

many terns do not breed till their third or fourth year. If these small terns have reached New Zealand from eastern Asia, it is not surprising that many of them should be immature; for it is characteristic of the young of many migratory birds to wander further than the adults and the normal wintering range. Nor is it inconceivable that Asiatic Little Terns should reach New Zealand. The European Little Tern is a vagrant to the coast of South Africa; and a remarkable instance of wandering by the Little Tern has just been published (*The Ring*, p. 144), viz. one ringed as a nestling on 20/3/49 in Java, Indonesia, was recovered on 4/12/52 in Gold Coast, West Africa.

*Sterna albigrons* is a species with many races, of which those breeding in cooler climates are migratory, while those which breed in or near the tropics are more or less sedentary. It is the common small tern of eastern and northern Australia from which two races *placens* and *tormenti* have been described by Mathews. Little seems to be known about their behaviour; and their validity as subspecies is in question; for they are not mentioned by Alexander, who gives only the subspecific name *sinensis* for Australian Little Terns. *Sterna nereis* is the common small tern of southern and western Australia, and a race has been described from New Caledonia under the name *exsul*. Little has been reported of it. In a key to the South-west Pacific Terns Mayr does not separate immature *albigrons* from immature *nereis*.

If the small terns which have been recorded in the Firth of Thames with increasing frequency are indeed *nereis*, some interesting questions arise. Where do they come from? Where are they being bred? Is there some unknown breeding ground in New Zealand, where *S. nereis* is much more successful than on the east coast of Northland? Miss Macdonald and others who have been studying the few known pairs, report that owing to sandstorms and predators, human and otherwise, very few young have reached the flying stage in recent years, certainly not enough to form a flock of thirteen, or even seven.

The stretch of the Firth of Thames which these small terns favour is very different from the typical habitat of *nereis* in the north, where the few breeding pairs are distributed along a clean, sandy coast, backed by extensive dunes through which at intervals shallow, clear rivers flow into the sea. In the Firth of Thames soft alluvial mud and mangroves are characteristic of the creeks and the outgoing tide exposes a vast acreage of flats. If the terns which we have described are immature Fairy Terns, it is a discovery of some significance, that what by New Zealand standards is a flock of them should resort in their second and probably in their third years to a habitat so very different from their typical breeding place; and it forms an interesting addition to our knowledge of the life history of the Fairy Tern. However, we find it difficult to reconcile our observations of their plumage, moults and behaviour with what is known of the Fairy Tern; and we believe that they are Little Terns of Asiatic, or less likely, of Australian origin.

Outside the Firth of Thames small terns which could not be positively identified as *S. nereis*, and, if the Little Tern is reaching New Zealand, may have been *S. albigrons*, are occasionally reported: e.g., one, dark-billed, at Te Ngaio, Kaipara, seen on 6/1/49 by D. A. Urquhart, B. D. Heather and R.B.S.; one at Puketutu, Manukau, flying with Godwits, seen on 1/3/54 by R.B.S.; one over Maungawhio mudflat at the base of the Mahia Peninsula seen on 19/11/55 by G. E. Sopp and H.R.McK.; one at Harania Creek, Manukau, flying with Knots, seen on 13/3/57 by R.B.S.

## THE NESTING OF THE HARRIER

By M. F. SOPER, *Queenstown*

Owing to their extreme timidity at the nest and the readiness with which they will desert if disturbed, continuous observations on any one pair of nesting harriers are not so easily obtained as with most New Zealand birds. The following generalisations are taken from the notes of 15 nests observed for varying periods of time during the course of attempts to establish a photo-

graphic hide. Two nests in particular were very well placed for long range observations in that we were able to look into the nests from the top of a high bank and so get laying dates, egg counts, hatching times and so on without flushing the birds.

Nesting activity starts about mid-September, when birds may be seen indulging in mating flights and carrying nesting material. In this district harriers nest in raupo, bracken, crops, rushes and tussock. The nest is constituted of a base of sticks on which is dumped tussock grass; it is usually an untidy structure and in the middle of the chosen area, not out towards the edge. Building takes about two weeks.

Eggs are laid from early October to late December. They are laid at irregular intervals though usually on alternate days to a normal clutch of five. Three or four eggs are common enough, six or seven more rare. It seems that the hen may start to incubate any time from the laying of the first to the third egg; so hatching extends over several days and in a most irregular manner. Usually two chicks hatch the first day, the third two days later. Further eggs may or may not be laid after incubation has started; there is no fixed rule. However if more than three eggs are laid it is not usual for the last two to hatch, as the harrier usually ceases to incubate soon after the arrival of the third chick. These unhatched eggs I have always found to be fertile and partly incubated. The theory that harriers rely on the body heat of the chicks to hatch the remaining eggs is untenable, as the chicks scramble out of the nest as soon as they are left unattended.

From this it will be seen that harriers are quite irregular in their laying and incubating habits. Our experience has been that no two birds are alike and that all possible combinations and permutations may be met.

The incubation period is somewhere between 31 and 34 days. Harriers sit very close and will not fly off till one is within a few feet of them; in a crop in fact they may sit so close that like pheasants they may get mutilated by crop-cutting machinery.

During incubation and the few days following the first hatch the male brings food to the female, calling her off with a rather high-pitched mewing sound. Prey is carried in one talon and is eaten at a feeding table some 100 yards distant. I have yet to see a male alight at the nest.

In our experience the hen seldom broods the chicks (if at all) once the oldest ones have reached the age of about four days — the youngest will now be about 24 hours old and there may be two unhatched eggs. Once this stage is reached the hen is away the greater part of the day, leaving the chicks unattended. If not hunting she will be perched on a post or on the ground about 100 yards distant and may stay in the one spot for hours at a stretch. The chicks are active and clamber round and out of the nest.

For the first fortnight feeds are approximately four-hourly: early morning, midday, 4 p.m. and dusk (varies with different birds). These times are remarkably constant for a given pair and it would appear that the parents have prey ready to bring in at these times and that it is not brought in as it is obtained.

As with the falcon, the hen does all the feeding of the chicks, but whereas falcon chicks take the pieces of flesh as they are offered, harrier chicks snatch from the parent's beak even before it is properly torn off the carcase; naturally the two biggest get the most. However, falcon chicks are fed at considerably more frequent intervals than harrier chicks so perhaps the latter are ravenous rather than hungry and their behaviour therefore condonable. (But it would never do for a falcon, sir!)

At two weeks they can with difficulty pull pieces off a carcase for themselves. Any part is acceptable and is in fact given from the first day onwards — skin, fur, flesh or entrail. In this district rabbit seems to form their entire diet and I have not managed to recognise any other than rabbit bones round the nest.

At three weeks feeds have dwindled to early morning, midday and dusk; from four weeks to flying often night and morning only.

Wing feathers are obvious at seven days and gradually more feathers come

through till by three weeks they are a sorry mixture of down and feather. At four weeks they are nearly full grown and have little down left. At five weeks they appear fully fledged, though they do not leave the nest till about six weeks.

At all stages they are very active and especially in crops they will be found scattered widely through the corn from about the first week onwards; not necessarily together, in fact often the reverse. They are frequently fed where they stand and not at the nest.

After flight the young continue to use the nest or near vicinity as a roosting place at night for at least two weeks. The hen continues to hunt for her brood during this time.

Finally a hotch-potch of unrelated observations: They will rebuild if their first laying is disturbed or destroyed, and early in incubation they will smash their own eggs. In our experience this second nest is not far removed from their first. Undisturbed, they may use the same nest for a number of seasons, or alternate between two nests. They will desert from the most minor interference and the mere fact of walking up to a nest to examine it and confirm its presence may be sufficient in the early stages. Yet, incredibly, they will allow a crop to be cut about their ears without deserting (chicks), and it is possible to shift a nest, found while harvesting, to the edge of the field, and the hen will continue to feed her chicks in this new situation. (But note here the fact that the chicks wander a lot and are normally frequently fed away from the nest, so that this could be explained as an exaggeration of a normal situation.) They will desert chicks as readily as eggs should they be flushed from the nest. This gives the secret of handling harriers — provided the nest is only visited when the bird is away of her own free will there is virtually no desertion risk; they will usually tolerate being flushed once, while four times seems to be the maximum. Anybody wishing to get information on laying intervals and times of commencing incubation would be wise to watch this. Of our own nests we caused desertion in five; we successfully got a hide up to three; the remainder we left as little disturbed as possible, making no attempt to introduce a hide. Of our desertions, one was caused merely by finding and walking up to the nest, two were caused by hides and two by occupied hides: that is to say, the hides had been successfully brought up to the nest and were accepted by the birds while empty, but the day one of us was left in the hide the birds deserted. We use a heavy grade completely opaque material and so we can confidently rule out the possibility of being seen. We suspect the birds have a 'sense of presence'. Ducks are the same, particularly Shovellers.

## **MORTALITY AMONG NESTING MUTTONBIRDS NEAR GREYMOUTH**

By J. R. JACKSON

During the 1955-56 nesting season several visits were made to colonies of Muttonbirds (*Puffinus griseus*) at Perpendicular Point, Punakaiki and at Twelve Mile Bluff, 12 miles from Greymouth, and in the 1956-57 season the colony at One-One, Hari-Hari, was visited as well.

The colony at Perpendicular Point was formerly very large, and Mr Fischer, who has known the birds for over thirty years, remembers that a stretch of six hundred yards along the cliff used to be riddled with burrows. Even five years ago some burrows remained on the way down to the first cave, but few signs of these now remain. However in 1955-56 at least seven nests and burrows were occupied under or beside the big limestone blocks at the furthest point. The many bleached bones give evidence of the much larger colony in former years. On 4/12/55 at sunset some thirty muttonbirds were flying close inshore and again on 18 and 21/1/55 they were seen in lesser numbers. In February Mr Fischer found two dead birds and a deserted egg. On 12/2/56 no birds were observed overnight nor on the night of 3/3/56. Three more corpses were found. The corpses were found by the more open and accessible nests, perhaps the least favoured nest sites.



DR M. F. SOPER, PHOTO

PLATE X. Harrier and chick at nest.