

agricultural land can be obtained elsewhere, at less cost. Why hack down, burn, and destroy splendid timber land in one part of the country and feebly attempt to sow and replant with trees other parts? Why make an attempt to preserve our native birds by providing sanctuaries in parts where birds are scarce, when in other parts, where the birds exist in myriads, we wantonly and by law exterminate and destroy them?

Thus have we taken a hurried survey of our avifauna, birds many of them unique in the scientific world. The least valuable for game, the poorest songsters, the least interesting still survive in considerable numbers; the battered ranks of the rest tell the sad tale. It is indeed pitiful reading, this passing of the New Zealand ornith.

ART. XLIV.—*The Little Barrier Bird-sanctuary.*

By JAMES DRUMMOND, F.L.S., F.Z.S.

[Read before the Philosophical Institute of Canterbury, 2nd October, 1907.]

By the courtesy of Mr. T. E. Donne, General Manager of the Department of Tourist and Health Resorts, and of Mr. R. H. Shakespear, Conservator of the Little Barrier Bird-sanctuary, I was able, at the beginning of 1907, to spend a fortnight on the island sanctuary, and to observe some of the birds there.

The numbers of our birds have been greatly decreased in recent years. Species have been driven out of districts with the advance of civilisation, and many birds which were once plentiful in nearly all parts are now found only in secluded spots. But I do not think that the position is as bad as it has been freely reported to be. Extensive inquiries have convinced me that we are justified in striking a much brighter note than has been struck by writers on ornithology in this country for a long time. It is quite probable that no native bird has been completely exterminated since Europeans came to New Zealand; there is, at any rate, no absolute evidence to show that any New Zealand bird has been exterminated during the past sixty years. The great destruction which has been wrought, however, has placed our birds in a distressing position, and a visit to one of their sanctuaries has a deep interest for all New Zealanders.

The Little Barrier Island is four miles and a half long and three miles and three-quarters wide. It lies forty-three miles

north-east of Auckland, in the mouth of the Hauraki Gulf. Cape Rodney, the nearest mainland, is fifteen miles to the west, and the Great Barrier is twelve miles to the south-east. Although the island is only 10,000 acres in area, no human being has crossed it. This is accounted for by its extremely rough and rugged character, which adds to its suitability for a bird-sanctuary.

I took an early opportunity of seeing the birds. There was no difficulty in this respect whatever. Large numbers of them came close to Mr. Shakespear's house, flying in his garden, and making themselves quite at home. I had only to go outside my tent to see scores of bell-birds, whiteheads, tuis, tomtits, fantails, and other small species. They are not interfered with in any way, and, as they have confidence in the members of Mr. Shakespear's family, who are the only residents on the island, they show no signs of fear. Guided by my observations, I should say that the bell-bird (*Anthornis melanura*, the korimako and makomako of the Maoris) is the most plentiful. It is found in all parts of the island, and seems to be present in countless numbers. The best feature of its presence is the fact that it is increasing at a fairly rapid rate. Its nest is often found in thick manuka and bush within fifty yards of Mr. Shakespear's house. Mr. Shakespear told me that in the previous season a pair safely hatched out their brood in a clump of manuka overshadowing the meat-safe, ten yards from the back door. Twenty years ago Sir Walter Buller said that "it is only a question of a few years and the sweet notes of this native songster will cease to be heard in the grove, and naturalists, when compelled to admit the fact, will be left to speculate and argue as to the causes of its extinction." A visit to the Little Barrier sanctuary shows that there are no grounds for adopting such a pessimistic tone. If the bell-bird was chased entirely off the mainland—which is a remote probability according to reports received lately—there is every likelihood that it will live on the Little Barrier as long as the forest there is preserved and the sacred character of the island is maintained.

I saw the North Island robin (*Miro australis*) several times. I was delighted with the little whitehead (*Certhiparus albicapillus*), another bird which the North Island claims as its exclusive property. On the Little Barrier the whiteheads exist in very large numbers. Scores of them came hopping and flitting down to watch me make my way through the thick manuka, and followed me as long as I remained in the manuka-clad parts of the island. The whiteheads and the fantails seem to be very friendly, and a flock of whiteheads may often be seen accompanied by two or more fantails.

The time at my disposal on the island was drawing to a close before I saw a stitch-bird (*Pogonornis cincta*, Maori hihi). Two days previous to my departure I was given the privilege of an interview. I was one of a party of five or six. We were on our way to the Heri-Kohu Peak, and at noon, when we were walking along a bushy track, a stitch-bird, which had come down from the heights, flitted about in an excited manner on the boughs above our heads. When its cry was imitated it came closer, and flew among some saplings, uttering a cry which might be written "steetch, steetch," repeated quickly several times. The bird was a female. She ran along the boughs, carrying her tail erect, at almost a right angle with her body, and her wings drooping. She turned round several times, and was the very embodiment of motion. Her cry hardly ceased, and there were very few moments when she took her black eyes off us. We saw seven stitch-birds on that occasion. They were all females. This is rather strange, as the female is described by several naturalists as being specially shy and retiring. The stitch-birds I saw on the Little Barrier were very tame. They had no fear, and even when a stone was thrown into the trees on which they alighted, they only flitted off to another bough. The locality which they favour with their presence most is in the north of the island. The haunt can be visited only with great difficulty and inconvenience. There these birds are numerous, and as many as fifteen have been counted at one time.

I saw a good deal of the white-breasted tits, which came near my tent every morning and gave me many opportunities for watching them as they flitted about in the low scrub. They have a peculiar method of alighting on a tree. The tits seem to be utterly devoid of fear, and they make close friends with all visitors to the island.

I saw many other native birds. Tuis are present in large numbers. The two migratory cuckoos—the long-tailed cuckoo (*Urodynamis taitiensis*) and the shining cuckoo (*Chalcococcyx lucidus*)—come regularly in their seasons, and depart again for their other homes across the sea. In the summer the long-tailed cuckoo's note may be heard at almost any time of the day, and also at night. I have heard the loud, shrill, and piercing "whirrt, whirrt," continued for nearly a quarter of an hour, ringing out over the gorges at intervals of from six to twenty seconds.

I did not hear the "song of dawn" on the Little Barrier in its perfection. It can be heard at its best only in the spring, and the time of my visit was too late in the season. In the spring months, as soon as the dawn appears, all the birds burst

into a joyous chorus. The bell-birds and the tuis lead, and are followed by the robins, the whiteheads, and others, until an almost incredible volume of sound is created. There is a surprising variety of notes, and, as they are all poured forth at the same time, they make a din of bewildering music.

Pied shags (*Phalacrocorax varius*) are plentiful, and are increasing rapidly. There are several shaggeries near the cliffs; the largest is about three-quarters of a mile from Mr. Shakespear's house. The black shag (*P. carbo*) is occasionally seen on the island. I became personally acquainted with the black petrel (*Majaqueus parkinsoni*) and Cook's petrel (*Es. relata cooki*), both of which nest in the burrows upon the heights. The cry of the black petrel, which is often heard at night, is unlike that of any other bird. It sounds like the combination of a soft whistle and a deep "whirr," coming from a husky throat. I examined the nest of one of these birds, in the soft soil at the top of Mount Heri-Kohu. The nest was at the end of a burrow, about 2 ft. long. A female bird was sitting on a single egg, and a chick had just thrust its head through the shell. The bird and the egg, after being examined, were placed back in the nest, and, in accordance with the rules of the island, neither was interfered with.

There are no huias (*Heteralocha acutirostris*), saddlebacks (*Creadion carunculatus*), North Island crows (*Glaucopsis wilsoni*), wekas (*Ocydromus*), pukekos (*Porphyrio melanonotus*), bitterns, or North Island thrushes (*Turnagra tanagra*) on the island. The godwit (*Limosa novæ-zealandiæ*), the turnstone (*Arenaria interpres*), and the knot (*Tringa canutus*), the famous migrants that breed in the Northern Hemisphere and spend the summer in New Zealand, do not visit the island in their regular flights, and shore birds are seldom found on the sanctuary, as there are no mud flats or beaches and no food-supplies for them. Ducks are entirely absent.

In 1868 Captain F. W. Hutton reported that saddlebacks were present, but were not common, and Mr. Reischek recorded their presence in 1886; but Mr. Shakespear has seen none during the ten years he has resided on the island. Mr. Reischek states that he saw the North Island kiwi (*Apteryx mantelli*), but it must always have been very rare on the island. In 1862 Captain Wood, of the "Porpoise," spent several days on the island with the express object of obtaining kiwis, but found none; and Sir George Grey, who spent two days on the south-west portion of the island, met with the same disappointment. Mr. Shakespear has not seen any kiwis on the island. Four years ago Captain Bollons, of the "Hinemoa," liberated a southern kiwi (*Apteryx australis*) and two North Island kiwis

(*A. mantelli*) from New Plymouth, and also kakapos (*Stringops habroptilus*), but nothing has been seen of them, although they may be getting on very well.

Large numbers of kiwis could be liberated on the island with advantage. Some of these birds might be sent from the south in the "Hinemoa," which could make a special trip for the purpose; and wekas and other native birds might also be placed on the sanctuary.

Several introduced English birds are on the island. Amongst these are the house-sparrow, the thrush, the blackbird, and the starling. They do no harm to the native birds, and the English birds and the native birds do not associate.

Of other animal life, insects are exceedingly plentiful; among them are four species of wetas, notably the large black one. A tuatara lizard (*Sphenodon punctatus*), nearly 2 ft. long, was caught near the landing-place, but was liberated again. It is supposed that other tuataras exist on the island, but this is the only one that has been seen by the present residents. There is at least one large colony of bats. It is thought that they belong to the short-tailed species (*Mystacops tuberculatus*), which was supposed to be on the verge of extinction. I was taken to the tree in Kauri Gully where the bat-colony exists, but no bats were seen. The Maori rat (*Mus exulans*) is very plentiful. There is a rare black lizard, which lives amongst the boulders near the shore. A gigantic earthworm (*Diporochæta gigantea*) is found on the hills in the bush. One specimen measured 4 ft. 6 in. long. It is one of the largest earthworms in the world. The waters teem with fish of different species.

The birds, on the whole, thrive exceedingly well on the sanctuary. Many of them are increasing fairly rapidly in numbers, and there is no evidence to show that any of the species represented will become extinct. The Norway rat, the pig, and the English bee are entirely absent, and cats are very rare. A theory has been put forth that the English honey-bee takes possession of the forests and drives honey-eating birds, like the bell-bird and the tui, away from the flowers and starves them out. Bees will take their share of the honey from the forest flowers, but it is hardly likely that they do so to such an extent as to affect the numbers of the birds. As far as any evidence brought forward goes, I think the bees should be acquitted, and all the blame for the birds' banishment from large tracts of country should be placed upon cats and rats, and bush fires, and on the advance of civilisation generally.

The climate of the island is very mild; there has been only one frost in the past ten years. In all respects it is an ideal place for a bird-sanctuary. It is well wooded; there is no

regular communication with the outside world; absolutely no natural enemies of the birds are present, except a few cats; and unauthorised people cannot land without experiencing inconvenience, hardship, and danger. The members of Mr. Shakespear's family, the only residents, are devoted to the birds, which are given all the protection that can be accorded to them, and it is gratifying to know that on this sanctuary they are secure from enemies.

Only two visits from unauthorised persons have been discovered since Mr. Shakespear has resided on the island. Owing to the island's rugged character, it is impossible to traverse it from coast to coast, but Mr. Shakespear frequently goes round in his yacht.

I append a list of birds on the sanctuary, supplied by Mr. Shakespear:—

Grey warbler; riro-riro (*Pseudogerygone igata*). Very plentiful.

White-breasted tit; miromiro (*Petraca toi-toi*). Plentiful.

North Island wood-robin; toutouwai (*Miro australis*). Increasing.

Pied fantail; tiwakawaka (*Rhipidura flabellifera*). Plentiful.

Whitehead; popokatea (*Certhiiparus albicapillus*). Very plentiful, increasing rapidly.

Ground-lark; pihoihoi (*Anthus novæ-zealandiæ*). Rare.

White-eye; tauhou (*Zosterops cærulescens*). Very plentiful.

Tui (*Prothemadera novæ-zealandiæ*). Plentiful.

Stitch-bird; hihi (*Pogonornis cincta*). Keeps to the rugged parts, but is increasing.

Bell-bird (*Anthornis melanura*). Present in very large numbers.

Bush-wren, or rifleman; ti-titi-pounamu (*Acanthidositta chloris*). Rare.

Kingfisher; kotare (*Halcyon vagans*). Not so plentiful as on the mainland, but fairly plentiful.

Shining cuckoo; pipiwhararua (*Chalcococcyx lucidus*). Plentiful in the summer; its egg has been found in the grey warbler's nest on the Great Barrier, but the egg has not been found on the Little Barrier.

Long-tailed cuckoo; koekoea (*Urodynamis taitiënsis*). Plentiful.

Kaka (*Nestor meridionalis*). Plentiful.

Red-fronted parrakeet; kakariki (*Cyanoramphus novæ-zealandiæ*). Plentiful at certain times of the year.

Yellow-fronted parrakeet; kakariki (*Cyanoramphus auriceps*). Rather rare.

Kakapo (*Stringops habroptilus*). Three liberated four years ago, but not seen since.

Bush-hawk; karewarewa (*Nesierax australis*). Plentiful.

Harrier; kahu (*Circus gouldi*). Plentiful.

- Morepork ; ruru (*Ninox novæ-zealandiæ*). Plentiful.
 Wood-pigeon ; kuku (*Hemiphaga novæ-zealandiæ*). Plentiful.
 Marsh-rail ; koitareke (*Porzana affinis*). Very rare.
 White-fronted tern (*Sterna frontalis*).
 Caspian tern (*Hydroprogne caspia*). Has been seen.
 Black-backed gull ; karoro (*Larus dominicanus*). Nests on the north-west corner of the island.
 Red-billed or mackerel gull (*Larus scopulinus*). Does not nest on the island.
 Nelly, or giant petrel (*Ossifraga gigantea*).
 Diving petrel (*Pelecanoides urinatrix*).
 Rain-bird (*Æstelata inexpectata*).
 Mutton-bird (*Puffinus griseus*).
 Shearwater (*Puffinus gavia*).
 Allied shearwater (*Puffinus assimilis*).
 Cook's petrel (*Æstelata cooki*). Nests on the top of the hills.
 Black petrel (*Majaqueus parkinsoni*). Nests on top of the hills.
 Grey-faced petrel (*Æstelata macroptera*).
 Dove petrel, or whalebird (*Prion vittatus*). Nests on the Hen and Chickens.
 Blue penguin (*Eudyptula minor*). Nests on the island.
 Gannet ; takapu (*Sula serrator*). Nests on the Great Barrier.
 Black shag ; kawau (*Phalacrocorax carbo*). Seen sometimes.
 Pied shag ; kawau (*P. varius*). Present in large numbers ; nests on the south-western side of the island ; and, as it is never interfered with, it is increasing in numbers rapidly.
 Kiwi (*Apteryx australis* and *A. mantelli*).

ART. XLV.—*The Grasses of Tutira.*

By H. GUTHRIE-SMITH.

[Read before the Hawke's Bay Philosophical Society, 3rd September, 1907.]

TUTIRA lies in the northern part of Hawke's Bay, about midway between Napier and Mohaka, and contains limestone of the varieties known to geologists as "Hawke's Bay limestone" and "Maungaharuru limestone," the former bounding the eastern edge of the run, and containing many distinct and unbroken shells ; the latter the western, and exposing only crushed fragments. Between these ranges are conglomerate and sandstone formations ; papa crops out in a few places. Slips are very numerous on the steep country, and the whole surface has been heavily sprinkled with wind-borne pumice-grit.