

BIRD LIFE ON THE SNARES.

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Before dealing with the birds on Snares Islands it would be well to say something about the islands themselves. For the most part, they are covered with *Olearia Lyallii*, and a great portion of this is a pure stand—there is no undergrowth whatever. Here and there, where the olearia admits enough light there is a considerable growth of fern and grass, mostly *Polystichum vestitum* (black fern) and *Poa foliosa*, with some *Asplenium lucidum*, var. *obliquum* (shiny fern) and *Poa Astoni*. The olearias grow to some twenty-five feet in height, but, because their root system is very shallow (due, no doubt, to the acidity of the peat at greater depths than about two feet) many of the trees are then blown over. They lie more or less prostrate, with enough roots still active to keep them alive, and root where their supporting branches touch the ground. Sprouting vertically from these new roots, they grow up and subsequently get blown over again. The result is that, in many places, particularly on the sides of the valleys, the bush is a mass of prostrate or semi-prostrate trunks. The wood is tough, hard and durable, and when at last it decays, it has a tendency to do so from the inside, leaving hollow shells on the ground or arched above it.

Veronica elliptica grows abundantly, especially near the coast, and it is a bad plant—difficult to force a way through, and not used by tits or fernbirds to nest in.

Senecio Stewartiae is not very plentiful, growing as isolated trees, or in small clumps here and there. Near the edge of the coastal bush there are a few larger areas, the biggest of which would be an acre or more.

The black fern grows in big, many-headed clumps, and eventually has a compound trunk, which may be over three feet high. It grows only in the bush, and especially along the edges of streams.

The shiny fern grows under the bush, where it has luxuriant foliage two feet long, or out in the open where it forms mats with rigid erect leaves from six inches to a foot in length.

Poa foliosa, the broad-leaved grass, grows in the bush or in the open, and in the latter situation, especially on banks where the soil is rich, grows like a nigger-head with a stem up to 1½ feet high. In such cases, the stem may be over a foot in diameter and be used by diving petrels for their burrows.

Poa Astoni, the tussock grass, when in suitable situations, also grows a stem up to 2 feet high, and sometimes as much in diameter, which is drilled by petrels. On rocky outcrops it grows on ledges, where it hangs over the sides, forming good sites for nests.

Along much of the immediate perimeter of the island there is a strip of these two grasses of varying width before the bush begins. There are also areas of grass in openings in the bush, and a large open field at the head of one of the valleys.

In some swampy areas, and especially near the depot, *Carex trifida* grows in thick clumps.

SNARES CRESTED PENGUIN.

It has been said that the penguins (*Eudyptes pachyrhynchus atratus*) by forming rookeries in the bush, kill out the olearia in a few years, and then move to another situation, whereupon the olearia re-establishes itself. That this does take place occasionally there can be no doubt, but it is far from being the general order of things. Firstly, because for their nesting sites the penguins prefer ground where rock is showing, or has no great thickness of soil over it, and so would be unsuitable for olearias anyhow. Secondly, because, in the three penguin colonies near our camp, which were partly under trees, the trees were only slightly affected. Thirdly, the olearia wood is, as I have said, durable and

withstands weather well, yet I saw no penguin colony with many dead trees in it either standing or fallen. Finally, there is abundant evidence that the penguins prefer a nesting site open to the sky, though they will nest in places more or less shaded by trees, for there were three or four colonies in the bush.

There were one or two areas of dead veronica obviously killed by penguins, and here and there a dead olearia, but no great number of the latter. Moreover, of the several areas that had evidently been used by penguins in recent years and then deserted, only two small ones showed dead olearias (small trees, say 6-10 years old) and a number of lush young plants coming on. I think it is at least as likely that these deserted nesting sites are due to fluctuation in the penguin population as to any desire of the birds to move to new areas. It is, of course, possible that infestation of the ground by vermin may cause the birds to move, but I found no evidence of this.

The penguins nest in colonies which may have from a dozen up to three or four hundred nests, and whatever amount of grass is on the ground when the birds begin their occupancy, there was no sign of verdure left by the time we arrived. Scattered all over the colony and half-buried in the mud were eggs, the decomposing contents of which were of a pale slate blue in colour. At the time of our visit all of the young were a month or so old, but I found three nests with addled eggs on which the birds were still sitting. The state of the inside of the eggs indicated that they were probably three or four weeks overdue, which is a long time for a bird to sit beyond its normal period. The penguins build good nests—a foundation of sticks a foot to eighteen inches long and up to an inch thick, lined with leaves and tufts of grass. The nests are placed about $2\frac{1}{2}$ feet apart in rows, the alleys between the rows being some 3 feet wide. The remnants of nests left at the time of our visit were in most cases not so distinct as to be identified, but while it was quite evident that in some colonies the nests had largely been arranged in rows, in others they seemed to have been higgledy-piggledy. Of the three birds found sitting, two were on two eggs, the third on one. It is probable that two is the normal clutch. Quite a number of pairs of birds were still building spasmodically and it is likely that these were birds that had failed with their brood. No nests were seen with fertile eggs in them, however, so it seems that the birds do not lay again.

On a previous visit, I noted this same nest building on February 1, but again saw no fresh eggs or any late young.

The most amazing thing about a penguin colony is the noise. There can be very few birds outside the *passeres* that make as great a variety of noises as these crested penguins do. They have a staccato bark that sounds in the distance like someone chopping wood; soft musical whistles that may give way to a series of guttural quacks reminiscent of an old drake in a farmyard; harsh screams of anger or alarm, and a number of grunts that sound in the distance like humans talking. Indeed, when walking around in the bush, one is constantly stopping and wondering if the noise comes from persons or penguins.

By November 24 the young penguins were fairly active, and though a few of the smaller ones were still being brooded in their nests by their parents, most of them had gathered into little groups of a dozen or so. It is not by any means certain that this gathering together of the young signifies communal feeding by the adults, for when a parent arrived with food and was beset by many young, it was very selective in the choice of the recipient, though how it could recognise its own young was not clear.

The penguin colonies became seas of mud after heavy rain and when a downy youngster had fallen down in this, it got up again such a bedraggled object that it is difficult to see how it could be recognised, unless by its voice. In one small colony we counted the occupants and found there were c. 60 young and c. 100 adults.

It is to be noted that the crested penguin of Snares is at least a month later in its nesting than the crested penguin of the islands off the S.W. coast of Stewart Island. The young of these last are fully feathered and ready to go to sea by December 1st, whereas the Snares young on that date are less than half grown.

By February 1 on Snares all the young of the year have left the colonies which are still full of birds, and there is, as I have said, still a good deal of nest-building and quasi-courtship going on. Of great numbers of birds seen on February 1 only two or three were moulting.

Many of the colonies were situated on either side of a creek—in cases a tiny trickle—and the birds going to and from them delighted in bathing and washing themselves in fresh water. The nesting sites were situated right on the shore or away inland so that the birds in some cases had to travel a mile overland and climb anything up to four hundred feet in doing so. One much frequented landing place was at the foot of a rock face 350ft. high and inclined at an angle of about 60 degrees to the horizontal. At any time of the day there would be 5,000 birds coming up or going down that face, which I doubt that a man could have climbed. Entertaining as were the colonies per se, they had an added interest as the centres of attraction for the three land birds (the snipe, the tit and the fern bird), all of which found in them their most concentrated food supplies. Throughout the day, tits and fern birds were to be seen collecting white maggots from the mud, and snipe were always to be found hiding in the surrounding cover.

CAPE PIGEON.

On our journey to the Snares we discussed the matter of Cape pigeons (*Daption capensis*) nesting on the Western Reef. When we arrived there and were anchored in the lee of the southern cliffs, these birds were seen flying to and from a rocky headland on the largest outlying island. Later we passed close to this cliff and saw birds obviously sitting on nests in clefts in the rock twenty or thirty feet above the sea, while bird droppings at the entrance to other clefts indicated the presence of other nests. On two rocky islets off the north-west corner of the main island many (say, c. 50 pairs) Cape pigeons were flying about and alighting, and with glasses, some could be seen apparently sitting on nests. Unfortunately, the sea during our stay was always too rough to permit any attempt at landing on these rocks.

On the western cliffs of the main island itself there were several Cape pigeon colonies. One near the north end of the island, was about three hundred feet up from the sea, in a broken rocky face with a good deal of grass on it. From above birds could be seen sitting on peaty ground in cracks in the rock. The behaviour of many of the birds circling around, clearly indicated that some pairs had not yet begun incubating. Along the cliff face the birds sailed to and fro on an updraught, pausing every now and then to hover with rapidly fluttering wings opposite the place where their mate was sitting, or where they were contemplating nesting.

Falla landed on the northern island of the Western Reef on December 4 and found Cape pigeons nesting there in great numbers. He has kindly supplied me with a copy of his notes on the subject for inclusion here:—

“December 4, 1947.—Cape pigeon.—During a circumnavigation of the main island in the afternoon, Cape pigeons were again seen fussing round the steep headland on the south-west point, and also in fair numbers round the cliffs and stacks at the north end.

“ ‘Alert’ was then headed out for the Western Reef where owing to the unusual spell of easterly weather, it was found possible to land on one of the inner islets of the chain. It rose by a series of easy terraces of bare granite to an abrupt termination in high cliffs, and seemed at first devoid of all life except for seals on the lower edges and a pair of skuas.

"However, before the summit was reached, a Cape pigeon was found sitting on an egg beside a sheltering rock ledge. This was an outpost of more numerous nests near the summit. Many were deep in crevices, some on narrow ledges, and others on flat ground within a foot or two of some breakwind shelter. In the small area of fifty square yards or so adjoining the cliff edge that Mr. A. J. Black and I had time to examine, there were more than 50 nests. All were composed of heaps of sharp angular fragments of the much weathered upper rocks and had exactly the appearance of those I have seen on the Antarctic mainland. Most of the birds had eggs but a few were sitting on empty nests. There was a good deal of the 'visiting' which is so characteristic of fulmars and enough cooing, clucking and cackling to remind one of a poultry yard. Their habits at the nest are similar to those recorded for the fulmar family everywhere, with defensive wing drooping and oil ejecting. Birds on the move shuffle to and from the cliff edge and most of the taking off and alighting is done there. A great deal of circling and cliff skimming seems to take place before any landings are effected.

"The activity here described was all observed between 3 and 4 p.m."

Of the eggs he brought back some were quite fresh, while I estimated that others had been incubated for periods of up to three weeks. They are white, the shell being very smooth and fine grained but without any gloss. They vary greatly in shape, the measurements of six eggs being: 67 x 40.5, 64.5 x 40, 62 x 44, 61.5 x 44.5, 60.5 x 42, 58.5 x 43.5 m.m. The average of all the eggs was 61.7 x 42.5 m.m. which is smaller than the average given by Clarke of 62.35 x 43.1 m.m. for eggs from the South Orkneys.

BULLER'S MOLLYMAWK.

The main island of Snares is one the chief breeding places of Buller's mollymawk (*Thalassarche bulleri*). These birds begin to lay about February 1, so it is interesting to note that up to the time of our leaving the island (December 7) no Buller's mollymawks had been seen in the vicinity.

GREY DUCK.

Grey duck (*Anas superciliosa*) were frequently seen, at least four pairs inhabiting the Boat Harbour and the two creeks that emptied into it. Up one of these a current season's duck's nest, with a rotten egg in it, was found on top of a clump of black fern. Not far away in a clump of slippery fern was another nest with seven fresh eggs in it. Two days later it had nine, but the bird was not yet sitting. Another nest in the upturned root of an olearia which had been blown over, had ten hard set eggs. A nest in a clump of *Poa Astoni* on a rock almost surrounded by the sea contained seven eggs which had been incubated for some time. Of these, three were "pullet" eggs of about half normal size.

SNARES SNIPE.

The snipe (*Coenocorypha aucklandica haegei*) is the least in evidence of the three land birds, but that is quite likely chiefly on account of its somewhat skulking habit, and because it is largely nocturnal. When flushed in the daytime, it usually runs a few feet, and stands still by some covert, silently regarding the intruder. They are not by any means entirely inactive during the day, and, especially on cloudy days, I frequently saw a pair running about and feeding by driving their bills deep into the ground. Yet, on many occasions when examining clumps of fern for nests, I have disturbed a snipe that was obviously having a siesta. It would run a few yards and then pause, stretch its wings over its back, and have a good yawn, its whole demeanour indicating that it had been in repose. They are reluctant to fly during the daytime, and, when they do so, it is not for more than ten or fifteen yards, and often for only two or three. Two persons can run one down if it is in the open, but could not possibly do so in the bush or in thick cover. At night they fly more readily and for considerable distances,

according to Falla and Fleming. I saw only one fly at night and its flight was swift and rather like that of a woodcock. Their food apparently consists chiefly of worms—this was the only food I saw them take—but they doubtless also eat the white maggots from the ground as do the tit and fern bird. I may say that worms of at least two kinds—a small pink one and a large whitish lob worm—are abundant, as we found when digging while pitching our camp. In the root of one clump of black fern were five or six lob worms up to a foot long and about half an inch in diameter. Always, as already noted, snipe are to be found on the outskirts of penguin colonies. They seemed to be rather territorial, as pairs could usually be found, each in its own locality, yet on one occasion I saw four of them in an area of five yards square, with a fifth not far away, and they were moving about quietly and harmoniously.

Their laying season commenced at the beginning of December, so we found only three occupied nests. In the middle of the depot peninsula were some rocky outcrops with a good deal of *Poa Astoni* growing on their sides. A pair of snipe inhabited this area and one evening I got some other members of our party to shoo the sea-lions away from these rocks while I searched for the snipe's nest. I found an old nest with an addled egg, on a rocky ledge overhung with grass, and another similar ledge that looked a likely place for this season's nest. The next day we found two nests, each with two fresh eggs; the first was in the heart of a big tussock of *Poa foliosa*, about one foot above ground level, and the second in a similar clump but more deeply buried in the grass. The nests were deep cups of fine grass $9\frac{1}{2}$ c.m. wide by 7 c.m. deep, and contained a good deal of material—much more, indeed, than is usual in members of the snipe and woodcock families.

On December 2 the snipe near the depot laid its first egg on the ledge I had been watching and she laid her second on the 4th. On the 5th, together with Fleming, I tried to photograph this bird, but she forsook her nest with less provocation than I have ever known to produce this result with any other bird.

One evening at dusk when two of us were hurrying through the bush, we came on a snipe, which did not see us until we were within a few feet of it. It ran, with outstretched wings, for three yards, and then paused, feigning injury with drooping fluttering wings. I thought it might have a nest nearby, but failed to find one when I searched the area next day.

The eggs, of which two is the full clutch, closely resemble woodcock eggs, being quite unlike those of the true snipe. They are bluntly ovoid in form, and the ground colour in the seven eggs I saw is greyish white or pale brownish buff. The markings, which may be clean cut spots or ill-defined blotches, are of reddish-brown, with underlying markings of blue-grey. In some, most of the markings were at the larger end of the egg, while in others, the spotting was evenly distributed over the whole surface.

Six eggs measured 54×32.5 , 45×32 , 44.5×32 , 43.5×32 , 43×32 , 41×31 m.m., which is considerably larger than the eggs of Chatham Island snipe or the snipe from the outliers of Stewart Island.

ANTARCTIC TERN.

Antarctic tern (*Sterna vittata bollonsi*) nested in considerable numbers around the island. While we were anchored at the foot of the southern cliffs, prior to landing, we watched a colony of at least twenty nests some thirty feet above sea-level, among tufts of *Poa Astoni*. On the south side of the landing there were eight nests from ten to twenty feet above sea level, and on prominent rocky headlands nearby, from one to five pairs of birds were breeding, at elevations up to 150 feet. The nests I saw were all shallow scratchings in a tuft of *Poa Astoni*, lined with blades of this grass and in one case the nest was overhung by a small veronica. This may have been as some protection against skuas,



Photo by author.

PENGUIN LANDING AT HARBOUR ENTRANCE, SNARES.



Photo by author.

SNARES FERN BIRD.



Photo by author.

SNARES TIT with Bill Full of White Maggots for Young.

for in a situation where skuas were very numerous, the nests of a colony of red-billed gulls (*Larus scopulinus*) were all completely underneath veronicas. In all the Antarctic tern nests we saw there was only one egg or young bird. That this tern has a prolonged breeding season is proved by our finding fledged young almost ready to fly and also fresh eggs. I saw three nests being built and a bird carrying grass in its bill to a fourth. It may be that the Antarctic tern raises two broods a year at Snares, for on a previous visit I had seen birds feeding young on February 1.

On narrow ridges with precipitous sides on the north coast of the island were two young terns, the one almost ready to fly, the other slightly smaller. They were being fed at frequent intervals by their parents on small, rather attenuated and not very silvery fish between two and three inches long.

The eggs resemble those of the black-fronted tern (*Sterna albigriata*) but are much larger. Of dark green, olive, or olive-brown ground colour with spots of black, or dark brown and underlying markings of grey, two measured 45.5 x 30.5 and 46.5 x 33 m.m.

ANTARCTIC SKUA.

Skuas (*Catharacta skua lonnbergii*) were abundant at Snares, particularly at the north-east corner where were the main penguin landings.

On one occasion we counted about 70 skuas in the air, most of which were using a grass-topped off-shore rock for a resting place. They feed extensively and chiefly on young penguins. During the time of our visit middens containing the remnants of several species of petrel were found in the vicinity of most skua nests.

Perhaps the most unexpected find was a pair of skuas with young close to our camp which showed no inclination to attack us. Even when the young birds were being disturbed, the old birds would stand calmly on a tussock nearby, calling it is true, and stretching their wings about their backs, but never making any attempt to swoop at the trespasser in their domain.

Of the 70 birds referred to above, there was no sign that any were nesting that year.

SNARES FERN BIRD.

The fern bird (*Bowdleria punctata caudata*) is the most plentiful of the three endemic land birds on the Snares, being found all over the island, even on steep faces, wherever there is vegetation.

Its nesting season was in full swing during our stay and by the size of some of the young birds seen, had apparently commenced about the beginning of October. I was fortunate, therefore, to see a fine display between a cock bird and a hen. The cock, with spread wings fluttering, sang loudly, a clear single bell-like note, keeping time by stamping with his left foot. The hen, behaving similarly, sang a little trill and danced to and fro on a grass tussock. The cock bird stood erect at times, drawing himself up and throwing his head back as he whistled; at other times he assumed a crouching attitude. The performance continued for some three or four minutes, and then the cock bird hopped off into the grass and the hen presently followed him.

The favourite site for the cup-shaped nest is in a thick clump of black fern or broad-leaved grass. In open situations, thick beds of shiny fern are also much used. First a deep hollow is made, wherein an outer layer of fine rootlets is lined with grass, *Poa foliosa* being almost exclusively used for the purpose. As is the case with the mainland fern birds, only the lower half of the deep cup is lined with feathers. The nest is tightly packed into the cavity which has been formed for it, so that the whole of the outside is supported by the surrounding material.

The cup measures 55 m.m. in inside diameter, by 65 m.m. deep, the walls being from one to three c.m. thick.

We found a great many nests and all of them without exception were in situations where they would be well sheltered from rain. *Poa Astoni* was not used as frequently as the broad grass and the black fern, but when it was used it was evident that the birds had burrowed deep into it in order to get sufficient shelter for their nests.

It was noticeable that the birds, when nesting in fern clumps, never did so over a crown, so that no nest was found which had been upset by young fronds growing up under it—which is remarkable seeing the frequency with which blackbird and thrush nests were found so upset.

The eggs are somewhat similar to, but average larger than those of the mainland species, though large eggs of the Stewart Island sub-species (*B. p. insularis*) are as big as the smallest eggs of the Snares bird. Six eggs measured in m.m. 24.5 x 16.5, 24.2 x 17, 24 x 16, 23.5 x 16.5, 22.5 x 16, 21.5 x 16.5.

The usual clutch is two, but about 5 per cent. of the nests found had one egg only and about 10 per cent. had three. The colour of the eggs is white or pale mauvy pink, and in each clutch the first laid egg is very heavily spotted over the whole surface with minute spots of red and mauve. The last laid egg of the clutch is very pale in comparison, having few if any red spots on it and only indefinite mauve blotches. I know of no other egg clutches in which the difference in colouring between the first and last egg laid is so consistent and so extreme. In the case of clutches of three, the second egg laid is about midway in intensity of colouring between the first and third, which latter two would form a normal pair.

There was some agent of destruction among the fern bird nests that we were not able to determine. One nest which had been under observation for some days in the top of a big clump of black fern, and in which the young one had been hatched for two days, was found empty. In two other cases nests had their single eggs destroyed, and in only one of these was the remnant of the egg found in the nest. The damage may have been done by snipe, for all three of these nests were in situations readily accessible to snipe, which most fern bird nests were not.

I have said that the birds are extremely common, and as they are rather territorial in their behaviour, disagreements between birds were often seen. In most cases the trespasser would just remove himself quietly from the territory of the protesting bird but occasionally there were seen twittering disputes accompanied by much fluttering of the wings and chivying, although it did not seem that the birds often actually came to grips. In open grass country, two nests were found which were just 18 yards apart; but two other nests were found, one on either side of a small penguin colony, and these were barely 12 yards apart.

That the birds occasionally nest in hollow logs is indicated by the fact that F. Newcombe saw a bird carrying nesting material into a hole in a rotten log in the bush.

The Snares fern bird flies more readily than the species inhabiting the mainland, and it was not unusual to see birds voluntarily undertaking flights of 50 yards or more, indeed I once saw one fly with building material for over 100 yards. Their food supply seems to consist chiefly of white maggots which they get out of the ground, mostly from the penguin colonies, but birds were seen foraging for insect food among the dead leaves on the floor of the bush, or on the bark and among the branches of the trees themselves. Both birds incubate, and I never saw on any occasion one adult feeding another. One bird which was feeding young in a nest, collected maggots from a dead seal which was lying on the rocks, taking billsful of this unsavoury diet to the young at frequent intervals. The young, when they first leave the nest, are almost square-tailed, and the parent birds evidently very soon begin to build another nest, for on one occasion I saw a pair of birds, accompanied by a young

one which had not been flying for more than a few days, building a new nest in a clump of fern.

That the breeding season is prolonged is shown by the fact that on a previous visit a nest was seen with newly hatched young on February 1, so that it is not unlikely that some pairs, at any rate, rear three broods in a season.

It was noticeable that the fern birds paid very little attention to skuas. Indeed, the indifference was mutual, for fern birds were frequently seen hopping about quite unconcernedly within a few feet of the larger birds.

It may be noted here that in the tops of the big grass tussocks it was not unusual to find little circular scoopings of two sizes in the dry grass, which looked as though they had been used as roosting places by birds, although there were never any droppings in them. The smaller were about 6 c.m. in diameter and the larger about 10 c.m. The material had obviously been arranged around them, and I formed the opinion that they had been made, the smaller by fern birds and the larger by snipe. They were very like the roosting places made by pectoral rails (*Hypotaenidia phillipensis*) on Cundy Island excepting that these invariably had droppings around them. It is reasonably certain that there is no hitherto undiscovered rail on Snares, for, of the hundreds of mutton bird eggs we saw lying on the bush floor, none was pierced and sucked, as would undoubtedly have been the case had there been a rail there.

SNARES TIT.

There was considerable discussion, mostly between Dr. Falla and C. A. Fleming as to whether the Snares tit (*Petroica macrocephala danneferdi*) was a tit or a robin. As most of its behaviour is more like that of a tit than that of a robin, I propose to refer to it as a tit.

It is a common bird, which is to say that the island is fully stocked. Like its mainland relatives it is strongly "territorial," though, possibly because of the limited terrain, its territory is only 60-100 yards across, against two or three times that amount on the mainland. On the day after our landing, I saw a pair looking for a nesting site. The hen flew to the depot shed and went inside while the cock sat on the roof. I had found three previous year's nests among the packing cases when clearing the shed, but the new arrangement inside did not suit the tit and she flew off, followed by her mate, to inspect the rock face at the Boat Harbour. An old tree five yards from our tent had a big hole right through it, so I set about making it a perfect tit's nesting site. By nailing a bit of rusty tin over one side of the tree and plugging most of the cavity with a big lump of fern stem, a nice dark cavity was produced with a suitable depression for a nest in its most secluded corner. The tits had found it within half an hour, and within the hour had begun building in it, so we had ample opportunities for watching the process. During site-hunting and nest building the hen is fed by her mate, but she carries all the material and does the building. (Falla once saw the cock bird also carrying material.) First she laid down a little circle of bits of dry moss, mixed with fern scales and a few leaves of grass. The outside of the bottom of the nest had a diameter of about 15 c.m. Gradually building this up, she carefully bonded it with tiny rootlets, fibres and cobwebs. During four days of almost continuous rain she collected dry material from a big scar of rotten wood on the underside of a limb, and from under overhanging fern fronds. The centre of the nest was composed chiefly of fern scales and finally lined with some wonderfully soft pale brown fern scales and a few light coloured petrel feathers. The cavity was 6.5 c.m. across by 4 c.m. deep. She began building on November 26 and the nest was completed by the evening of December 1. Then, very tit-like, she rumbled up the bottom of the nest and left it for two days. Actually, I did not see her near it during those 48 hours, but early in the morning of December 4 I found an egg

in it. She missed the 5th and laid her second egg early on December 6, the day we left the island.

Many tit nests were found, and the two chief differences between them were their external diameter, which varied from 10 to 16 c.m. according to the cavity in which the nest was placed, and the colour of the feathers used as lining. Some nests had all light coloured feathers, others darker, and one all black. Without exception they contained three eggs or young. Most of them were exceedingly well hidden in hollow logs or holes in trees. All around the perimeter of the island tits were nesting just over the edge of the cliffs on ledges or among vegetation. In the bush the nests were all less than four feet from the ground, and one was actually on the ground, at the foot of a big sloping tree. All were very well protected from rain.

The cock bird feeds the hen while she is incubating, flying with a bill full of food to a perch which may sometimes be thirty yards or more from the nest, and calling her off. In a crouching attitude, and with wings fluttering she receives the food and immediately returns to the nest. The chief food is white maggots from the ground, but the birds assiduously hunt the top growth of the olearias for caterpillars, the one most frequently found being greenish and about an inch long. They also hawk small moths in the air, and though they are not very adept at catching them, usually persist until they do so. When the young are small the cock calls the hen off the nest to a nearby perch for her food, and also feeds the young at the nest, the hen standing aside while he gives the food to the young. When the young are feathered both birds work hard to keep them supplied. The young are fully feathered and can fly some distance before they leave the nest, and at this stage show a lightish patch on the belly, due to pale tips to the feathers of that area. This light-coloured patch, which corresponds to the light patch on the mainland tits, is distinctly larger in some of the young in a nest than it is in others, which probably indicates a colour difference in the sexes of the young as is the case with the mainland tits. It would be interesting to know if these pale ends wear off the feathers so as to leave the young birds all black like their parents.

The eggs, always three in number, are white, with small brown and grey spots, sometimes covering the whole surface of the egg, but always more thickly disposed at the larger end, where they frequently form a well-marked zone, with the rest of the egg almost unspotted. Usually the brown markings predominate, but in some eggs the grey are the more numerous. In shape, the eggs are broadly ovoid as a rule, but more elongated ones are not uncommon. While the broad eggs closely resemble those of the tits of the mainland, the elongated ones approach some forms of robin eggs, though I saw none that had the soft markings so common in robin eggs.

It is worth enumerating the points in which the field behaviour of this bird resembles that of a tit or that of a robin. The Snare bird's nest is exactly that of a tit, and is not like a robin's. Its choice of nest sites is tit-like, being often in quite dark holes such as would not be used by a robin. No nests were found in big clumps of fern, where robins would surely have built. The eggs are tit-like, and none that were seen had the soft ill-defined markings so common in robin's eggs. The birds do not eat worms, which are robins' favourite food. (I once saw one eat part of a very small worm, but it left the remainder.) The most conclusive evidence, however, is the bird's stance—it flicks its tail up at an angle in a way that a robin never does. If the arrangement of the tail muscles of this bird are examined it will be found to be similar to that of *Petroica* not *Miro*. It should be said that it does not flick its tail up as much as the mainland species do. An unfortunate defect in my hearing prevents my hearing their song, but Falla tells me it is typically tit-like.

WAXEYE.

Waxeyes (*Zosterops lateralis*) were sparsely distributed through the bush. Several nests were found but none contained eggs or young.

INTRODUCED BIRDS.

It is worth making brief reference to the introduced birds noted, as it is certain that all these got there under their own steam.

Blackbirds (*Turdus merula*) were fairly plentiful, though, owing to their extreme shyness, they were not often seen. They nested chiefly in big bushes of black fern, the usual clutch of eggs being four, one c. 5 was noted. Many nests were upset by fern fronds growing up under them. Nests were also found in dead stumps and forks of olearia. So shy were the birds that I only once saw one on its nest, and a nest of eggs near our camp was forsaken immediately on our arrival. Several times when in the bush I saw a blackbird flying towards me. When it saw me it would sheer off with a cry of alarm and fly well out of sight. I saw no young flying birds of the year.

Song Thrush (*T. ericetorum*).—Not so plentiful as the blackbird, and not so wild, the thrush was still much shyer here than on the mainland. Nests were found with eggs (clutch four to five) but none with young. All found may have been second clutches (though no flying youngsters were seen), or the nesting season is much later than on the mainland. There are no berry-bearing plants on Snares, so thrushes and blackbirds must live entirely on animal food throughout the year.

Hedge Sparrow (*Prunella modularis*).—Only one seen. It is on all the islands off the south-west coast of Stewart Island.

Starling (*Sturnus vulgaris*).—Seen on several occasions flying over the camp.

House Sparrow (*Passer domesticus*).—A nest from which young had recently flown, was found in the roof of the depot. The birds were occasionally seen, a flock of ten being once noted. They were wild and did not come near our camp for scraps, which could be taken as a good indication that none of the birds seen was actually a mainland emigrant.

Chaffinch (*Fringilla coelebs*).—A few seen and heard singing.

Redpoll (*Carduelis cabaret*).—A few seen.

Goldfinch (*Carduelis carduelis*).—Some seen; rather more seen than redpolls.

BLUE SHAG OF STEWART ISLAND.

On November 24 the "Alert" took a cruise around the entrances to Port Pegasus.

On the west side of the middle entrance was a colony of blue shags (*Stictocarbo punctatus steadi*) nesting in well sheltered clefts on a cliff some 150 feet high, the fourteen nests being about 75 feet above the sea. A little further on, on a rocky islet, were two nests about 25 feet above sea level; but excepting these two, all the other nests that we saw (a total of 40 or 50) were high up on cliffs, and would only have been accessible by rope from above, and even then most of them would have been very difficult to reach because the ledges on which they were placed were so much overhung.

Some birds were sitting but a great many were building, flying to grassy ledges at the top of the cliffs and returning with large billsful of grass and vegetation. I saw only one bird carrying seaweed to its nest, but as we were unable to examine any nests closely, I cannot say to what extent seaweed was used in their construction. The birds do not place their nests as close together as does the ordinary spotted shag (*S. p. punctatus*) although in many cases the ledges were very suitable for crowded colonies of nests. In this respect according to C. A. Fleming, the bird resembles the Chatham Islands spotted shag.

In Port Pegasus we constantly saw these birds flying about in pairs or in parties of up to 12 birds. It has been said frequently that the blue shag was almost exterminated by the whalers in the early days, and it is only now recovering. I very much doubt this, for in the 15 years that I have known the bird, its numerical status has remained practically

ADDENDA.

Insert after line 37 on page 71—

The measurements of two c 2 are: (a) 72 x 54.5, 68.5 x 50; (b) 72.5 x 57.5, 70 x 51.5. Other eggs measured: 75.5 x 54.5, 74 x 55.5, 65.5 x 51, 64 x 49.5 m.m.

Insert after line 44 on page 78—

The eggs are larger than those of the mainland tits, the measurements of six being:—21.5 x 15, 21 x 15.5, 20.5 x 15, 20 x 16, 19.75 x 15, 18.5 x 14.5 m.m.