars which we would attribute to Kea attack. Further, the grader, Mr. J. O'Neill, who had been grading for 10 years previously

during which time he would have inspected between 20,000 and 40,000 high country pelts, was confident that none bore scars from Kea attack.

KILLER KEAS

In North Canterbury where it is usually claimed that only a few sheep are lost at a time, this is considered to be the work of a "killer Kea." When he is in a flock he will kill the sheep and the other Keas join in feeding on the dead sheep. He is usually found to be an adult male and when he is destroyed there is no further loss of sheep.

The large losses cannot be work of a few Keas nor can the theory of killer Keas explain the rapid spread of the habit of attacking sheep. If reports are to be believed in a few years every station along the length of the Southern Alps from Marlborough to Southland had experience of Keas killing sheep and has continued to. Every small remote valley has and has had its killers. This points to learning by Keas, as would be expected in such an intelligent bird.

BLOOD POISONING

If the low rate of injury, less than 1/20,000, is conceded then either Keas attack few sheep, or most sheep attacked die. The latter is sometimes explained by "blood poisoning." By one variant the death of sheep with small wounds, perhaps a quarter-inch tear of the skin, is explained. Not infrequently these sheep with small wounds are found dead among other sheep more typically "kea-ed," that is among sheep with their body cavity open. I found an instance, 4/1/58, after a prolonged spell of very bad weather. In a small bay at the bush-edge were two sheep, both only a few days dead, and with frothing of blood from the nostrils. One was a typical "kea-ed" sheep, whereas the other had no wound that I could find. The frothing of blood indicates a haemorrhage, perhaps the result of an infection like gas-gangrene. If so, on occasion Keas might carry the infection after feeding on carrion, but also sheep would be expected to be infected more often naturally. In other cases of poisoning there are extensive areas blackened under the skin on the back. This blackening may be bruising and subsequent gangrene, and in J. H. King's description (Marriner 1906) "bruising" is used. Unfortunately I have seen no such sheep.

It seemed worth looking to find a pathogen. Prof. J. A. R. Miles of Otago University has helped. He has looked especially for psittacosis and haematozoa, but failed to find them. Eighteen Keas have been examined at the Otago Medical School and blood samples from another ten also. Laird (1949) reports his examination of three blood smears and I have examined 32 smears. All the results have been negative. It has been found that some Keas have a haemolytic anaemia. This is a stress disease and there seem to be no associated microbes. Some Keas have bumble-foot, almost certainly as in poultry and many other vertebrates, a staphylococcal infection. These would not be the poison. Further I have handled more than 500 different Keas and have been occasionally scratched and bitten, but not poisoned. Therefore if Keas do carry a poison only a small proportion can be carriers and few sheep receive a poison from Keas.

An ideal way to tackle this problem of blood-poisoning would be to send live poisoned sheep to Otago University for expert examination, so that the organism responsible could be found. Then it might be worth looking further to find the organism on Keas.

One point does arise: if the small wounds heal, and if small wounds are usual, then the rates of attack may be greater than the above estimates.

INACCURATE DESCRIPTION

Many accounts reveal that the authors have not watched Keas carefully. While Kea is the subject, the description is of attack by man or a mammalian predator, not by that fastidious bird, the Kea.

Keas Covered in Blood.

Several times I have had described to me Keas covered in blood, their chest and head covered in gore. A simple experiment is to smear some blood on a Kea. On 12/8/61 I chose the Kea L1218, a first year male, the boss of about a dozen juveniles about. The first difficulty was in wetting the plumage, for the blood tended to roll off. It was necessary to rub the blood into the plumage as I did on the crown, chest and a leg. He flew 25 yards away, fluffed up his feathers and spent five minutes preening, but made little impression on the blood. Then he began walking back for more food. As he walked past another Kea, they stopped and it preened the blood on his crown for a minute. Then he came back by me and fed. For the next hour, while I watched, his feathers remained fluffed up and he was uneasy. Next morning his plumage was clean, his manner normal, and again he was boss.

Yet by careful observation Keas when feeding on carrion will be seen with blood on part of their plumage, on the small feathers at the base of the upper mandible. They have got it on when the mandible has been driven into carrion up to the hilt. Similarly when feeding on roots often a little mud gets on these feathers.

They do not get covered in gore like an inexperienced butcher.

The Kea's Feeding.

R. Guthrie of Burke's Pass (Marriner 1908) describes the Kea as "viciously striking" and many others similarly. The Kea is careful and slow in the use of its bill, though a big pressure is exerted as it closes. It will wriggle and heave its body to drive the upper mandible slowly in and then lever. Never does it strike viciously and repeatedly and quickly.

A Kea is loath to feed in small corners or where its view is blocked. Their vision with eyes on the side, and directed slightly down, is far wider than ours, so while feeding they can see your movements out of the corner of their eyes. A local variant told by H. Heckler, Lumsden (Marriner 1908) and still common there, is how Keas so engrossed in feeding on carrion are easily hit and killed with a stick. The Keas would flush at the preparatory back-swing.

KEAS' NOCTURNAL ACTIVITY

Another common error is to emphasise the darkness of the night when attack occurs. Normally a Kea goes to roost half an hour or so before nightfall, but if they have found rich feeding they may continue after dark. Their night vision is not as good as man's. After dark they will be seen misjudging their landing on a branch. I have been able to see baits from six feet which Keas failed to see from three inches. They will continue feeding after dark on a sheep corpse but as night becomes blacker the adults will slip away to their usual roosts. The juveniles may roost nearby. If Keas have not come up to you

before nightfall they will not come after. They may wake and feed actively an hour or so before daybreak by a full moon. After daybreak and before sunrise and again after sunset and before nightfall Keas feed on the open riverbeds. With the rise of the sun they retreat to the forest.

KEAS GRIMLY HANGING ON TO FRANTIC SHEEP

Many accounts are like R. McKenzie's, Birchwood (Marriner 1906) who describes the Kea ignoring the sheep's frantic efforts to rid itself of the bird. He writes: "The frenzied sheep jumped and ran about in any direction for dear life, then, separating itself from the mob, made a direct line down a steep slope and in its mad career finally dropped over a precipice, until which moment the bird held on with its claws, its wings slightly extended as if to steady itself or to be ready to fly off at any moment."

Actually the spread wings would not help the take-off, which begins with a low body, a swing forward and a spring, when the wings are raised.

More credible is J. Morgan's Mesopotamia (Marriner 1906) description: "Then it inserted its beak; at this the sheep ran into the mob, and the Kea just flew off, and when the sheep was quiet again it once more got on to its back. . ."

I find it easy to entice Keas on to my body, but at any movement they take flight.

I would judge eight of the fourteen accounts in Marriner (1908) as containing false statements.

GEOGRAPHIC VARIATION

Despite the mobile human population of New Zealand, I believe a geographic variation in the type of tale has developed.

In North Canterbury, from the Waimakariri Valley north, many will describe the Kea sitting on a sheep's back. The sheep is often undisturbed and the Kea apparently inactive, or pulling tufts of wool until flushed by the approach of a man. Here the runholder often tells how: "When I took over, the place was over-run with Keas. In two or three years I had cleaned them up and have had no trouble since. I do not bother to destroy them now as I have got rid of the killer Keas." It is here that killer Keas are emphasised.

In Mid-Canterbury by the Rakaia and Rangitata Rivers runholders complain of large losses and most actively destroy Keas. The Keas seem to attack at all seasons. Local tales still told are of a Kea riding a sheep into the shearing shed and a sheep with a Kea on its back trying to brush the Kea off by running under a rock.

In the McKenzie Country there is more emphasis on attack in winter and spring snow falls. Here the frightened sheep often run over bluffs and in fact in the steeper mountain parts many sheep are lost over bluffs but in most Keas are not incriminated.

In Otago and Southland by the lakes where Keas were discovered attacking sheep, the largest losses are claimed like those described above. Even fifteen years ago, before the destruction of the rabbits, some runholders would claim to be considering giving up their runs because of Kea losses, and rumours continued about actually giving up runs, despite Marriner's (1908) scotching one such rumour.

As described above by Lumsden the tale of hitting Keas for a six with the shepherd's crutch persists.

POSITIVE EVIDENCE OF THE KEA AS A PREDATOR

Now Keas do feed on carrion and about the bush edge on most stations there is a good supply of this food. In an acre on the Bruce Spur 11/10/58 I found eight dead sheep from the previous summer. Three in the bush had certainly not been "kea-ed." Of the five in the open the Keas fed on one and the others had not been investigated recently.

Also Keas will attack live prey. Mr. R. Gillet of Lincoln had a tame Kea which would catch and disembowel any mice thrown in its cage. Mr. A. G. MacIntyre, formerly a trapper at Wainihinihi, found a Kea on a branch above a trapped opossum, with its entrails pulled out. Besides being sick with the shock of trapping the opossum was cold, wet and hungry when the Kea found it and presumably attacked.

I have seen a juvenile Kea pursue a Blackbird *(T. merula)*. On 2/4/61 there was a flock of 50 juvenile Keas on an avalanche fan at the foot of Mt. Oates. The ground was very broken with big blocks of rock, brought down by the winter avalanches surrounded by a thick alpine scrub. A male Blackbird flushed and a Kea chased it 200 yards across the fan for two or three minutes until both were lost from my sight. The Blackbird would swerve round the boulders and shrubs, climb sharply 20 feet and plunge down. The Kea easily followed every manoeuvre. While this one Kea chased the Blackbird, the other Keas were quite indifferent. This Kea, perhaps recently fledged, may have made a mistake and thought he was playing in flight as with his parents.

It is not difficult to encourage a Kea to sample a man. Once on a man they soon start investigating and tearing his clothes. Then the Keas probe the flesh and the inevitable flinch causes the Keas to take flight.

CONCLUSION

It is credible that Keas do attack sheep trapped in snow, sick sheep, sheep injured by falls or sheep they mistake as dead. When such a sheep reacted they would take flight, but return when it relaxed. If such occurs, the evidence suggests it must be very rarely; so rarely, that the destruction of Keas is not justified. This destruction, or the clearing of the forest, has made Keas much less common in the run-land than in the forest alps further west.

I consider that the protection which most native birds enjoy should be extended to Keas.

THANKS

I wish to thank G. L. Bowron & Co. Ltd., Canterbury Frozen Meat Co. Ltd., Mr. J. O'Neill, and many shepherds and runholders, often unknown to me, who have told me of Keas and their experiences.

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OBITUARY — JAMES PRICKETT

The news of the death of James Prickett in January, 1962, will have brought a sense of real personal loss to a wide circle of fellow naturalists. "Jim" came to New Zealand as a boy in 1907 from Westmorland where the birds of the fells had already begun to arouse his interest. During a long and active life he served in the Australian forces in World War I and later became a successful and highly regarded business man in Auckland.

He was an intrepid motorist; and such was his love of the countryside that during his week-ends he explored nearly every lane and side-road that led to the bush or coast for many miles north and south of Auckland. After an interest in botany had taken him into many quiet corners, he turned more and more in his later years to the study of birds, especially with a set of powerful cameras; and while he continued to work at his business, his lunch was often eaten with a friend on the old Puketutu causeway among the waders or on the northern motorway in search of White Herons. Here on one occasion he took with him a well-known New Zealand cricketer, a fast bowler who, by throwing stones with nicely judged accuracy, forced Kotuku to fly from its roosting tree. Jim had his telephoto lined up and obtained two supremely beautiful flight photographs.

If a rare bird was reported, especially a large one, distance was no object. He was particularly active in the winter of 1957, when there was an irruption of large Australian birds. He obtained colour pictures, sometimes under dismal conditions, of White and Glossy Ibises, Little Egret; and ultimately he had the unique distinction of having photographed Royal Spoonbills in colour in four localities; Manawatu estuary, Manukau, Kaipara and Parengarenga. Among other rarities which fell to his camera were Fairy Terns at Te Arai, Black-fronted Terns on a derelict jetty in Kaipara, Curlews in the rain at Miranda; a Banded Rail in colour-movie, gesticulating near its nest at Middlemore Hospital; three Asiatic Black-tailed Godwits with a White-winged Black Tern overhead against a background of autumn tints in the Firth of Thames. But like all true bird photographers he was happy to sit in a hide, patiently enduring the heat and constriction. It was from Don Urquhart's hide at Karaka that some of his best pictures were taken, really superb studies of Godwits.

A most generous and helpful member of the Auckland team of bird-watchers, he was the obvious choice to be called upon to act as host to transient ornithologists, who had just a few hours to see some New Zealand birds. Without his jolly Pickwickian presence Field Study week-ends will not be quite the same. On his many excursions in search of birds and plants both in New Zealand and Australia he was ably and devotedly supported by Mrs. Prickett, to whom the Society offers its sympathy.

— R.B.S.

SHORT NOTES

SOOTY TERN AT CUVIER ISLAND

I was very interested in J. A. F. Jenkins' note on a Sooty Tern *(S. fuscata)* in coastal waters at the end of July, 1961. About the same time when I was on Cuvier Island, a Sooty Tern was seen flying back and forth in Northwest Bay on 24/7/61, for about fifteen minutes during which time it called frequently. It was bigger than a White-fronted Tern *(S. striata)* and its dark colour and long tail-streamers were particularly noted. It was also seen by Ian S. Hogarth.

D. V. MERTON

[The first seven records of Sooty Terns from New Zealand proper were in the period February to April, usually following strong cyclonic storms from the north. It is curious that in 1960 four were found ashore in August; and now there are two occurrences for July, 1961, at a season when New Zealand waters are at their coldest. The nearest breeding grounds to New Zealand are at the Kermadec Islands, where (Oliver 1955, p. 343) 'Wideawakes are first heard at Raoul Island during the latter half of August'; after supposedly being away in the tropics. — Ed.]

★

WHITE-WINGED BLACK TERN ON A SUBALPINE TARN

Swan Lagoon, to give it its local name, is a subalpine tarn of some 40 acres in extent, situated at about 2000 ft. a.s.l. on the tussock plain a little to the north of the road which leads to L. Ohau in north-west Otago. As I was passing on 7/1/62 I could not help noticing that this quiet tarn with its shallow edges had attracted a rich and varied population of waterfowl and waders, conspicuous among which was a pair of pure Black Stilts *(H. novaezealandiae)*. A little later I was examining a tern which showed a black head and underparts as it squatted on drying mud among a scattered group of Black-fronted Terns *(C. albostriatus)*. As soon as I was in a position to see the bird in its true colours with the light behind me it was obvious that it was a White-winged Black Tern *(C. leucopterus)* in almost full breeding dress; but the small bill was not yet red; and a faint trace of white was still visible above and below the bill. In flight the striking pattern of the wings contrasting with the wholly white tail corroborated the identification. In its manner of flight and feeding over the tarn, it resembled the Black-fronted Terns so closely, that against the bright sunshine it was virtually impossible to separate it from them. Two days later when I visited the tarn again, I could not find the White-winged Black Tern; but this was not altogether unexpected, as many Black-fronted Terns drift about the Mackenzie country in summer, following even the smallest streams; and where they go a White-winged Black Tern may also go, for both species when inland are largely insectivorous. The biggest concentration of Black-fronted Terns was over the great morass of the Tasman River delta on L. Pukaki.

To find a White-winged Black Tern on a subalpine tarn in New Zealand is not as surprising as at first it seems. This tern has been widely reported around the coasts of the two main islands and has reached as far south as Invercargill (Heather, *Notornis IX*, 21). In Borneo where it is a regular winter visitor, with a wide range of

habitats it ascends far up rocky rivers and is well known in the farthest interior at 3700 ft. (Harrison, *Notornis VII,* 136).

The plumage changes of the White-winged Black Tern are notoriously puzzling. Adults and sub-adults have been observed near Auckland to change from winter dress to almost complete breeding dress in January and February, the main change taking place within about three weeks. In this plumage they sometimes remain in New Zealand throughout the southern winter and the same birds have been seen still elegantly black and white in late November and early December. In short, White-winged Black Terns in full or almost full nuptial dress may be found in New Zealand in any month of the year.

R. B. SIBSON

★

ORIENTAL CUCKOO AT WHANGAROA, NORTHLAND

For some time in January, 1962, a strange bird, which was finally identified as an Oriental Cuckoo *(Cuculus saturatas),* was reported by my neighbours. Then for three consecutive days in early February it stayed and fed in my garden, where it perched on posts or upright sticks, keeping very still, not even moving its head, then diving down on to the garden with a flop with wings outspread. The food seen to be taken was worms only; and it got one every time.

From my workshop I was able to observe it for many hours at twenty feet, using binoculars, though they were hardly necessary. Size, smaller than Bush Hawk; head round, bill dark, not hooked, with yellow band at base, not long. Eyelid yellow. Top of head sandy-ginger with light slashes, back brown; upper wing surface brown with white bars; upper tail light blue with white bars; tip of tail fringed white. Upper breast white with speckling; breast light with yellow-buff slashes; under tail blue-black with elongated white dots. Legs yellow with white feathers on upper leg. Flight in long shallow dips.

T. M. ROBERTS

[Mr. Roberts' account is accompanied by rough sketches which were made on the spot and leave no doubt about the correctness of the identification. — Ed.]

★

COMMUNAL DISPLAY OF SHINING CUCKOOS

Vegetation at Rissington, Hawke's Bay, consists largely of exotics such as pine trees, gums, wattles and poplars, except for a low growth ot mixed native shrubs and trees and exotics in a few deep gullies, and lining the steep banks of the Mangaone Stream. It is surprising to find a few Bell-birds and Tuis inhabiting the area, and odd pairs of Grey Warblers and Fantails nesting in the cypresses *(C. macrocarpa).* An occasional Shining Cuckoo *(Chalcites lucidus)* is heard. At 8 a.m. on 25/12/61, there occurred one of those cummunal gatherings which I have observed on previous occasions but in much more suitable surroundings. Six Shining Cuckoos were together in a Black Wattle, making the usual rapid flights from branch to branch, with much excited calling on the note used in such displays. An hour later, the display was being continued in the top of a tall gum, and then the birds were lost sight of. They must have collected together from a very wide area.

A. BLACKBURN

FEEDING BEHAVIOUR OF RED-BILLED GULLS

On 8/2/62, a small party of Red-billed Gulls *(L. scopulinus)* was observed to feed in an unusual manner on Awapuni Lagoon, Gisborne. The tide was low, and at this stage there is a considerable expanse of water from one to one and a half inches deep, which contains numbers of small sprats and flounders. My attention was drawn to three gulls flying in line ahead just above the surface of the water, with a fairly rapid wing-beat, the wing tips not quite breaking the surface, but causing a ruffling upon it. The feet were trailing in the water with the webs partly extended, and the neck was stretched forward, with a definite upward kink in it, so that the lower mandible was parallel with the surface, and about a quarter of an inch above it. Two birds held the beak open, and the other closed, throughout a perfectly straight flight of about thirty yards. Thereafter a succession of single birds went through the same evolution on approximately the same course, and it was noted that during most of the flights a sprat, and in one instance a tiny flounder, leapt from the water right under the tip of the bird's bill, to be caught unerringly. It would appear that the beating wing-tips and trailing feet acted as a kind of net to drive a fish forward until it sought to escape by leaping; also that the trailing feet acted as a brake to reduce the bird's speed to a noticeable degree.

A. BLACKBURN

★

A NOTE ON THE DIVING OF THE TWO NEW ZEALAND GREBES

When I was watching Crested Grebes *(Podiceps cristatus australis)* at Lake Fergus in October, 1960, two dives were timed at 15 and 25 seconds. In May, 1961, at Lake Te Anau, a single bird was watched on two successive days swimming in front of the hotel, between 20 and 100 yards offshore. Timing of twelve dives varied from 45 to 62 seconds, average 52.6 seconds. These times are considerably longer than those given for the northern subspecies in the Handbook of British Birds. When diving, the head and neck first curved downwards, the back raised, and the bird went under with a push of its feet; on emerging it frequently, but not invariably, shook its head. On several occasions after a dive it raised its body vertically out of the water, and shook itself with some flapping of the wings.

Dabchicks *(P. rufopectus)* were studied in the Rotorua district during October, 1960. Six dives were timed at 37, 25, 50, 28, 33 and 25 seconds. Birds were seen bathing with much splashing and wing flapping, and after a bath they sometimes raised the body vertically out of the water and dried off with vigorous movement of the wings. Chasing was observed, the pursuing bird with its back humped and neck downcurved, so that the head was pushed forward and at a much lower level than the back. There were two very tame birds at Lake Rotoiti. Both dived near the shore; one emerged with some weed pulled from the lake floor and then dived again to swim under a boathouse, carrying the weed in its bill. These birds communicated by a series of low pitched "tuk tuk tuk" notes.

—A. T. EDGAR

MYNAS ON TIRI TIRI ISLAND

During my stay at the lighthouse station on Tiri Tiri during November, 1961, I noticed that the Indian Myna *(A. tristis)* had established itself around the out-buildings, i.e. watchtower, cowbail, etc. At no time during my stay were these birds seen on any other part of the island.

A daily check was kept and the most seen at one time was ten. These checks were made between 5 a.m. and 7.30 p.m., the average daily count being six over a period of 28 days.

In conversation with the keepers who have been at the lighthouse station for the past eighteen months, I learned that these birds have been seen around the station during the past few months only.

Their habits are regular. They feed in and around the hen-run in the early morning; they try to get at Starlings' nests on the watch-tower roof, chase Tuis, and make a pest of themselves in the keepers' gardens during the day. At night they return to the hen-run to feed.

I would say that there are four pairs and possibly two or three young birds on this island and that they are on the increase. As both Tuis *(Prosthemadera novaeseelandiae)* and Bellbirds *(Anthornis melanura)* still survive in the groves of pohutukawas, though much of the island is cleared, it will be interesting to see how they react to the presence of Mynas. The following episode substantiates some of the charges commonly made against the Myna.

On the morning of the 24/11/61, while milking the cows, I heard a bird singing and calling on the watch-tower. I took this to be a Starling *(S. vulgaris),* but on getting up to have a look I saw that it was a Myna.

While I watched, the bird moved along the roof, stopped and looked into the spouting, at the same time calling like a Starling. It did this a number of times, calling at each place where it stopped.

Suddenly the Myna disappeared into the spouting. Then its head appeared and it was seen to drop a small object. This happened three times. By now a Starling had landed near the hole and was making a great noise.

The Myna came out of the spouting and flew at the Starling, which flew off. The raider was joined by another Myna and they flew to the base of the watch-tower. I immediately went over and found three young Starlings a few days old, all dead.

Another Starling's nest, with four young birds dead outside, was found in an old shed around which Mynas had also been seen.

— A. WRIGHT

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MYNAS ON WAIHEKE ISLAND

As Waiheke becomes more and more urbanised, the Myna *(A. tristis)* spreads and increases. For some years it has been common along the coast opposite. It was first recorded on the island in May, 1944, a single bird after an easterly storm. Later two were seen at Arran Bay on 4/1/56 *(Notornis* VII, 87). During a stay on Waiheke in December, 1960, I noted five near the shopping area at Oneroa, three at Little Oneroa and four on the roads around Palm Beach.

D. F. BOOTH

[A few pairs now breed at Onetangi and a flock of 12 was reported in June, 1962. — Ed.]

BLACK SHAG FORCED DOWN BY AUSTRALIAN MAGPIES

As I was coming down from the Waimata Valley near Gisborne, I observed a large bird in a dive. I stopped my vehicle to get a better view, and then found that it was a Large Black Shag *(P. carbo)* which was being hotly pursued by two Australian Magpies *(G. hypoleuca)*. The Shag in flight apparently had no defence whatsoever against the attackers, and they eventually forced it down on to the roadway.

I have previously seen Australian Magpies attack a large variety of birds, and attacks on Harrier Hawks in some parts of the country are almost hourly occurrences, but I had never before witnessed an attack on a Black Shag. The Shag sat on the roadway, but was disturbed at my approach and flew off, apparently unharmed.

It seems apparent from this incident that the Black Shag prefers to fight, if necessary, with his feet on dry land.

A. G. HALL

★

WHITE-FACED HERONS FEEDING AWAY FROM WATER

On 26/7/60 between Oamaru and Kurow I watched for some time four White-faced Herons *(A. novaehollandiae)* which were feeding in a farm-paddock that was being worked up. They were walking quite fast over the ground, picking up worms and grubs without stopping. In this district I have often noticed these herons feeding in lagoons, streams and water-races and nearly always solitary; but I have never before seen them feeding over freshly ploughed land.

A. NUTTALL

★

LITTLE EGRETS MOLESTED BY GULLS

On 25/7/61 a Little Egret *(E. garzetta)* flew low over the m.v. Kaitangata as she lay in Greymouth Harbour. The egret was being closely pursued by an adult Black-backed Gull *(L. dominicanus)*. To avoid the pursuit, the egret dived between the ship and the wharf and settled on a beam under the wharf at water-level. By the simple process of walking along the wharf, we were able to stand right over the egret at a distance of about eight feet and watch it for some time. It eventually escaped by flying along beneath the wharf.

— J. G. F. JENKINS

On 16/4/61 we found a Little Egret at Port Albert in Kaipara. It was attempting to feed as the tide fell in the shallows of a muddy creek but it was persistently molested by several Red-billed Gulls *(L. scopulinus)* which formed a watchful semi-circle on the landward side wherever it settled. The egret kept on taking short flights of a chain or so, trying to shake off its persecutors and find a quiet fishing ground. While we watched, the egret must have moved some hundreds of yards upstream by short stages; but all to no purpose, for when we left the expectant gulls were still dogging its steps.

— R. B. SIBSON
H. R. McKENZIE
D. A. URQUHART

TWENTY-SECOND ANNUAL REPORT FOR THE YEAR 1961 - 62

OFFICE BEARERS FOR THE YEAR

President: Mr. A. BLACKBURN

N.I.V.P.: Dr. R. A. FALLA *S.I.V.P.:* Mrs. L. E. WALKER

Secretary: Mr. G. R. WILLIAMS *Treasurer:* Mr. H. R. McKENZIE

Editor: Mr. R. B. SIBSON *Asst. Editor:* Mr. A. BLACKBURN

Members of Council: Mr. E. G. TURBOTT, Mr. J. C. DAVENPORT Mr. F. C. KINSKY

The three members of Council due to retire at this Annual General Meeting are: Mrs. L. E. Walker, Mr. J. C. Davenport and Mr. F. C. Kinsky. All are eligible for re-election. However, Mr. Davenport does not wish to stand again. Nominations have been called for the three vacancies and the three following have been received: Mrs. L. E. Walker, Mr. F. C. Kinsky and Mr. B. D. Bell. A ballot is therefore unnecessary and I am pleased to declare these candidates elected.

The Society is greatly indebted to Mr. Davenport for his five years of valuable service on Council, and members of Council received his resignation with regret. Members of the Society will also be sorry to learn that Mr. F. C. Kinsky has had to resign as Convener of the Banding Scheme because of pressure of work; and that for similar reasons Mr. P. C. Bull has resigned as Convener of the Beach Patrol Scheme. I should like to thank these three members very sincerely on behalf of the Society for the unselfish and efficient way they have played an essential part in the Society's activities.

The Society is also grateful to its Librarian, Miss E. Evans and her assistant Miss M. McIntyre for their unassuming but valuable work during the last twelve months.

Council has carried out Society business by means of four Council circulars this year. Among the many matters discussed have been: Finances, banding schemes, regional organisers, a second edition of the Checklist of New Zealand Birds, next year's Field Study Course, the coming R.A.O.U. Camp-Out later this year. These subjects have been, or will be, open for discussion during the course of this meeting.

G. R. WILLIAMS
14th May, 1962

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TREASURER'S REPORT, 1961 - 62

The membership of the Society is now 798, being Hon. Life 1, Life 65, Endowment 3, Ordinary 686 and Junior 43. Of this total 17 are resigning after 31/3/62.

The annual turnover of members is much too high, this year 70 in and 64 out. This is believed to be due largely to faulty recruiting. Recruits not really interested soon drop out, making a great amount of extra work for the officials concerned. Members would do well to first prove for themselves that their friends will be keen enough to continue. Officials will always be glad to receive good recruits. The position in regard to Juniors has greatly improved. In the past many were put in by relatives in the hope that they would become interested

BALANCE SHEET AS AT 31st MARCH, 1962

Current Liabilities

Last Year						
99	Sundry Creditors	85	2	4		
93	Subscriptions in Advance	67	8	9		
20	Provision for Index	40	0	0		
212					192	11 1
	Reserve Account —					
	Life Subscription and					
405	Endowment A/c.	439	0	0		
34	Add additions 1961-62	30	2	6		
439					469	2 6
	General Reserve —					
861	Balance 1/4/61	1446	8	10		
300	Add Library Accessions	26	0	0		
	Add Tranfer from					
300	Card Committee	–	–	–		
	Add excess of Expenditure					
–	over Income	77	9	5		
1461		1549	18	3		
	Less excess of Expenditure					
15	over Income	–	–	–		
1446					1549	18 3
2097					£2211	11 10

Current Assets

Last Year						
134	Bank of New Zealand	132	9	9		
431	Post Office Savings Bank	444	3	0		
20	Sundry Debtors	19	16	1		
4	Subscriptions in Arrears	–	–	–		
589					596	8 10
	Stocks on Hand —					
26	Printing and Stationery	24	10	0		
100	Banding Scheme	137	10	0		
–	Nest Record Scheme	12	0	0		
–	Beach Patrol Scheme	2	10	0		
	Back Numbers "Notornis" and					
327	Sundry Publications	357	18	6		
453					534	8 6
	Addressograph at cost					
8	less depreciation				6	7 8
47	Library Purchases to date	–	–	–		
300	Add valuation 31/3/61	–	–	–		
347		347	6	10		
	Add accessions 1961-62	27	0	0		
					374	6 10
	Investment Fund —					
700	Auckland Elect. Pr. Brd. Stock				700	0 0
2097					£2211	11 10

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st MARCH, 1962

Last Year	Expenditure						Last Year	Income					
386	Printing "Notornis" (including Library List, £48/10/-)			397	2	9	537	Subscriptions	685	1	8		
60	Postages			58	12	1		Add arrears expected to					
76	Printing & Stationery			64	9	3	4	produce	–	–	–		
16	General Expenses			27	11	8							
104	Banding: Banding Scheme	134	16 9				541					685	1 8
	Banding Reports free to operators	6	6 9				30	Donations, General				40	12 5
	Banding Reports written off	40	8 3				19	Field Week-end, Whakatane	–	–	–		
				181	11	9	–	Field Week-end, Clevedon	5	1	10		
–	Beach Patrol Scheme			9	19	0						5	1 10
–	Nest Record Scheme			7	7	9		Surplus back numbers					
1	Depreciation			1	2	6	39	"Notornis," etc., profit on sale				36	16 7
	Back Numbers "Notornis"						49	Interest				57	13 8
50	written off			–	–	–		Excess of Expenditure					
	Excess of Income						15	over Income				–	– –
–	over Expenditure			77	9	5							
693				£825	6	2	693					£825	6 2

We report to the members of the Ornithological Society of New Zealand (Incorporated) that we have examined the books, accounts and vouchers for the Society and also those relating to the Card Committee for the year ended 31st March, 1962. We certify that the balance sheets for the Society and the Card Committee are properly drawn up to show the true financial position of the Society at that date. We have accepted the values placed before the Treasurer of stocks on hand.

14/5/62

CHAMBERS, WORTH & CHAMBERS, Auditors

CARD COMMITTEE

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDED 31st MARCH, 1962

Last Year				
	After deducting the cost of the products sold from the sales we are left with a			
364	**Gross Profit** of			359 8 5
	From this we deduct the following expenses:			
162	Advertising	227 5 8		
10	Depreciation	— — —		
1	General Expenses	2 10 6		
20	Donation	— — —		
20	Postages	13 7 8		
21	Sundry Services	12 12 0		
11	Stationery	22 16 6		
245				278 12 4
119	Leaving us a profit on sales of cards of			80 16 1
16	To this we added: Interest Received			16 6 0
2	Donations			13 6
137	So that the **Net Profit** for the year is			£97 15 7

BALANCE SHEET AS AT 31st MARCH, 1962

Last Year			
	Our Assets consist of:		
35	Printing Blocks	40 0 0	
569	Cash at A. & N.Z. Bank	659 19 5	
75	Stocks	— — —	
679	And **Total:**		699 19 5
93	From this **we deduct what we owe others**		15 19 8
586	**Leaving** us with		£683 19 9
	This Balance is made up as follows:		
	Profits to 31st March, 1961		586 4 2
	Profit for year ended 31st March, 1962		97 15 7
			£683 19 9

in nature. This usually failed. Now most of them are coming in on their own initiative and are doing really good work, some obviously to be leaders in the future.

Subscription rates are the same as for last year except that there is now provision for Endowment membership at £1/10/-.

The increase in subscriptions this year, £148, is mostly due to the increase of Ordinary subscriptions from 10/- to £1. Extra expenses have been the printing of the Library List £48/10/-, the writing off of Banding Reports, £40/8/3, and a Banding Scheme increase of £49 in use of bands and stationery.

The printing rates for "Notornis" continue to be very satisfactory. For the high quality photographs supplied free we heartily thank Dr. M. F. Soper, Messrs. F. C. Kinsky, G. J. H. Moon, J. Prickett, P. Morrison, J. Kikkawa, N. B. MacKenzie and F. O'Leary.

A plan put forward by Mr. and Mrs. D. McGrath of Wellington for reproducing out-of-print and rare back numbers of the Society's journals is coming before Council. The object is to encourage the sale of full sets, make up deficiencies in members' sets, bring other excess copies into value and make a reasonable profit. Mr. and Mrs. McGrath have made a most generous offer to assist in the carrying out of this plan. The offer virtually means the underwriting of the greater part of the scheme.

For help with the Banding Scheme with another £100 this year we are very grateful to the Internal Affairs Dept.

The Christmas Card Scheme has been successfully continued for a further year by Mr. B. S. Chambers. Miss C. R. McIntyre has done fine service in despatching the parcels of cards. At the end of the last financial year £300 of the profits, invested in stock at 5% was handed over to the Society. This ensures an annual income of £15 per annum.

We again thank Messrs. Chambers, Worth & Chambers for the voluntary work of auditing the books.

H. R. McKENZIE, Hon. Treasurer

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LIBRARY ANNUAL REPORT, 1961 - 62

During the year, 100 pamphlets and separates have been added to the library, and the 35 periodicals received on exchange have continued to come regularly.

77 items have been borrowed by members, and 10 items by other libraries on interloan. Circulation of journals has continued, and two circuits are in operation.

A very large collection of separates has been donated to the library by Dr. H. G. Deignan of the United States National Museum. They number several thousands, and have not as yet been sorted and listed. This will be a very big task, and we hope to enlist the assistance of some Society members. I am grateful to Miss C. Bernrieder who has already started to sort the collection into alphabetic order of authors.

I wish to thank Miss M. McIntyre for the help she has given in the library during the past year.

ENID A. EVANS, Hon. Librarian

NEST RECORDS SCHEME
Annual Report for Year Ended 31st March, 1962

The annual intake of nest record cards for the year ended 31st March, 1962, was just under 200, approximately half the number received in the previous year. The number of contributors has also declined by half (11 this year as compared with 20 last year) and it is clear that the biggest effort is being made by a hard core of regular contributors. It is to be hoped that more members will take part in the scheme during the current year. Every contribution, great or small, will be extremely welcome. Full particulars of the scheme, together with supplies of cards, may be obtained from the organiser. Completed cards for the 1962-63 season should be sent to the organiser by 28th February, 1963.

The entire collection now amounts to 2708 cards and a complete list of cards for each species will be appended to next year's report. The only nest record received for a species new to the collection was one for the Yellow-crowned Parakeet sent in by Mr. J. R. Jackson. Contributors for the year were:

S. R. Kennington, M. F. Soper, A. Wright, B. L. Enting, J. Cowie, B. R. Keeley, J. C. R. Claridge, D. G. Dawson, J. R. Jackson, D. V. Merton, H. R. McKenzie.

Dr. Soper's contribution again amounted to over 50 cards.

A few general points to conclude. Cards are not required for nests which have not been laid in or for nests which appear to be deserted when found. Please do not use pencil when filling in cards and, before sending in, check carefully for mistakes and to ensure that no information has been omitted.

J. C. R. CLARIDGE, Hon. Organiser

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INTERIM REPORT ON THE BEACH PATROL SCHEME — For the Year 1961

The detailed analysis of the year's patrols has taken longer than expected, so once again I must ask you to accept an interim report. It is hoped to have the full report in the hands of the editor in the near future.

The Beach Patrol Scheme has had a very successful year and new records have been established with regard to the number of members taking part (40), the length of coastline inspected (770 miles) and the number of birds found (3,229). The year has been a most exciting one both with regard to the numbers of birds found (an average of 4.2 birds per mile instead of the 1.7 in 1960) and to the occurrence of species that are very rare or new in New Zealand (*P. leucoptera* and *P. longirostris*).

To assist in determining the geographic distribution of the various species, the coastline of New Zealand has been divided into 18 zones, 10 in the North Island and 8 in the South. Last year patrols were reported from 12 of these zones, and already there is evidence of differences between zones with regard to the frequency with which

various species of petrels are found. For instance, *P. vittata* accounted for 89% of the 569 prions washed ashore on the Wellington West Coast in July but for only 71% of the 1,074 prions found on the Auckland West Coast at this time.

To detect seasonal changes in mortality, it is desirable to have patrols for every month of the year. In 1961 this was attained only in the Wellington West Coast and Otago zones, but patrols covering at least 8 months were received from Bay of Plenty, Auckland West Coast, Taranaki, Wellington South Coast and North Canterbury. The year 1961 was characterised by three "wrecks," a small one of *P. gavia* in March, a very large one of *P. griseus* in May and an even larger one of *P. vittata* in July (30 birds per mile on the Auckland West Coast). It seems probable that there was some widespread failure of the food supply in the autumn and winter of 1961 because, apart from the severe mortality mentioned above, the press reported an unusually bad year for mutton birders in the South, a poor year for whales in Cook Strait and very heavy mortality of *P. tenuirostris* in Australia.

In conclusion there are two administrative matters to report. First, we are trying to reduce the amount of form filling that is required of beach patrollers. In particular, we are devising a new record card which will largely replace the two kinds used at present. When this new card comes into use (probably at the beginning of 1963) the old specimen record cards will be used only for those specimens that are measured. Secondly, it is with some regret that I have had to inform Council that I can no longer afford the time required for the proper running of the Beach Patrol Scheme.

Mr. B. W. Boeson is taking over as from this meeting, and all correspondence concerning the supply and return of cards should now be sent to him C/o P.O. Box 30, Carterton. Finally, I wish to thank all those members who have contributed so much to the success of the scheme and to ask them to extend to Mr. Boeson the support that they have so generously given to me.

P. C. BULL, Organiser

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REPORT BY CONVENER OF CARD COMMITTEE For Year Ended 31st March, 1962

Ladies and Gentlemen,

The accounts which I am presenting this year are not as favourable as we would have hoped for. They do, however, show a surplus which is therefore an increase in the Society funds and to this end the results are favourable, as that is the whole object of the scheme.

Unfortunately last year we were very late in placing our Christmas cards on the market and as a result many members had already made other arrangements before knowing of our product. The net effect of this was a drop in sales which directly affected our gross profit. Because we managed to cut the cost of producing the cards we managed to recoup some of the loss of sale so that the gross profit on the venture was very similar to that of the previous year. The main increase in overheads came from a substantial increase in advertising. In the past we have endeavoured to keep our advertising costs to a

minimum by co-operating with members of both our own Society and the Forest and Bird Protection Society in distributing our advertising pamphlets in conjunction with their own circulars. This year we were not able to do this and, as a result, incurred substantial postage so increasing the cost of our advertising.

In our balance sheet we show a nominal value for the cost of printing blocks to date. These blocks are being kept in good condition by regular maintenance so that should they be required in the future they will reproduce high quality work. This coming year our Committee plans to continue the scheme and to make available the Christmas cards earlier in the season.

We are indebted to the help of Miss M. C. R. McIntyre who last year handled the complete packaging of all the cards, together with the mailing of them. At the same time we extend our appreciation to Mr. A. C. Hipwell who painted the originals for last year's cards. The success of our scheme rests heavily with these two members who graciously undertook their respective jobs.

B. C. CHAMBERS, Convener

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NOTICES

DONATIONS to 31/3/62

Cash, General: McGrath, D., £10/10/-; McDougall, Miss B. B., £2; Blackburn, A., Love, T., Parsonson, C., Rutherford, V. M., St. Paul, E., £1; Bunce, L. J., Davenport, J. C., Dawson, E. W., Fitzgerald, M. E., Pick, Dr. M., Todd, A., 10/-; Sundries under 10/-, 18/5.

Cash, Illustrations: Fagan, J. A., Sladden, B., £1.

Banding Scheme: Internal Affairs Dept., £100.

Life Subscriptions Increase: Gow, G. V., Endowment member since 1950, now changed to new rate of Life, £20, owing to his having passed the required 30 years he says (he is really well over 80 years); Bell, B. D., £5, total now £15; Keast, J. A., £5/2/6, total now £10/2/6.

Clevedon Field Week-end: Several car owners donated their car allowance, totalling £10.

Back Numbers of "N.Z. Bird Notes" and "Notornis" Donated: The single ones are Vol. 9, No. 1, given in response to special appeal. Other members also have sent it spceially, along with other numbers. Boult, A. A., 1; Carrington, E. E., 27; Couldrey, Mrs. E. M., 16; Coulthard, J. E., 1; Cullen, Mrs. O., 6; Doig, Mrs. W., 1; Duguid, Mrs. F., 13; La Roche, S. A., 69 (full set) and Reports & Bulletins; McKenzie, G. K., 18; McQueen, A., 1; Parham, W., 10; Reid, Mrs. W. J., 10; St. Paul, R., 56 (full set); Taylor, Miss L. L., 4; Watson, A. H. Estate, 25; Watts, Simon, 16.

NEW MEMBERS up to 10/5/62

Allan, Rigby, 27a Skinner Street, New Plymouth
Attwell, R. F., 27 Pompallier Terrace, Ponsonby, Auckland W.1
Barrett, R. S., P.O. Box 42, Ohaeawai
Bishop, Miss Lois J., 5 Clairville Crescent, Glendowie, Auckland
Black, M. J., Kahu Road, Paremata
Cathie, Graham, " Tree Hills," Ohauiti, Tauranga
Coombs, Miss Sheila, 80 Ngapuhi Road, Remuera
Criglington, M. J., Sefton, North Canterbury
Gibson, J. D., 12 Redman Avenue, Thirroul, N.S.W.
Greaney, D. D., Jacksons Bay, P.B., Hokitika
Gross, Peter, Darwin Road, Keri Keri
Hamilton Public Library
Hardacre, Colin H., Te Karaka, Gisborne
Heron, G. C., 86 Endeavour Street, Wellington
Hurley, D. E., 35 Moana Road, Kelburn, Wellington
James, Ian, Kereta, R.D. 3, Thames
Jarvis, Terence N., 111 McKillop Street, Porirua East
Keillor, Mervyn, R.D. 10, Waimate South
Lambert, John, 4 Edward Street, Te Kuiti
Ledgard, N. G., Rangiwai Road, Titirangi
Less, J. A., Umawera, P.B., Okaihau
MacKnight, Mrs. Leila D., 40 Challenger Street, St. Heliers
McLean, P. McD., Te Mapara, R.D. 1, Te Kuiti
O'Connor, Wm. G., 35 Armien Road, Panmure
Purser, L. G., Rotowaro, via Huntly.
Roderick, C. D., Wildlife Branch, Internal Affairs, P.B., Wellington
Rutherford, Stephen, Adberg, Scargill, R.D. 3, Amberley
Slinn, D. J., Zoology Dept., University of Auckland, Auckland
Templer, H., Newstead, R.D. 4, Hamilton

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BACK NUMBERS OF " NOTORNIS "

Members are reminded that back numbers of *Notornis* and the earlier *N.Z. Bird Notes* are obtainable from the Society. Enquiries about costs and the parts still held in stock should be made to:— Mrs. Hetty McKenzie, Box 45, Clevedon, Auckland.

Other publications available are: *The Takahe* (5/-); *Identification of Albatrosses* (1/-); *Reports and Bulletins, 1939-1942*, with Index, (12/-), Index Alone 1/6. These precede Vol. I of *N.Z. Bird Notes* and record the first three years of the Society's work.

As there is a steady demand for back numbers of *Notornis* and especially for the earlier N.Z. Bird Notes (1943 - 1950), members are asked to offer to the Society, for gift or sale, past numbers which they no longer need.

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BANDING REPORTS FOR SALE

The full and detailed Ninth, Tenth and Eleventh Annual Reports of the Banding Committee for the years ending 31/3/59 (38 pages), 31/3/60 (42 pages) and 31/3/61 (37 pages) are available at 5/6d. each and may be obtained from Mrs Hetty McKenzie, Box 45, Clevedon, Auckland.