

BREEDING OF KOKAKO.

By H. R. McKenzie, Clevedon.

The finding of an occupied nest of a pair of kokako, or blue-wattled crow (*Callaeas cinerea wilsoni*) on December 2, 1950, in the Moumoukai Ranges, east of Auckland, was the result of patient search over the last ten years. The effort has been led by Mr. J. W. St. Paul, a ranger employed by the Auckland City Council on its water reserve. He lives within sound of kokako song and has made a special study of this rare bird. The writer and others have worked with him and many interested persons have been shown their first kokako in this area.

The party of December 2, the Rev. R. J. Fenton, Messrs. F. J. Lownsborough, Fraser Murray and the writer, journeyed from Clevedon in the hope of seeing birds and perhaps finding a nest. Lunch was decided upon after a fruitless search had been made in second growth where it joined the main bush. Mr. Lownsborough, carrying the "tucker tin," was leading the way into the shade of the big trees when he saw two large dark birds (his first kokako) go into the bushy head of a medium-sized tawa tree. Interest quickened when only one came out again. A dark shape resembling a nest could be seen high up in the thick foliage. With the aid of a rope across his feet, Fraser Murray climbed the 17 feet of bare trunk, and then nine feet up through the branches to the nest. The sitting bird regarded him calmly at a distance of 18 inches. When he gently stroked its tail the bird moved up the tree two feet and waited while he looked at the three small, almost naked chicks. Mr. Fenton then climbed up. The bird left the nest but came back to only a foot or two in front of his face and covered the chicks. This kindly, gentle creature continued throughout the ensuing visits to show no fear and very little resentment at the presence of human beings at such short range.

The almost upright branches of the tree prevented close observation except from practically at the edge of the nest. This caused much difficulty to photographers. Mr. W. P. Mead, of Castlecliff, Wanganui, secured a good series of photographs by using flashlight. Others had varying success.

The hope of the local bird-watchers had been to find a nest being built and observe it until the departure of the chicks. This aim was not achieved but it was decided to make the most of the opportunity presented to study the later stages of breeding. Many members of the Ornithological Society of New Zealand took part in watching and in the provision of transport. The names of those who supplied notes of their observations have been abbreviated as follow: J. W. St. Paul (J.W.St.P.), E. G. Turbott (E.G.T.), R. St. Paul (R.St.P.), Capt. A. T. Edgar (A.T.E.), Rev. R. J. Fenton (R.J.F.), Tom Shout (T.S.), Fraser Murray (F.M.). Small differences will be detected in these notes. I have purposely not attempted to reconcile them because in the case of a number of impressions being recorded they cannot truthfully or profitably be standardised. The range of impressions as given will, I think, be more useful to future observers. For generous assistance I thank the abovenamed and all other helpers. Mr. Mead has kindly supplied the photographs of the kokako appearing in this issue.

THE NEST.

The nest corresponded in general with the descriptions of Buller, Reischek and McLean. The main platform, placed on a firm spreading side-branch, was made of rough dry twigs which protruded irregularly all round. The maximum length of sticks was 58.5 cm (23 inches), average, 38 cm; maximum thickness 9mm ($\frac{3}{8}$ in), average 3.5 mm. These were not used to build up the walls. Tawa, mahoe, putaputaweta, pigeon-wood, wineberry and supplejack were represented in order of quantity as listed. Others could not be recognised. On the top of this platform, but about the centre only, was placed a layer of rotten wood, three pieces being about 7cm by 2cm, some smaller ones and a quantity of

grainlike residue from a boring insect, loosely held together with cobwebs. The sides were a mixture of small rata vine (being more terminal branchlets than side-rooting vines), leaf fibre of kiekie, much moss, a little lycopod and filmy fern. The two latter had been torn from the trunk of the tree beside the nest. The cup above the decayed wood was composed of a thick layer of moss which was almost free of the base of sticks. This feature is remarkably like the form of construction used by the tui and bellbird. The final lining was a thick loose felting of punga scale. The measurements (E.G.T.) were: Outside width 22in., diameter of cup 6½in. The whole structure was loosely built and untidy and by the time it was deserted by the chicks it was a flattened wreck. None of the nests so far found by the local observers has been sturdy enough to be used twice, or to remain in sufficiently good order to be used the following season.

A peculiar nest was found on November 3, 1950, by Messrs. R. H. D. Stidolph, J. W. St.P. and the writer. It was in a tawa tree about 40 feet up and only a few chains from the site of the nest found on December 2. D. A. Urquhart made a hazardous climb and found it to be a flat platform of sticks with a flat mass of moss on it. There was no nest cup. Perhaps it was a pre-breeding "play" nest, made by the same pair. It was not used. It was found through the birds staying and feeding quietly about the one place.

THE CHICKS.

December 2, 1950.—All three chicks unable to lift heads. Eyes not open. Prominent white egg-tooth. Small round wattles pinkish lavender. Wing quills not yet beginning to open and not separated from each other. Small quills down centre of back. A little fluffy dark brown along back, above each thigh and on top of head. Remainder of body bare, the skin smoky blue.—(F.M. and R.J.F.)

December 7—Lifting heads readily. Eyes half opened as horizontal slits, iris brown. Bill black with white egg-tooth of only pin-point size. Feathered on head and mantle, blue-grey, and back, grey-brown. Wattles purple edged with bluish, forming the angle of the gape and spreading outwards where they could be most prominent and effective as a food-guiding mechanism in feeding. Primary and secondary wing quills and upper wing coverts had sprouted, all to a length of c 14mm. Quill sheaths bright blue, giving the wings the appearance of having blue double bands (quills and coverts). A varying amount of wispy down adhering to tips of feathers. Naked patches on sides of body. Black patches on either side of base of bill already distinct, one less developed than others.—(E.G.T)

December 9.—Eyes open. Egg-tooth still present. Wattles becoming more blue. Feathered on head, back, sides, thighs and partly underneath. Wing quills open. Bare on strip down from neck, at base of wing and on belly. Black patches each side of base of bill.—(F.M.)

December 10.—Chicks grown considerably and frequently exercising themselves, stretching legs to full length backwards like a cat. Inside of mouth purplish pink. This has a very striking effect. Wattles cobalt, more red at angle, still flexible, but bending round distinctly into the adult position. Eye brown; bill and feet black. Measurements: Culmen, 25mm. Length of middle tail feather from sheath, 43mm. Length of sixth primary from sheath, 54mm.—(E.G.T.) Chicks had grown noticeably from the previous day.—(J.W.St.P.)

December 14.—Watched from 8 a.m. to 2 p.m. Wattles pale pinky-blue, the pinkish tinge contrasting with the bright blue of the parent. Whereas the wattles of the adults are fairly closely appressed to the throat those of the chicks stand out somewhat. Plumage almost same as parent, bluish-grey generally, lighter on head, wings darker and brownish-grey. Lores velvety black, but this colouring not extending to eyes as in the adult. Chicks pecking at material on side of nest. One stretched one of its wings.—(R.J.F.) Twice a chicken stood up and

stretched. Appeared to be very strong in legs, but tail and wing feathers still had considerable growth to make. A little brownish down showing in feathers.—(T.S.)

December 19.—Wattles lie close to the neck of the adult, like scales, with a very narrow piece of feathered throat showing between, while wattles of young birds at this stage hang down and are a pale blue, rather purplish on the underside. Colour of chicks: Grey above, with a brown wash on the back, some down still showing.—(A.T.E.)

December 21.—Mouths of chicks still very brightly coloured on the inside. Tails about half-length, much of feathers still in sheath at butt end.—(F.M.) The determining of the colouring of the inside of the chick's mouths gave rise to much discussion. The writer boldly described it as fuchsia red. His elation was unbounded when Mrs. E. G. Turbott, not having heard his version, used the same term. F.M. studied this carefully, finding that from the principal fuchsia red area, tonings of blue and mauve showed toward the outer edges, particularly in the neighbourhood of the wattles, while deep down the throat the tone merged into a rich yellow.

December 24.—Young chicks hopping out of nest into branches and flying back two or three feet on to nest. One went straight up about four feet and had trouble getting down to nest again.—(H.R.McK.)

December 25.—Hopping about tree but parents persisted in feeding at nest only.—(H.R.McK.)

December 26.—Moving freely about tree, though sometimes all in nest. Only twice in two hours was a chick fed while on branches. All other feeding done at nest. The female led one chick away about 20 feet, she kept about a yard ahead, calling to it softly. She then flew downhill but the chick returned in stages to the nest.—(J.W.St.P.)

December 27.—Messrs. J. W., R. and R. B. St. Paul witnessed the young leaving the home tree. Mr. R. St. Paul writes: "Arrived at nest 12 o'clock. Two young birds on branches below nest, the third young one in tree 25 to 30 feet away on downhill side of nest. At 12.5 old bird returned to feed young one away from nest and commenced to coax the other two young away. At this stage the wind was getting gusty and rain was in sight by Cape Colville, so for the next half-hour she put in every effort to coax them down the hill. By 12.20 she had got one down two chains while the other two were half a chain behind, so she fed the one and called the others. At 12.25 one of those behind lost its balance in the toro tree it was in and came down to within two feet of the ground, where it managed to alight on an old punga stump three feet in front of where I was standing. It had a good look all round, then hopped up a kiekie stem and worked its way into the thick part of a tawa tree where it was fed by the old bird.

"The tawa tree was bushy and covered with kiekie and supplejack. By 12.30 the last young one had climbed to the top of the toro and put in a good flight of half a chain to join the other two young ones. At 12.35 all young birds were together and the old bird was away for more food. At no time did the male bird appear on the scene."

This successful conclusion was most gratifying to those who had come to regard these birds with affection. The storm came and it precluded the keeping of a watch to see whether the young returned to the nest for the night. It is assumed that they would be most unlikely to do so.

The age of the chicks when found cannot be calculated until more is learned about this bird. Young birds vary a great deal. These had their eyes unopened on December 2. A blackbird chick (H. R. McKenzie, "N.Z. Bird Notes," Vol. 1, No. 9, p. 110) opened its eyes at seven days, whereas Mr. P. A. S. Stein informs me from his notes that a gannet chick takes only one day, or a day and a half to do so. No comparison, therefore, can safely be made. I consider that the chicks, when found,

were two to three days old. This would give the period from hatching to leaving the nest as 27 or 28 days.

FEEDING OF CHICKS.

Notes on feeding were taken by F.M., R.J.F., J.W.St.P., A.T.E., E.G.T., T.S., and H.R.McK. The results were so similar that separate reports need not be given. On December 2, the day the nest was found, no feeding was observed. So great was our fear of causing disaster through disturbance that we quickly departed, leaving the hen still brooding the chicks.

The first feeding observed was by E.G.T. and party on December 7. From this date ripe berries of supplejack and pigeonwood and green fruit of raurekau (*Coprosma grandifolia*) were used. On December 14, chewed green leaf was seen to be fed with berries. (R.J.F.) This was apparently used more as the chicks grew older. Several observers saw a parent pulling pieces from the leaves of a pigeonwood and the chewed leaf usually fed seemed to be of the colour and texture of this species. Ripe raurekau was used a little later. (J.W.St.P.) The only other food identified was the white end of the rhizome of a lycopod (J.W.St.P.)

On December 14, the female, while at the nest, snapped a flying insect, but was not seen to feed it to the chicks. (R.J.F.) Apparently insects and larvae are not used. It is not likely that a change of food would have been made between hatching and December 7th, a period of perhaps seven days.

It is possible that little insect food is taken by the adults, in which case it would not so readily be used for the young. McLean ("Bush Birds of New Zealand," The Emu, Vol. 11, p. 229) states that insects are part of their diet and that they search the bark of trees and turn over the leaves on the ground with their bills as if taking insects.

A party disturbed on an open creek bank (N.Z. Bird Notes, Vol 2, No. 7, p. 174) could have been obtaining grubs and insects, but may have been eating clover as they will do.

Reischek (Transactions N.Z. Inst., Vol 19, p. 191, 1887) who shot and skinned many specimens, writes: "This bird feeds on berries and the young leaves of various plants." Evidently he found no insect material when dissecting.

J. W. St. Paul, who has watched their habits for over 40 years, and intensively in the last 10 years, doubts that they are seeking grubs when they probe in the moss on the branches of high trees. This may be a means of obtaining water. He has never seen them take insects or search the bark of trees for them. He has seen them snap at flies but has not known them to actually take and eat them. R. J. Fenton (see ante) is sure that the bird took a passing insect at the nest. He saw this at a distance of two feet. Two of our most prominent observers, McLean and St. Paul, do not agree on this matter. However, the difference may be explained by a geographical variation of diet. Further study is necessary.

Another possibility in regard to food for the chicks is nectar. On November 3, 1950, R. H. D. Stidolph saw a bird probing into the base of a fuchsia flower. It did not detach the flower.

Several observers timed the feeding. Mr. Tom Shout, National Park Warden, slept under the tree and obtained a record of early morning activity on December 15: 3.30 a.m., tui song began; 4.30 a.m., a parent left the nest and went away; 5 a.m., came and fed; 5.5 a.m., the other came and fed; 5.20, both came and fed; 6.10 a.m., one fed again. Maximum, 40 minutes; minimum, 15 minutes; average, 32 minutes (T.S.) A faster rate of feeding may have been expected at this time of day.

December 17.—No berries seen to be fed. Feedings: Maximum, 28 mins.; minimum, 5mins; average, 14mins. (J.W.St.P.) December 19: Berries and leaf; maximum, 28mins.; minimum, 5mins.; average, 14mins. (A.T.E.) December 24: A record kept by H. R. McKenzie reads: 12 noon,

male fed, 12.18 m., 12.26 m., 12.29 m., 12.45 m., 12.46 female, 12.55 f., 1.4 f., 1.8 m., 1.30 m. and f., 1.53 f., 2.3 m., 2.4 f., 2.8 f., 2.34 m. and f., maximum 26, minimum 1, average 11. This was the fastest feeding recorded to date. The usual rate was 25 to 30 minutes average, slower in the heat of the afternoon and quickening a little in the evening, though even then by no means fast. Berries and leaves were used. On the last two days so much food was required that it was often collected only a few yards from the nest tree and feeding was at short intervals of 5 to 10 minutes, with odd periods up to 20 minutes. (J.W.St.P., R.St.P.)

At this time the droppings below the nest were examined and it was found that the food had consisted mainly of pigeonwood, supplejack and raureka berries as well as leaves. (R.St.P.) The young birds, when hopping about in the vicinity of the nest were seen to pull at leaves but it was not certain whether they actually fed. The female, and perhaps the male also, ate droppings which fell in the nest but did not trouble about those which lodged on the outside.

Food was carried by the parents in the bill and the upper throat. The bill of the male was usually partly open, showing some of the food, while the female usually had hers closed, perhaps because she used more chewed leaf. The upper throat showed quite a bulge. A load of food consisted of two to four large berries, some large and some small berries, some berries and some chewed leaf, or all chewed leaf. The chewed leaf was imparted with much saliva. A food load was given all to one chick, or divided between two or three.

The male, distinguished by his greater size, darker colour, heavier bill and coarser head, was occasionally shy of coming in to the nest when watched by an observer. He would then wait for the female and come in with her quite readily. Once I saw him give the food to the female and she took it to the chicks. Another time he fed to the female two berries and some chewed leaf which she received and then went off into the bush, apparently keeping them for herself.

CALLS OF PARENTS AND CHICKS.

December 7.—The only sound heard was a croak while feeding; doubtful whether given by parent or chick. (E.G.T.)

December 9.—A small croaking noise from chicks noted when parents approaching with food. (F.M.) A small croak made by chicks when disturbed. (F.M., R.H.McK.)

December 15.—When the bird first left the nest at 4.30 a.m. she settled in a small tree and gave three clear musical calls before moving on. At 6.10 a.m. and again at 7.45 a.m. a bird, after leaving the nest, perched in clear view overhead and in the space of 20 to 30 seconds gave four calls resembling "kaack." This seemed a harsh call for such a fine songster. It probably denoted a protest. (T.S.) In the period December 2 to 27 no other observers heard either song or the "kaack" call of protest. Song during the feeding period has, however, been previously experienced. In the case of the nest found on 26/12/43 (N.Z. Bird Notes, Vol. 1, No. 7, p. 82) J. W. St. Paul states that he located the nest through finding the two birds singing together about 20 feet from it. Unfortunately this nest was inaccessible to one man alone and he had to leave the district the next day. On his return feeding was still proceeding, being noted on January 5 and 8, 1944, but when help was obtained and the nest reached by R. B. Sibson on January 9 the young had left.

December 16.—The parents, when chicks were handled, came close up, uttering a kind of "putt, putt," not very quickly repeated. (F.M., H.R.McK.) The chicks when handled protested with croaks and squawks almost small squeals on the part of the smallest and least prominently marked one, presumed to be a female. Later, when a parent was at the nest and the chicks were begging food with open mouths, they made a hissing noise like a miniature of the hissing of an angry goose. (F.M., H.R.McK.)

December 19.—The chicks set up a faint clicking at times. (A.T.E.)

Mr. R. Quinn, of Clevedon, knew the kokako well when he lived as a youth at Patumahoe. He describes the call of the young after their having left the nest, as a hoarse double croak, repeated at long intervals. I have heard this call, though without seeing the bird. It is quite unlike any note of the adult known to me. The low mewling made by adults, apparently to keep touch with each other in the bush, was used by these parents when both were present.

BREEDING HABITS.

Records of nesting of the kokako are few and for the most part scanty. Placed in seasonal order of date they give an indication of the breeding season, but provide by no means a definite or full account of it.

22/11/1887.—H. S. Munro (unpublished).—Nest of two eggs and one newly hatched chick found by bushmen half a mile north-west of the village of Clevedon. The eggs were taken and the chicks extracted from them. One egg was given to the Auckland Museum and Mr. Munro has the other at his home at Papakura.

12/10/1906: McLean.—Complete nest, apparently unused.

28/11/1943: H. R. McKenzie (N.Z. Bird Notes, Vol. 1, No. 7, p. 82).—Deserted nest with broken eggshells as if eaten by rat. Fallen dry toro leaves filled nest, but not compacted, so certainly not a nest of the previous year.

26/12/1943: J. W. St. Paul (N.Z. Bird Notes, Vol. 1, No. 7, p. 82).—Pair feeding young in nest in inaccessible tree (see ante). Young left nest on January 8.

December, 1885: Reischek. (Transactions of N.Z. Inst., Vol. 19, 1887, p. 191).—Three young sitting outside a nest in "Waitakarei" Ranges. Buller gives this date as January 3.

13/1/47: J. W. St. Paul (N.Z. Bird Notes, Vol. 2, No. 7, p. 174).—One young being fed in tree by parent.

January 15: Buller.—Two young, which left nest when disturbed, near Whangarei.

24/1/1943: J. W. St. Paul (N.Z. Bird Notes, Vol. 1, No. 3, p. 29).—Young bird in tree full grown but not fully feathered.

21/2/1945: J. W. St. Paul (N.Z. Bird Notes, Vol. 1, No. 11, p. 136).—Two young birds being fed in trees by parents.

February, 1882: Reischek.—Two full-grown young birds shot in the Pirongia Range.

Early April, 1880: Reischek.—At Castlehill, Tokatea Ranges, three young in nest. One was caught but two escaped.

Reischek stated that it was his belief that the kokako nested twice a year and this has been mentioned by subsequent writers. The above list shows that only one case (early April, 1880) could well have been a second breeding. It was probably late through previous accidents, or was an isolated second breeding. The opinion is held locally that breeding twice in a season is not customary and that it may yet be proved that it does not breed every year.

The dates of records of nesting of the orange-wattled kokako in the South Island indicate breeding once only in a season. Buller (2nd edition), January, nest with chicks. W. D. Campbell (Transactions N.Z. Inst., Vol. 12, p. 249) two in February, one with one egg and one with nearly fledged birds. Potts ("Out in the Open," p. 195) five nests, all in January, one had two newly hatched chicks.

Reischek believed that they have two or three young at a time. This is borne out by the evidence given above. Also Mr. Quinn states that he saw several nests at Patumahoe, and they contained usually three, but sometimes only two eggs. It was not uncommon for one egg to fail to hatch.

According to Buller, an English authority, Dr. Gadow, stated that the kokako did not conform clearly with any order and he considered it to be between the *Corvidae* (crows) and *Laniidae* (shrikes). Thus it came to be called a "N.Z. crow."

Buller states: "In disposition the kokako inherits the true characteristics of the crow family, being inquisitive, shy and crafty."

In the experience of local observers the latter statement is incorrect. McLean practically denies the charge of inquisitiveness and I agree with him. It is even difficult to attract it with calls which will bring other more inquisitive birds. Those who have watched this bird at a few feet will hardly agree that it is shy. The term "crafty" is even further from the mark. Few birds are more innocent. The crows and other members of the genus *Corvus* have a name for killing, robbing and mischief, are unmusical and for the most part unlovely. The kokako is gentle and harmless, highly musical, beautiful, dignified and engaging. My recent happy experience with a breeding pair has made the name "crow" most distasteful and in this I have the agreement of others who shared in this fascinating study. Stonor has placed the kokako with the saddleback and the huia in the family *Callaeidae*, New Zealand wattle-birds.

The prospect for the kokako in this area is very good. A large tract of native bush has been taken over by the Auckland City Council for a water reserve. To this is being added some thousands of acres of rough hilly grazing country which is to go back into second growth. This will provide food and shelter of the best kind. The birds are carefully guarded by both official and unofficial rangers and the settlers of the district are kindly disposed toward them. Thus they should remain with us, an interest and a delight always.

[The Society is indebted to Mr. W. P. Mead, of Wanganui, for the opportunity to publish his excellent series of photographs of the kokako. As far as is known, this is the first time that this species has been photographed in its natural haunts and members will join in congratulating Mr. Mead on his outstanding success.—Ed.]

NOTICE TO MEMBERS.

RINGING SCHEME.—All ringing schedules should be made up to March 31 (do not include birds ringed after that date) and sent in to the convener immediately for summarising.

NEST RECORDS.—All completed cards should now be sent to the organiser for cataloguing. Further cards may be obtained for back records.

INQUIRIES.—The following are at present current, and reports should be sent to the organisers as soon as possible.

BANDED DOTTEREL.—Reports should be sent to the organisers, Messrs. C. A. Fleming and R. H. D. Stidolph. The information required is shown in *Notornis*, Vol. 4, No. 1.

DABCHICK.—Information (as detailed in Bulletin No. 1, 1941-42, O.S.N.Z.) should be sent to the organiser, Mr. R. B. Sibson. The type of information required is very wide in scope.

GODWIT.—Notes on distribution, numbers and plumage is asked for (vide *Notornis*, Vol. 4, No. 2) by the organiser, Mr. R. H. D. Stidolph.

WEKA.—Distribution data in the Gisborne-East Cape district is being collected by Mr. J. C. Davenport (vide *Notornis* Vol. 4, No. 2).

COOK'S PETREL.—Information of the distribution of Cook's petrel in North Auckland is being collected by Mr. J. C. Davenport, who should be communicated with for details.



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KOKAKO BROODING CHICKS, MOUMOUKAI, DECEMBER 9, 1950.



Photo. Copyright, W. P. Mead.

KOKAKO CHICKS IN NEST, MOUMOUKAI, DECEMBER 9, 1950.



Photo. Copyright, W. P. Mead.

KOKAKO BROODING CHICKS.—Showing how wattles are appressed to throat; Moumoukai, December 9, 1950.



Photo. Copyright, W. P. Mead.

KOKAKO FEEDING CHICKS, MOUMOUKAI, DECEMBER 10, 1950.



Photo. Copyright, W. P. Mead.

KOKAKO PREENING CHICKS.—Moumoukai, December 10, 1950.



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KOKAKO FEEDING CHICKS—Moumoukoi, December 10, 1950.