

The Yellow-faced Honeyeater flocks which move early have a few White-naped Honeyeaters with them, and an occasional Fuscous Honeyeater, but later flocks are composed almost completely of White-naped Honeyeaters.

- (i) Weather is considered to be a most important factor. On April 13th, the early morning was calm and fully overcast. The sun broke through at 9 a.m. and it remained sunny. Migrations commenced at Pine Island at 9.05 a.m. On the following morning April 14th, there was a slight breeze but the day was cool and fully overcast and this appeared to be the reason for the absence of migrants. Flocks were seen elsewhere in the A.C.T. throughout April and early May.
- (j) On April 13th, an estimated 10,000 birds passed between 9.05 a.m. and 11 a.m. The movement on this day ceased as abruptly as it started.
-

BANDING THE LITTLE TERN.

C.B. Campion, Abbotsford, N.S.W.

For those banders who are fortunate enough to live within reasonably easy reach of one of the numerous breeding grounds of the species, the Little Tern (*Sterna albifrons*) offers a most rewarding and stimulating exercise during the spring and summer of the eastern coast of Australia. The beauty and charm of this graceful little sea-bird, combined with the pleasant open nature of its seaside haunts, make it a delightful subject for study. Add to this the fact that all the laurels of distant recoveries remain to be won and the result is a project to gladden the heart of any bander.

THE PROBLEMS

In his article, "A Review of 'Least Terns' in Australian Waters" (The South Australian Ornithologist, Vol. 22, Parts 7-8, April 1959), W. B. Hitchcock summarised the known facts of the distribution and breeding of *S. albifrons* and *S. nereis* around our coastline. As regards the former species Hitchcock raises important problems which the banding technique can help to solve.

1. Where do the populations of *S. albifrons* breeding in eastern Australia spend the winter?
2. What of the relatively large numbers of eclipse plumage *albifrons*, normally present (in Sydney, at least)

during each breeding season? Are these birds merely immature "reserves" of the local breeding populations, or do they include immatures and/or eclipse plumage adults of the northern hemisphere wintering here? The assumption of nuptial plumage in May and June by some albifrons observed in the North Island of New Zealand (McKenzie and Sibson, 1957) suggests that northern hemisphere birds do winter south of the Equator.

3. Does the eastern seaboard of Australia form part of the winter range of the subspecies S.a.saundersi which breeds on the shores of north-east Africa, the Red Sea, Persian Gulf and rivers of northern India? This interesting possibility is posed by the existence of a single specimen so identified taken at Wollongong, N.S.W., in 1903.

In November, 1958, systematic banding of the Little Tern was commenced at Sydney Airport, where some 20 to 25 pairs breed each year. The work has been carried on in each subsequent year and when the fifth season concluded at the end of January, 1963, a total of 224 individuals had been banded. Although much useful data on breeding, constancy of pair-bonds, return of adults to the breeding colony and related aspects of the bird's life-history are accumulating, no light has as yet been shed on the question of where Australian S.a.sinensis spend the winter. This is doubtless due, in part, to the fact that the total sample banded to date is exceedingly small when measured against the area over which they are likely to be dispersed during the non-breeding season. Add to this the fact that, of the 224 individuals banded, 171 were nestlings of which a proportion would have failed to survive to the flying stage and a further proportion would, in all probability, have succumbed within the first few weeks or months of leaving the breeding ground, and it will be appreciated that the chances of obtaining distant recoveries, from areas not noted for ornithological activity, must remain very slender indeed until the number of banded individuals can be materially increased.

Problems 2 and 3 are related. Whilst it is quite easy to trap and band breeding adults by exploiting the powerful attraction exerted by a clutch of eggs in advanced incubation, non-breeding birds present a much more formidable task. Attempts have been made at Mascot, using wader nets and mist-nets on the foreshores where they habitually roost at night. These have, so far, proved abortive for a number of reasons including the prevalence of winds and lights from nearby streets and traffic. In the coming months other methods will be tried, including the use of large clap-nets, and it is hoped that a breakthrough will result. At this point it might well be asked what will be achieved in solving problems 2 and 3 by the mere trapping of non-breeding birds present in Australian

waters during our Spring and Summer seasons.

Regarding problem number 2, Hitchcock points out that Australian and Japanese specimens are indistinguishable either by measurements or by plumage. However, the application of bands to numbers of these individuals should, in time, produce recoveries in breeding plumage which will help to throw light on this question. On the other hand, any individuals referable to the subspecies S.a.saundersi should be immediately apparent by the black shafts of the outer primaries (white in sinensis).

BANDING PROCEDURES.

All the Little Terns banded at Sydney Airport to date have been members and progeny of a breeding population. As previously explained, efforts to catch and band non-breeding birds have been unsuccessful so far. On the ternery the task must be tackled in three stages: nest location, trapping of adults and banding of nestlings as they hatch.

Breeding Habitat: Sandy spits near the entrances to estuaries and inlets, the beaches of offshore islands and low dunes behind coastal beaches appear to be the favoured natural breeding habitat of the Little Tern. However, the activities of mankind in filling and reclaiming low-lying areas adjacent to suitable estuaries would appear to create, at times, opportunities which the birds are not slow to seize. The ternery at Sydney Airport is an example of this. Extensions to the eastern side of the airport, involving the diversion of portion of Cooks River and the filling of the old river-bed together with nearby low-lying swampy areas, resulted in the formation of a series of low dunes, composed of sand and shells dredged from adjoining Botany Bay. This has proved to be an ideal habitat for the local breeding population which the alterations had displaced from its old haunts along the margins of Cooks River. On the western side some swamps and ponds were filled with ash and this area was also used until the progress of grasses and tall weeds rendered it unsuitable.

Interested readers should keep in mind any similar work which may be going on in suitable localities within their reach. One such possibility which occurs to the writer is suggested by recent news items referring to reclamation work in preparation for the establishment of an oil refinery at Bulwer Island, near Brisbane.

Locating the Nest: The eggs of the Little Tern are well camouflaged and the nest is very elementary, consisting, in its simplest form, of a small hollow scraped in the sand. The more elaborate examples differ only by the addition of varying



Nest of the Little Tern - an example of the more elaborate type, showing a relatively large quantity of collected shell fragments. Photo: K.A.Hindwood.

amounts of shell fragments. The incubating bird is alert to any movement and usually has the further advantage of being warned by its mate or the occupants of nearby nests when the observer approaches. Because of this and the fact that the incubating bird is quite inconspicuous against the background of sand and shells, nests are best located by close observation of the terns' behaviour. This is best achieved from a vantage point under cover, with the aid of binoculars. On each visit to the colony, the bander's first approach will result in putting up all the adults present at the time. This is an advantage because it then becomes fairly easy, from the chosen vantage point, to watch the birds back to their nests as, one by one, they become reassured and return to their eggs. Once the bird has settled, its position should be noted by reference to some conspicuous feature (e.g. a clump of grass or a stone of different colour from the surroundings), visible to the naked eye and preferably in direct line with the bird and observer. The nest is then usually located by walking in a straight line towards the reference point. This procedure must necessarily be repeated for each nest since each sally by the bander will flush all nearby members of the colony. Since

egg-laying by the various females may be spread over a period of six or seven weeks, it follows that nest location must continue to receive attention throughout the entire breeding season which (at Sydney) may commence in mid-October and is usually complete by mid-January,

Trapping Adults: The clutch usually numbers two or three, but occasionally only one egg is laid. Laying takes place mostly on alternate days but sometimes on succeeding days. Trapping is best carried out in the final third of the incubation period which occupies twenty or twenty-one days from the completion of the clutch. If attempted too early it is much less effective and desertion of the eggs can result. For this reason and the additional one that the chicks leave the nest, as a rule, within twenty-four hours of hatching, it is a distinct advantage to locate the nest before the clutch is complete, thus allowing an approximate calculation of the hatching date to be made. Where no eggs are added after the nest is first discovered, close and frequent observation is required if trapping is to be carried out at the optimum time and the chicks banded before they have dispersed. The writer has made a small number of water tests and the indication is that the eggs commence to float at about the mid-point of incubation. The imminence of hatching is foreshadowed by the appearance of very fine cracks around the larger end of the egg and this may occur three or four days before the awaited event although, in some cases, the time may be shorter. The voice of the unhatched chick can usually be heard inside the egg from twenty-four to forty-eight hours before the process is completed. Trapping during this last three or four days of incubation is usually highly successful.

The trap itself is extremely simple and can be made, literally, in five minutes. A piece of small mesh wire netting ($\frac{1}{2}$ " or $\frac{3}{4}$ " will do) measuring 36" x 36" is folded in towards the centre on all four sides in such a manner that opposite edges meet in the centre. The folded piece then measures 18" x 18". The edges can now be pulled up and formed with the hands so that the trap assumes the shape of an open square box with sides 9" high and 18" long. At each corner there will be surplus netting of doubled thickness and triangular shape. This can be folded flat against one of the adjoining sides. The funnel is formed with the hand. Midway along one side, the edge of the wire netting is pushed inward and upwards. A little judicious stretching and forcing quickly results in a rough funnel entrance about 4" high and 4" wide.

When placing the trap over the eggs it is best to take advantage of the fact that, in windy conditions, the birds generally prefer to alight a few yards to the lee side when approaching the nest. When leaving the eggs they usually fly

directly from the nest into the wind. For these reasons it is best to arrange the trap so that the funnel entrance is on the lee side. When this is done the bird is able to find the entrance and enter the trap more readily. On the other hand its escape is rendered more difficult because, on the approach of the trapper, it normally attempts to fly upwards into the wind. If these precautions are adopted it will be found that very few birds escape before the bander arrives on the scene to secure the prize.

Having caught the first of the pair, reset the trap and retire again to the observation point (preferably under cover and sufficiently distant to enable the birds to overcome their nervousness) and it is more than likely that the other member of the pair will be caught soon afterwards. During this time the first bird, having been banded and recorded, should be retained in a small calico bag provided with adequate air-holes. If released immediately the first bird will often merely return to the nest and re-enter the trap. The reason for this is not yet clear, but it may be that the pair take turn about in regulated "shifts" of incubation or that one bird (the female?) does most of the duty with the mate acting principally as a relief.

Readiness to enter a trap varies with individual Little Terns, some remaining relatively shy and difficult to trap during all stages of incubation. Again, the individual's reaction will vary with atmospheric conditions. During cool southerly changes, which often occur in Sydney in the breeding season, they are, generally speaking, much more anxious to resume incubation than is the case on warm days. Provided the weather is not too cool, it is usually quite safe to leave a trap in position over well-incubated eggs for up to two hours at a time. Beyond this point it is wiser to remove the trap and try again after several hours have elapsed during which the pair have been free to resume incubation without interference, or better still, next day. Over-persistence by the bander at this time is likely to provoke desertion of the eggs or affect hatchability.

Operating in the manner described, it has been found that one person can deal comfortably with four or five traps at a time, provided the nests are not too far apart. They should be viewed at regular intervals (say every 15 to 20 minutes) whilst they remain in position and trapped birds should be removed as quickly as possible.

Banding the Chicks: The chicks of the Little Tern are hatched in down, their eyes are open and they can run very soon after emerging from the egg. Within a very short time they start to disperse and leave the nest

site. Because of this, close attention must be paid to the nest as the estimated hatching date approaches. Although, in some broods, hatching may be completed in the space of one day, it often happens that the bander must visit the nest on two, or even three, successive days to be sure of banding every chick. The leg and foot are sufficiently well developed to receive the band immediately without danger of binding either the toes or the tarsal joint. The writer can recall only one exception to this statement.

RECORDED BREEDING PLACES AND EGG-DATES.

The following list of known breeding localities and egg-dates, included for the information of the interested reader, is, in all probability, far from complete. Additional information would be most welcome. The writer's address will be found on the back cover of this journal.

Queensland:

Observatory Cay, Lihou Reef, East of Cairns, Sep. 30
Bowen - Pt. Denison - October 24.
Mackay - Shoal Pt., Victor Id. - October 15 and 20;
November 2, 4, 13 and 17.
Bundaberg - Pelican Id. - August 23; October 4, 17
and 18.

New South Wales:

Tweed Heads - October 7; December 3.
Byron Bay - October 20; November 13 and 27.
Ballina - August 26; September 1 and 25.
Yamba - October 16; November 9.
Nambucca Heads - December 11.
Port Macquarie - January 19.
Forster (Wallis Lake) - October 4; November 12 and 25.
Corrie Island - December 6.
Port Stephens - January 12.
Hunter River Estuary - October 24; November 12 and 16-19;
December 4 and 13.
Swansea - no egg dates.
Botany Bay - October 18 and 26; January 4 and 17
(earliest and latest).
Lake Illawarra - November 14; December 9.
Ulladulla (Burrill Lakes) - December 9.
Meroo Lake - No egg dates.
Lake Coila (near Tuross Heads).

Victoria:

Mallacoota - October 5; November 17, 21 and 24; late
December; January 12-24.