The insects, dung beetles and flies are well known scavengers. The pseudoscorpions probably preyed on the other invertebrates. Without doubt the mites were most important. The macrochelid mites were very numerous and the rhizoglyphine mites ten to a hundred times more so, there being certainly millions in the nest. The mites swarmed all over the chicks. Your arm when you reached in the nest would get hundreds on. Their constant movement on the chicks may have caused failure in the search for lice and analgesid mites.

There were no fleas or flea larvae.

THE BREEDING SEASON OF KAKAS

The long breeding season of Keas which lay between July and the end of January is now known (McCaskill 1954) and the Duke of Bedford (1954) describes the Red-tailed Black Cockatoo — " Banksians may nest at any time of the year, but the majority lay in autumn and winter." The Kaka has a similar long season for:

This hen twice fledged chicks at the end of December and once at the end of March.

Stead found three Kaka nests in Codfish Island in early January, 1935, and presented the eggs to the Canterbury Museum.

Thomas Brunner found two nests in March, 1848, by the Waitahu and Buller rivers, with the chicks at about the same stage as this nest, and R. Henry found two eggs on 19/3/1895 at Dusky Bay. These eggs are now in the Canterbury Museum collection.

It is certain Kakas lay between September and March; and perhaps Stead's success indicates that at least in the south the peak of the laying season is in December. However, I have frequently seen flocks of six Kakas, or more, in January and think these may be family parties, with chicks recently fledged. Also in September I have had no difficulty in finding locations for Kakas. The hen remains close to the nest. The month when most nest must remain an open question.

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NESTING RECORD OF TUI

By A. BLACKBURN

From casual observations in the past, the period given in the literature between hatching of the eggs of the Tui *(Prosthemadera novaeseelandiae)* and departure of the young from the nest has to me always been suspect. There are not many available references. N.Z. Bird Notes I, 29, gives the period as "ten days" in a rather vague way;

and in II, 131, a period of fifteen days can be inferred, the age of young chicks having been estimated. There are also two references in Oliver, p. 503, the first stating a period of "about fourteen days," and the second "a fortnight." There is a further reference on p. 504 to observations by R. S. Bell of the nesting of a Kermadec Islands Tui, the fledging period being given as 21 days, and this being the only record substantiated by dates. C. Claridge *(pers. comm.)* states that there are no records of this nature in the Society's Nest Records Scheme, and indeed only five Tui cards in the collection.

An opportunity for accurate observation has been provided by a pair of Tuis nesting 20 yards from my home in a suburb of Gisborne. On 23rd and 24th December, 1962, the female was observed bringing much green nesting material to a site 25 feet up in a rimu, near the tip of a thin side-branch, and fortunately on the northern and thus more sheltered side of the tree. Later examination of the discarded nest showed it to be thickly lined with small twigs of tamarisk. On 26th and 27th December, there was a very severe southerly gale, with some heavy rain, and it appeared certain that the nest would be destroyed, or at least deserted. The sway of the tree during the storm was up to 30 degrees. However, on 29th December, the first calm day after the gale, on investigating the nest I disturbed the hen, obviously brooding. The clutch subsequently proved to be three, so the first interesting point is that eggs were laid each day during the gale; but how they remained, or were kept, in the nest is a mystery.

On some subsequent days the hen was observed to leave the nest fairly early in the morning to feed briefly but avidly on mahoe berries nearby, and during some days of hot sunshine was seen perched for considerable periods below the nest. The male was seldom in close attendance, and was frequently in song 50 to 100 yards from the site. On the evening of 11th January, 1963, the male was for the first time observed vigorously chasing Blackbirds, Thrushes and Mynas away from the vicinity, and it was considered that hatching had taken place, or was about to do so. The following evening, 12th January, two half egg-shells were found together 17 yards from the nest site, and later a third was found 15 yards from it. In each case the smaller half of the shell was completely unbroken. Thus the clutch was established as three, and the date of hatching as 11th or 12th January.

Following hatching, it was noted that the male concentrated his attention much on Sparrows, Silvereyes, and the larger introduced species, and took no notice of a family of Goldfinches, which were often in close proximity to the nest, nor of a family of four Fantails feeding nearby. It would appear that the hunting away of other birds may be partly connected with food supply, for Blackbirds and Thrushes were here competing for mahoe and totara berries and kawakawa fruits, and the Silvereyes for these and nectar from red-hot pokers. The Sparrows consistently took the honey water supplied, and as the the Mynas — well, no one likes these overmuch.

From this point I quote from daily notes:

28th January: 16 or 17 days after hatching, the hen is observed still feeding young in nest on insect food, mainly cicadas, small and large.

29th January: More cicadas being fed to young. At 10.30 a.m. one very immature young bird found perched in a low shrub im-

mediately below the nest. An hour later it is in a shrub 25 yards away, and although the hen bird is in attendance, it does not appear to feed it. At 6 p.m. two young clearly seen in the nest, and a third suspected, so that by refusing food, the parent birds may have led it back to the nest. (Observation on this interesting point is lacking, but three birds subsequently left the nest.)

30th January: At 8 a.m. and later, hen still feeding large cicadas.

2nd February: At 10 a.m. hen Tui still taking insect food, mostly cicadas, to young in nest. At 2 p.m. three young birds observed in a close group 3 feet from the nest, two briefly returning there to be fed. Hen feeding them on totara berries at intervals of 6 to 7 minutes. At 6 p.m. the young are still near the nest, which appears to be partly destroyed, probably by movements of young.

3rd February: At 6 a.m. the young are still grouped within 6 feet of the nest site. The male has not been observed to feed the young since leaving the nest, and for some days has ceased hunting away other birds, except of his own kind. Female seen to feed both insects and berries. In the evening the young are still grouped in the top of the rimu tree.

The next three days record the occasional dispersal of the young into the tops of nearby trees, frequent reforming into a tight group, and being fed on berries and occasional insects.

7th February: The young were noted to be dispersed during the day, two within six feet of the ground, and were subjected to vigorous flying attacks by the male bird, and much threat display. The reason for this behaviour is not yet apparent.

8th February: At 5.45 a.m. two young are feeding on mahoe berries and the third at the honey water. The male again attacks them by diving and threat posturing. On arrival of the hen near two of the young, he displays vigorously to her, with song, and follows her closely in flight. At 6.45 a.m. the young are noted huddled close together high in a karaka, and they remain so all day, only moving to a nearby tree. On arrival of the male alone shortly after 7 a.m. they make a suppressed screaming sound, quite different from the low chattering given when expecting food. Following the regrouping, the male attended the feeding of the young on several occasions, and displayed to the female, and later he sat quietly by. Feeding by the hen during the day certainly included nectar, which the young took delicately from the tip of the hen's slightly opened bill. The hen was observed several times to adopt a threat posture to the young immediately after feeding, and this behaviour, I feel sure, is closely connected with the earlier attacks by the male. The first attempt at song was heard to-day, one young emitting several clear, sweet, single notes.

The attacks were reminiscent of the behaviour of the male North Island Weka *(Gallirallus australis greyi),* which I have observed to attack its young furiously when they have reached the rufous-feathered stage, with the object of driving them out of his territory. Shortly afterwards he would be seen to feed the young, the conflict of the two instincts being most interesting. However, the reasons for the male Tui's behaviour were different, and in my opinion can be ascribed to (1) the danger in dispersal of the young at the age of four weeks, particularly to points within a few feet of ground level, and (2) to the convenience to the hen bird in feeding young which are grouped together.

A note on the plumage of the young at four weeks is as follows: Some grey fluff still adhering, particularly to upper tail coverts and sides of breast. Grey area round throat and nape. Yellow gape still very noticeable, but now faded to cream. White alar bars conspicuous.

The same pattern of behaviour continued until 11th February, the young usually being found grouped high in a karaka tree, some 30 feet from the house. One young bird, presumed to be a male from the less amount of pale feathering at the throat, was observed to bathe vigorously in a tin of honey water, so a shallow dish of water was provided and used for this purpose.

Feeding of nectar or liquid is by two methods: (a) Referred to above, with the hen's bill in a horizontal position, and (b) The hen perches above the young bird, and vigorously regurgitates three or four times with a "pumping" action, her bill held vertically downwards. This method was used with honey water. On two occasions when method (a) was used, a quantity of clear liquid, no doubt honey water previously fed, was observed to flow from the young bird's bill.

12th February: Young birds are dispersed during the day and seen only occasionally, but by 6 p.m. are gathered in their usual roost high in the karaka tree, but no longer in a close group.

14th February: At 6 p.m. there is some apparent "rounding up" by the male, but the young male bird responds to threat posture by opening his bill wide, and refusing to move. No sign of grouping for the night.

15th February: A brief period of active feeding of all three young with honey water by the hen at 8 a.m. At 7 p.m. the young have forsaken their usual roost and have apparently dispersed.

A plumage note at five weeks: The gape is still noticeable, but much reduced. The pale yellow line extends to the tip of the bill, showing on both mandibles, the remainder of which is very dark grey, almost black. The mantle and underparts are still blackish grey, but the metallic sheen shows brilliantly on primaries, secondaries, and tail. The length of tail now equals that of the adult bird, having grown fully half an inch in the past three to four days. A ring of grey feathering seven-eighths of an inch wide, uniform round the neck of the two females, but in the male narrower in front. Legs blackish, but feet light grey.

SUMMARY

1. The hen laid her eggs during the height of a severe gale with some heavy rain.

2. The hunting away of other birds by the male appears to be connected with food supply in the vicinity of the nest.

3. The brooding period up to hatching is confirmed as 14 days.

4. The made was not definitely observed to feed the young on any occasion, either in the nest or subsequently.

5. The period in the nest is established as 21 or 22 days.

6. Every observation of feeding at the nest was of insect food only, and after leaving the nest, of berries, occasional insects, and nectar.

7. A young bird either leaving or fallen from the nest at 17 or 18 days was led back to the nest, probably by withholding food.

8. Attacks and threat display against the young at four weeks would appear to be to force them to regroup at a height for safety, and for ease in feeding.

9. At five weeks the young become practically self-supporting.