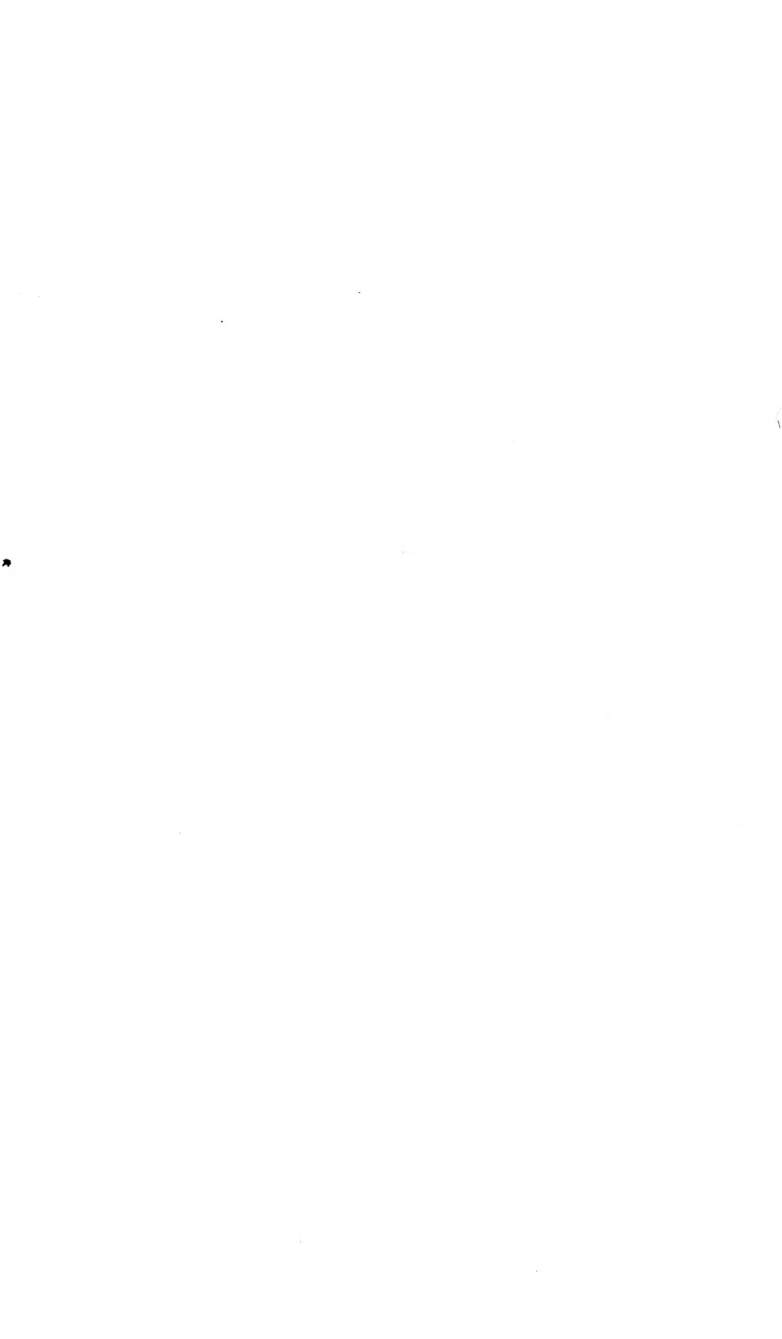


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The Emu

A Quarterly Magazine to popularize the Study and Protection of Native
Birds and to record Results of Scientific Research in Ornithology.

VOL. XXII. 1922-23



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1.
BUFF-BREADED QUAIL
(*Turnix affinis*)

Male

Female

The Emu

Official Organ of the Royal Australasian Ornithologists' Union

"Birds of a feather."

VOL. XXII.]

1ST JULY, 1922.

[PART I.

Buff-breasted Quail (*Turnix olivii*)

By A. J. CAMPBELL, C.M.B.O.U., F.A.O.U., Melbourne.

Near Cooktown (N.Q.) on 25/6/99, Mr. E. Olive, the well-known field naturalist, obtained a strange Quail, a female. The specimen was described as a new species by Mr. H. C. Robinson, was exhibited by the Hon. Walter Rothschild at a meeting of the British Ornithologists' Union, held in London, 21/2/1900, and subsequently figured in "Birds of Australia" (Mathews), vol. i., pl. 19.

Over twenty-one years afterwards (1/11/21) Mr. W. McLennan, collecting for Mr. H. L. White on the Cape York Peninsula, "bagged" a male Quail new to him, and a week or two later secured the female. The interesting "bag," which proved to be *Turnix olivii*, in due course reached Mr. White, who promptly and patriotically decided to figure the pair in *The Emu* for the benefit of R.A.O.U. members.

As usual in the genus *Turnix*, the female is considerably larger than the male. *T. olivii*, as Mr. Robertson has pointed out, is most nearly allied to *T. castanota*, Gould, but differs in its larger size, in having the head not conspicuously spotted with white, and in being without the whitish centres to the feathers of the dark olive-buff breast. The technical descriptions are as follow:—

Adult Male.—Forehead, lores and crown neutral grey, which color extends down nape; each side of crown and nape mottled black; ear-coverts mouse grey; hind-neck auburn; sides of neck feathers dull white, tipped black; mantle, scapulars and back auburn, some feathers with black bars and margined with white, or pale olive-grey; rump, upper tail-coverts and tail auburn; lesser wing-coverts grey mottled black; median and greater wing-coverts hazel feathers with irregular-sized marks of dull white on black line; primary-coverts black; secondaries and primaries chaetura black tipped and edged on outer web with dull white; chin, throat and malar region pale smoke grey; fore-neck and breast dark olive-buff faintly barred darker (deep olive); abdomen pallid neutral grey; under tail-coverts warm buff; tibia light neutral grey. "Bill brown, cutting-edge and lower mandible bluish white, irides and legs yellow" (W. McLennan).

Collector's measurement in flesh:—Length, 183 mm.; wing, 93; culmen, 15; tarsus, 22. (Plesiotype, "H. L. White Coll.," Nat. Mus., Melbourne.)

Adult Female.—Forehead and lores dusky neutral grey; crown deep neutral grey; sides of crown chestnut brown mottled black; ear-coverts mouse grey; hind-neck auburn; sides of neck neutral grey; mantle and scapulars auburn, some feathers with black bars and edged with pale olive-grey; back, rump upper tail-coverts and tail auburn; lesser wing-coverts light mouse grey mottled black and brown; median and greater wing-coverts hazel, some feathers like mantle with several black bars and edged with pale olive-grey; primary-coverts, secondaries and primaries chaetura drab feathers tipped more or less with dull white, and primaries edged on outer web with pale smoke grey; chin and throat whitish or pale smoke grey; fore-neck and breast citrine-drab or greyish olive; abdomen pallid neutral grey; under tail-coverts warm buff; tibia neutral grey. "Bill pale dull olive, irides and legs yellow" (W. McLeman). Collector's measurements in flesh:—Length, 221 mm.; wing, 103; culmen, 17; tarsus, 30. (Plesiotype, "H. L. White Coll.," Nat. Mus., Melbourne.)

Description of Nest and Eggs of *Turnix olivii* (Robinson)

By H. L. WHITE, C.F.A.O.U., M.B.O.U., "Belltrees," Scone, N.S.W.

With the exception of the searches made by Sid. W. Jackson for the eggs of *Atrichornis rufescens* (Rufous Scrub-Bird) and F. L. Whitlock for those of *Eremiornis carteri* (Desert-Bird), I know of nothing so remarkable as the work put in by W. McLeman in his long hunt after the elusive *Turnix olivii* (Buff-breasted Quail).

His labour and perseverance were rewarded by three clutches of eggs of this previously practically unknown bird; one of the sets goes to Messrs. Bettington's "Ferragong" Collection, while the others remain in my own.

The locality worked over is near Coen, at the base of the Cape York Peninsula, and about 180 miles north-west from Cooktown; a district not easy of access, but rich in bird life. In his very full daily notes, McLeman first mentions the bird on October 31st, 1921. He kept in touch with it up to April 5th, 1922.

Types. Clutch, four eggs, roundish in shape, much compressed and pointed at one end, forming quite a dumpy pyriform shape, more so than any others of the Quail family that have come under my notice. Ground colour whitish, minutely speckled, spotted, and blotched all over with markings of reddish-brown, bluish-grey, and black, the last two colours being the most pre-



Upper—Class of country frequented by the Buff-breasted Quail.

Lower—A nest with eggs *in situ* Coen, Cape York Peninsula, Queensland.



A. Nest of Buff-breasted Quail (*Tianix olivii*), undisturbed.

Photo. by W. McLennan, R.A.O.U.



B.—Nest of Buff-breasted Quail (*Tioyx olivii*) ; vegetation opened up to show eggs in nest.

Photo. by W. McLennan, R.A.O.C.

dominant. (Incubation heavy). Shell fine, and surface rather glossy. Measurement in inches:—A, 1.13 × .93; B, 1.13 × .92; C, 1.13 × .89; D, 1.17 × .93.

Taken by W. McLennan at Coen, Cape York Peninsula, North Queensland, on March 22nd, 1922.

Nest.—Ovate, with entrance at side, placed in a shallow depression in the ground in short fine grass between a stool of a few stalks of long grass, and a small shrub; composed of soft, dry, narrow blades of long grass and stalks of fine grass. Outside measurements: Width $5\frac{1}{2}$ inches, depth 5 inches, length 6 inches, entrance $3\frac{3}{4}$ inches wide by 3 inches deep; inside width 4 inches, depth 4 inches; length $4\frac{3}{4}$ inches; depression in which placed 1 inch deep. (For nests see Plates 2 and 4).

Co-Types.—Clutch, four eggs, more heavily blotched than the Type clutch (especially Spm. D), and not quite such pointed specimens. (Incubation fresh.) Measurement in inches:—A, 1.12 × .93; B, 1.17 × .93; C, 1.12 × .93; D, 1.08 × .93.

Taken by W. McLennan at Coen, Cape York Peninsula, North Queensland, on March 24th, 1922.

Nest was situated in a very thinly grassed patch—thin stools of long grass widely scattered, with short fine grass growing between, placed at the base of a stool of long grass amongst short, fine grass. Nest spherical, composed of narrow blades of long, dry grass and short, dry grass, and a couple of dead leaves of ironbark tree with the grass in the egg chamber.

Measurements.—Outside: Width 5 inches, depth $5\frac{1}{4}$ inches, length $5\frac{1}{2}$ inches; a few ragged ends of grass project 5 inches beyond the entrance. Entrance: Width $2\frac{1}{2}$ inches, depth 3 inches. Inside: Width and depth $3\frac{1}{2}$ inches, length $4\frac{3}{4}$ inches; depression in ground $\frac{1}{2}$ inch in depth.

An Abnormal Clutch of Blue-faced Honey Eater's Eggs (*Entomyza cyanotis harterti*)

Clutch of seven eggs taken by W. McLennan at Coen, Cape York Peninsula, North Queensland, on 3rd April, 1922. In his notes W. McLennan says:—

"Flushed a Honey-Eater (*E. cyanotis*) from a Babbler's nest, 10 feet from ground in a Swamp Paperbark tree (*McLalenuca*); it contained a remarkable set of seven eggs. The Babbler's nest was quite a fresh one; the Honey-eaters evidently took possession before it was fully lined, as the strips of paper-bark used by the Honey-eaters were mixed with the strips of messmate bark used by the Babbler, so that I could not tell where one ended and the other began." Eggs all slightly incubated.

The seven eggs forming this clutch are so much alike that apparently they were laid by the same bird.—HENRY L. WHITE, "Belltrees," N.S.W. 11/6/1922.

The "Lost" Paradise Parrot

By A. H. CHISHOLM, R.A.O.U., State Secretary,
Queensland.

With apologies to Milton, and without irreverence, it may be suggested that it would not be out of place to term the story that here follows, "Paradise Lost and Regained." In brief, it centres on a beautiful Queensland bird which was known in Europe of old as the Paradise Parrot—a species which suffered so severely towards the close of the last century that it has long been regarded by many ornithologists as extinct—dreadful word!—but which has been proved by Queenslanders to be, if very rare, still extant.

It was nearly eighty years ago that John Gilbert, able coadjutor of the great John Gould, when carrying out ornithological work on the then recently-discovered Darling Downs, shot Parrots of a species he had not previously seen. Gould referred the specimens to the genus *Psephotus*, and, filled with admiration of the beauty of the birds, gave them the specific title of *pulcherrimus*. "The graceful form of this Parakeet," wrote Gould, "combined with the extreme brilliancy of its plumage, renders it one of the most lovely of the *Psittacidae* yet discovered; and in whatever light we regard it, whether as a beautiful ornament to our cabinets or a desirable addition to our aviaries, it is still an object of no ordinary interest." Superlatives having been wrung from a seasoned ornithologist who saw only lifeless specimens of the "most lovely" bird, what was to be expected from those persons fortunate enough to know it in life? But, strangely enough, little was written about the species until the eighties. By that time, apparently, large numbers of Gould's Beautiful Parrot had been sent abroad for aviaries, and had become known to the bird-dealers of Britain and the Continent under the name of Paradise Parrot.

What a degree of popularity and admiration the shapely little Australian enjoyed (*sic!*) is made evident by W. T. Greene, M.A., M.D., F.Z.S., in his finely-illustrated *Parrots in Captivity*, published in London in 1884. After describing the "Beautiful or Paradise Parrot" as more lovely, if possible, than the Many-coloured Parrot (*P. multicolor*), the writer says: "No one can see it without desiring to possess so beautiful and graceful a bird, and large sums are constantly being paid for handsome specimens by amateurs; but alas! one in a dozen survives a few months and—dies suddenly in a fit one day." Further, the Rev. F. G. Dutton, a correspondent of Greene's, improves on the foregoing tribute by saying soundly, "*Psephotus pulcherrimus*, the Paradise Paroquet, as the dealers call it, is not only the most beautiful *Psephotus*, as its name says, but surely the most beautiful Paroquet that exists. The vivid emerald green and brilliant carmine of the cock, beautifully contrasted with the grey



Beautiful or Paradise Parrots (*Psepholus pulcherrimus*) on Termites' mound ("Ant-hill"). Male at entrance to nest. Female above.

Photo. by C. H. H. Jerrard, Queensland.

of the rest of the plumage, make him 'a joy for ever'." Could admiration be more whole hearted than this? "But," adds the reverend writer, "handsome is as handsome does, and I regret that I cannot give any of those I have kept a good character as a cage bird. They are very shy, and the cock is much given to driving about the hen."

It would appear that in those days nothing was known in England of the unusual nesting habits of the Paradise Parrot. Greene, never guessing that the object of his greatest admiration was addicted to nesting in termites' mounds, laid it down that *Pezoporus formosus* (now *P. callicus*) was the only Australian Parrot that did not breed in trees. After observing that odd specimens of *pulcherrimus* had been known to exist for at least two years in outdoor aviaries in England, Greene adds that "in Germany eggs have been produced, but as yet no young of this species have been reared in captivity, at least to our knowledge." On this point, Dutton remarks that a pair he had was "most anxious" to bore into the wall of a room in which they were placed; but instead of encouraging this laudable desire, he sent both to the Zoological Gardens, where they died. Greene and Dutton are in accord regarding the good health of the species in captivity, the former stating also that he knew of "few foreign birds more amiable and inoffensive in their habits, or more susceptible to being completely tamed." He was on less solid ground in adding that "these slim and elegantly-shaped birds are natives of New South Wales, where they feed on the honey and pollen of flowers, flies, and small insects, and in winter on such insects and seeds as they can find."

Many years before the date of Greene's book Queensland settlers had become more or less familiar with the breeding habits of *Psephotus pulcherrimus*. To them it was, variously, the Ground Parrot, Ground Rosella, Beautiful Parrot, Elegant Parrot, and Ant-hill Parrot, to which multitude of titles was added subsequently the name of Scarlet-shouldered Parrot. In many districts it was a favourite cage-bird, though, perhaps, no more so than outside its own country. The Barnard family, of Coomooloolaroo, near Rockhampton, were among the earliest people with ornithological leanings to take note of the nesting-habits of the "Ant-hill" Parrot.* When Carl Lunnholtz, the Norwegian author of *Among Cannibals* (London, 1890), was at Duaringa in 1881, he was introduced by the Barnard boys to the burrows of the beautiful bird in termites' mounds, and of these he penned an interesting description. On another occasion, near the Nogoia River, Lunnholtz had an experience with a pair

* Some writers have overlooked the fact that Silvester Diggles, in his unfinished *Ornithology of Australia* (issued about 1868) stated of this bird: "The eggs (five in number) are deposited on the bare ground in a deserted anthill, the entrance being a small hole in the side. The young are covered with a thick white down, and much resemble those of hawks."

of these birds that deserves to be revived from the semi-obscurity of his book.

"An hour before sunset," he says, "I left camp with my gun, and soon caught sight of a pair of these Parrots, † male and female, that were walking near an ant-hill, eating grass-seed. After I had shot the male, the female flew up into a neighbouring tree. I did not go at once to pick up the dead bird—the fine scarlet feathers of the lower part of its belly, which shone in the rays of the setting sun, could easily be seen in the distance. Soon after, the female came flying down to her dead mate. With her beak she repeatedly lifted the dead head up from the ground, walked to and fro over the body, as though to bring it to life again; then she flew away, but immediately returned with some fine straws of grass in her beak, and laid them before the dead bird, evidently for the purpose of getting him to eat the seed. As this, too, was in vain, she began again to raise her mate's head and to trample on the body, and finally flew away to a tree just as darkness was coming on. I approached the tree, and a shot put an end to the faithful animal's sorrow."

A LOSS AND A SEARCH.

That little tragedy will serve, fittingly enough, as an introduction to a dark period in the history of the species generally. Possibly the sad phase had its genesis much earlier, with the spread and stabilising of settlement. Howbeit, the fact is that as the years went by the Paradise Parrots steadily decreased in numbers. In time they became an unknown quantity on the markets overseas. In time, too, they vanished from districts where once they were a feature—a very beautiful feature—of the sub-tropical landscape. The decimation attracted no particular attention in ornithological circles until 1915. Then Mr. A. J. Campbell, C.M.B.O.U., wrote in *The Emu* (vol. 14, p. 167), an article entitled "Missing Birds," specifying in this respect the Paradise or Scarlet-shouldered Parrot (*P. pulcherrimus*), the Turquoise or Chestnut-shouldered Parrot (*Euphema pulchella*) and the Night-Parrot (*Geopsittacus occidentalis*). "It would be interesting to know," wrote Mr. Campbell, "if these three beautiful Australian Parrots still exist or have been exterminated. If the birds are extinct, what is the cause or causes of their extinction?" After adding that "all that remain to-day appear to be a few stuffed specimens in collections," Mr. Campbell suggested that perhaps Mr. Charles Barnard, of Central Queensland (now President of the R.A.O.U.) could state when the Beautiful Parrots were last observed in his district. To this query Mr. Barnard replied that his people had not seen one of the Parrots since the 1902 drought, at the same time undertaking to look for the species at Fairfield station, an old haunt.

† Lumlholtz called the species *Platyercus pulcherrimus*.

Mr. Barnard subsequently informed me (June 15th, 1919) that he visited Fairfield in the preceding September. The search was unavailing. "Where, about the year 1882, the birds were plentiful and breeding, there was not one to be found on this occasion, nor any trace of old nests in the ant-hills."

That was all. There was no other response to Mr. Campbell's inquiry. The Paradise Parrot, it appeared, had been lost in annihilation's waste. So it seemed to ornithologists in Australia, and so it seemed to Mr. Gregory Mathews in England. "It is a matter for deep regret," he wrote in 1917,§ "that this most beautiful of Parrots appears to have become extinct without any lasting record of its life-history being made." Further, in referring to another Parrot, not yet uncommon, Mr. Mathews advised study "before it becomes extinct like its congener, *P. pulcherrimus*."

That was the position when, in the middle of 1918, the subject was taken up afresh in Queensland, the stronghold of the missing bird. Hints gathered in conversation with old settlers had indicated that further search would be at least worth while. Accordingly, letters on the point, bearing the query-caption, "Is it lost?" were directed to and published by the leading daily newspapers of Brisbane and the Darling Downs. The response was prompt. It was also partially satisfactory. Most of the replies received earliest dealt with the species only from a posthumous viewpoint, but at last there came a note calculated to dispel some of the growing fear that "the beautiful has vanished and returns not." A constable of police who had served for fifteen months at a native police camp at Coen, Cape York, identified the missing bird from a description published in the *Brisbane Courier*, and affirmed that it was still to be found in the far North. This was heartening. It was doubly interesting for the reason that the range of the species was greatly extended, the most northerly record previously given being a somewhat indefinite one, by Dr. Ramsay in his *Tabular List*,|| for Port Denison, a little to the south of Townsville. Further inquiries tended to confirm the constable's statement, the present patrol at Cape York stating, in an official report, that the bird was not at the Cape itself, but was moderately plentiful at a certain point in the neighbourhood of the Archer River.

In addition, the constable in question made it clear that his "ant-hill" bird was not the Golden-shouldered Parrot (which also nests in termites' mounds) by sending the following note in substantiation of his letter of a year previous: "Re the Scarlet-shouldered Parrot. It makes its nest in ant-hills, from about six inches from the ground to a height of about four feet up the ant-hill, but I always found most nests at a height of approximately two feet. The average number of eggs laid is four, although on one occasion I found five eggs in a nest. I have

§ *Birds of Australia*, vol. 6, p. 422.

|| *Proc. Linnean Society, N.S.W.*, vol. 2, 1878.

noticed these Parrots moving over the ground in numbers, but I never noticed more than two or three close together at any time. I have also seen the Golden-shouldered Parrot, and it is similar in habits to the Scarlet-shoulder, but not so plentiful. Both of these birds keep moving back when settlers take up land close to their habitat. They never seem to trouble trees, but if disturbed fly off and alight on the ground further away."

The next piece of information as to the whereabouts of the residuum of the Paradise Parrots was almost equally surprising, coming as it did from as far west as Longreach. The writer was a drover (W. A. Campbell), and he reported having seen several of the birds on the Nive River, 25 miles above Augathella, in May of 1918. "One pair was bathing in a large waterhole within a few yards of me while my horse was drinking. I took particular notice of them because they were so quiet." It is not reflecting on the author of this note to say that I was unable to get it substantiated by station-men in the Augathella district; but it is at least possible that his birds were Turquoise Parrots, which beautiful birds are (or were) more partial than *P. pulcherrimus* to the expanses of the interior.

Well, for three years the benevolent pursuit of the lost Parrot was continued intermittently. And intermittently there floated in suggestions and whispers regarding the existence and whereabouts of odd members of the species. Occasionally, something more definite arrived. For instance, a bushman dwelling in an out-of-the-way spot between Bundaberg and Gladstone reported in 1919 that the missing "Red-shoulder" was to be seen about his locality. He knew nought of its distinctive breeding habits, but mentioned that some of the birds could be seen in captivity. Accordingly, Mr. C. T. White (Queensland Government Botanist) and myself took train on a night in April of 1920, travelled 250 miles in that way, walked ten miles through inhospitable country, and crossed a broad creek in a leaky boat, what time herds of ravening sand-flies scored our bare legs— all to find that the local Parrot was *Ptilotes*, the Red-wing, a bird that could be seen in a dozen cages in Brisbane! The irritating similarity of vernacular names had deceived our friend. Still, as old John Burroughs once said, "Whichever way I go, I am glad I came." Among other arresting sights of the locality were a pair of White-eared Flycatchers (*Monarcha leucotis*) and two young, this being probably the most southerly record of the breeding range of MacGillivray's beautiful Flycatcher.* But that by the way.

THE "LOST" BIRD FOUND BREEDING.

We come now, somewhat belatedly, to more recent and thoroughly definite developments in the search for the Paradise

* *Monarcha leucotis* was first taken by John MacGillivray, naturalist of H.M.S. Rattlesnake, on Dunk Island, in 1848. It is still but little known. Eds.



Habitat of the Beautiful Parrot (*Psittacus pulcherrimus*) showing type of country, entrance to nest in a "Termite" mound and photographer's hiding place.

Parrot. On December 11th last, Mr. C. H. H. Jerrard, a keen naturalist and capable photographer, wrote from the Burnett country to say that he had seen a pair of Parrots which he was almost sure were *Psephodus pulcherrimus*. A description which he supplied, and which fitted the species, was made out as the birds perched in a tree, but for portion of the time when watched they were on the ground. Less than a week later Mr. Jerrard became sure of his birds, having his opinion reinforced by a neighbour who had kept the "Ground Parrots" in captivity years before. Moreover, on December 15th he was fortunate enough to see what he took to be the same pair of birds with a group of young ones. There were seven or eight Parrots in all, and in the cases of five or six of them the centre only of the abdomen was red and the breast was greyish, instead of green and blue. At least one was seen to be fed by a parent bird. All were feeding on grass seeds, which they obtained by running the stalks through the bill.

Here, at last, was a report that was not only definite, but was one that came from within reasonable distance of Brisbane,† and, moreover, was made by a man who was competent to follow it up. His attention having been directed to the termites' mounds, Mr. Jerrard soon found holes suggesting the breeding-hollows of the Parrots. In more than one case there were signs that nesting operations had been commenced and then left off. But the year drew to its end without any discovery of an actual nest, and the scant literature on the subject having given September-December as the breeding period, there remained but little hope of a pair of the beautiful birds being studied "at home" for many months. Queensland birds, however, swayed by a wilful climate, are not as other birds are in the matter of breeding seasons. So, it was not altogether surprising that the patient watcher was able to report, on January 21st, 1922, that a pair of the Parrots had recommenced work on a hollow that had previously been visited. On that date Mr. Jerrard watched the mound for two hours, but was chary of investigating closely. He saw the male bird pay one visit of inspection, without actually entering the hollow, the female being in the vicinity at the same time. That caution of the observer was wise. Subsequent observations made it clear that eggs were not laid in January, for it was not until March 4th last that Mr. Jerrard was able to report with certainty that the female Parrot was brooding eggs.

From this point on the watcher waxed keener than ever in his fraternal spying upon the rare and lovely Parrots. Working with care, he erected a rough hessian shelter in front of the exposed little hillock that afforded the birds a home (see Plate).

† It will be sufficient to say that the spot is about 150 miles north of the capital city, and not far from the point where Professor Richard Semon, of Jena, saw specimens of the species in 1891.

and from this vantage-point was able both to study and photograph the pair. On March 18th last Mr. Jerrard sent me the first picture ever taken of the Paradise Parrot at its nest. This photograph (Plate 5.) depicted both male and female, and showed the regal little head of the house to be the bolder bird of the two. Indeed, though apparently the female was sole custodian of the eggs—the male was never seen to enter the tunnel—she was much more nervous than her mate. Frequently he would accompany her to the hollow, which she would at once enter and remain in for periods extending from half an hour to two hours. The ceremony attached to her re-emergence was both interesting and pretty. The male would alight on the mound, and, looking into the hole, emit soft, sweet chirps until the faithful little home-keeper answered by coming out and flying off with him.

Is not this practice in affinity with the methods adopted in the conduct of the homes of Hornbills? The male Paradise Parrot is evidently master of his own household, and were he not, as the old English aviculturists assure us was found to be the case, an entirely amiable bird, he might have developed—who knows?—the domineering tactics of the Hornbills, and walled his mate in the nesting-hollow for the term of her breeding period. But this is rather an idle supposition to apply to a *menage* which, despite what the reverend bird-keeper of old had to say about the male driving his mate about a cage, is obviously ruled by affection. Certainly, the regal bird would seem to take to himself "more time for vainer hours" than his sober little consort, but who will say that all this grace and beauty should be hidden away in a dark hollow at any time? Further, Scarlet-shoulder is apparently the melodist of the pair. "He has a musical and very animated song," writes Mr. Jerrard. "I heard it in October of 1921, and noted how his whole body vibrated with the force and intensity of his musical effort, imparting an agitated motion to the long tail, which bore adequate testimony to the vim of the performance. It all seemed to indicate a very intense little personality under the beautiful exterior."

Considering all the circumstances attached to the species, what would any reader of these notes have aimed at in the case under review, apart from placing on printed and pictorial record something of the life-history of the species? We thought the matter over, and came to the conclusion that it would be best to take some of the young from that nest in the public interest. It might be possible to have them breed under authoritative control; but at least thousands of people who would wish to see live specimens of a distinguished Queensland bird should be given the opportunity to do so—under proper conditions. Alas! that amiable scheme was doomed to failure. On April 8th Mr. Jerrard reported that some mischance had intervened to prevent the eggs being hatched. He had reason to believe that incubation had commenced before the beginning of March, but, judging



Beautiful Parrot (male) at entrance to nest.

Photo. by C. H. H. Jerrard, Queensland



Eggs of the Beautiful Parrot (*Psephotus pulcherrimus*) *in situ* in Termites' mound.

Photo. by C. H. H. Jerrard, Queensland.

by the behaviour of the birds, there was no indication of young near the end of that month. Any further history attaching to that nest can be told briefly.

"In accordance with the suggestion contained in your last letter," wrote Mr. Jerrard early in May, "I opened up the nest on April 24th, there being no longer any doubt that it had been deserted. The enclosed photographs show the result of that investigation. I was careful not to touch the eggs before photographing them. They had not been disturbed, but seem to be all addled. One was punctured and the contents dried up; another I broke, and found it to contain nothing but stinking fluid. No embryo seems to have developed in any of them. I cannot suggest any reason for this state of things. Had the parents been very shy of my hiding-place at first I might suppose that the eggs had got cold. But the fact is that I fixed up the hiding-place about noon on March 7th, left it for nearly two hours, returned, and after less than an hour's wait the pair came to the mound and the female entered the nest. It was a hot, sunny day, and the mound was like a warm oven, so the eggs could hardly have cooled. I left the hutch there that night, but the birds seemed to be quite familiar and unafraid of it."

Then follow these notes, taken on opening the mound: "The entrance tunnel is about nine inches long and one and a half inches in diameter. It enters the nesting-chamber at the top and to one side, so that the eggs cannot be seen or touched from outside. The nesting-cavity is roughly circular, about 15 to 18 inches in diameter and eight inches high in the middle. The light, honey-comb material in which it is excavated had not been carried outside (as in the case of the harder material through which the tunnel is bored), but lies at the bottom, forming the bed of the nest, on which the eggs lie. There is no other material whatever. The floor of the nest is lower than the ground outside. The eggs, five in number, are white, with a pinkish tinge, and measure .9 in. x .8 in. Both ends are shaped nearly alike. They rest under the centre of the mound. There were no termites in the mound when I opened it."

No further nests of the kingly Parrot have come under notice, but from general observations Mr. Jerrard is able to offer a few additional notes of interest. In 1921 he saw one pair and heard of another, the former couple bringing out a brood of four or five. This year there was the pair which he studied at the nest, and several persons reported seeing half a dozen of the birds together—two old birds with a family. That is all. Three other mounds have been examined, but the nests were old; one had two entrances, a few inches apart, communicating with one large cavity within. It is regarded as remarkable that during a month of last year in which a pair was under observation they were never observed outside of a particular area of about two or three acres; one suggestion is that this was a feeding-ground, and that the nest was some distance off. Attention was usually

called to the birds by the short and sharp but musical whistle uttered before taking flight from the ground on the approach of danger. They allowed one to approach on horseback within, perhaps, twenty yards before rising. Mr. Jerrard thinks that the old birds are constant to one nesting locality year after year, and that some of their offspring subsequently pair and nest in proximity to the parental home. He has never seen one of the Parrots more than a mile from the spot where he first discovered them last year.

DISTRIBUTION AND HABITAT.

It will, perhaps, be permissible now to examine the past distribution and habitat of the Paradise Parrot, both from printed records and private information. Gould recorded the species for both Queensland and New South Wales, but qualified this distribution by stating in his *Handbook* (1865): "Little more is at present known respecting this bird than that it is an inhabitant of the upland grassy plains of Queensland." A. J. North quotes this latter statement in his *Nests and Eggs of Birds found Breeding in Australia and Tasmania*, adding that though very willing to claim the beautiful bird for his State, he could not find justification for doing so. "I have never met with it nor heard of it being observed in any part of the State," he says, and goes on to regret being unable to describe the adult female bird from the small series of skins in the Australian Museum. The late Silvester Diggles, of Queensland, wrote of the species as being "found most plentifully in the district of Darling Downs," adding that it had been obtained in other parts of South-Western Queensland, "specimens having been shot occasionally near both Ipswich and Brisbane." Further, I have personal information that the bird was plentiful in the Brisbane Valley, particularly about Crow's Nest and Esk (at which latter place it was a favourite cage-bird), and that it was not uncommon to meet with pairs or small groups of the birds near Brisbane many years ago.

From the Darling Downs, Ipswich, and Brisbane districts the distribution of the species appears to have extended in a northerly rather than a westerly direction. There is a printed record of specimens being taken in Western Queensland, but I have reliable information that the species was known of old in the south-western districts of Goondiwindi and St. George. The former township being on the border of New South Wales, it is fair to assume that the Beautiful Parrot did reach the southern State, but probably no one can say if the dip was ever sufficiently pronounced to justify the bird being recorded as other than a Queenslanders. Reaching north from the Brisbane district, the main resort of the species was the Burnett and Wide Bay areas. Several correspondents have made patent this fact, and all agree that the species preferred slightly scrubby grass-country rather than open plains. Northerly again, the "Ant-hill Parrot" was

found a little to the west of Rockhampton; then there is Dr. Ramsay's record from Port Denison, after which the species appears to make an amazing jump of about one thousand miles, to the vicinity of far Cape York.

A REMARKABLE HABIT.

In the course of the search for the missing Parrot, it became evident that the name Ground Parrot was the most familiar one for the bird, "Elegant" that by which it was known to dealers, and "Ant-hill" Parrot the most definite title for identification purposes. It was, indeed, the bird's habit of nesting in termites' mounds, no less than its graceful and pretty ways, that made it so noticeable in earlier days, the only other Parrot known to follow this practice being the closely-allied *P. chrysopterygius*, the Golden-shouldered Parrot of the far North. Incidentally, it is curious to reflect that the notable nesting trait of these two Parrots is shared by certain other species of birds possessed of long tails—a factor which would seem rather opposed to occupancy of an earthen burrow. The beautiful *Tanyiptera sylvia*, the Long-tailed Kingfisher of the far North, also breeds in termites' mounds. Further, *Merops ornatus*, the so-called Bee-eater, which is graced with two long, feathery shafts extending beyond the tail, always makes its nest by burrowing in a bank or in sandy ground with, preferably, a slight slope. Why this point of similarity between birds whose only other feature in common is the possession of long tails?

It would appear, however, from what my correspondents have been able to ascertain, that *P. pulcherrimus* is not constant to termites' mounds for nesting purposes, but, like most other members of the genus *Psephotus*, may resort to trees. Certainly, it is not so confirmed a ground-loving Parrot as the unobtrusive *Pezoporus*. A bushman living near Crow's Nest tells me that he once saw an "Ant-hill" Parrot dash into a tree to escape from a Hawk; and Mr. A. J. Roderick, of Howard, says he frequently saw the birds feasting on acorns of the oak-trees. Gould, by the way, stated that the species fed on "the seeds of grasses and other plants growing on the plains," and Diggles records its food as grass-seeds and those of small papilionaceous plants.

Correspondents unite in agreeing that the species was never particularly communistic. Usually the birds were to be seen in pairs or, at most, half a dozen together, and then only locally. In this respect the rare species differs a good deal from the commonest member of the genus, *P. haematonotus*, the Red-backed Parrot of south-west Queensland and the southern States, which I have often seen associated in flocks running into three figures.

In regard to the behaviour of the species in captivity, the following interesting instance is given by Mr. J. O'Neill Brenan, an experienced Brisbane naturalist: "Prior to the year 1880 a few

were regularly caught by a bird-catcher and dealer then living in Brisbane; and in January of that year his catch included three or four young 'Beautifuls.' They were not nestlings, but had not been long upon the wing, that fact being apparent from the colour of their beaks, which were light yellow or cream coloured. I bought one, a young cock; he learned to whistle the usual 'Pretty Joey,' and at times made attempts to imitate the song of a Canary. He had, however, been trapped a little too late to make a good artificial whistler, and invariably broke into his native bright little call. Although quite friendly, always greeting me merrily when I approached his cage, he would never submit to the slightest handling, and would often attack the hand of a person attending to his food and water tins. He was a very hardy bird, did well on canary seed, was fond of bird's eye chili and milk thistles, and enjoyed perfect health from the day I bought him until nearly thirteen years afterwards, when a wind storm blew his cage down. The fall injured him internally, and he died the next day.

"If you asked any of the old-time bird dealers about the 'Beautiful' Parrot they would not know it," continues Mr. Brennan. "They called it the 'Elegant,' which, of course, is quite a different bird.* The man from whom I bought my bird told me that the first lot of 'Beautifuls' (he called them 'Elegants') that he and his brother sent home brought £25 a pair in London. It is to be hoped that this aptly-named little Parrot has not actually died out. Its length of tail gave it a most graceful appearance, whilst the adult male's variety of colouring was so perfectly blended that it was exquisite as well as brilliant. Flying in the sunlight the Bullen-bullen (*Barnardius barnardi*) takes some beating, but I think the 'Beautiful' was ahead of it."

WHAT CAUSED THE DECIMATION?

We come now to an examination of the cause or causes behind this tragedy. As to the active agency responsible for the disappearance of the Paradise Parrot, opinions vary. It is reasonable, in the first place, to assume that the bird's habit of nesting in the mounds of termites has contributed to its destruction by rendering the brooding bird, eggs, and young peculiarly open to attacks by natural enemies. Mr. William Gleeson, of Crow's Nest, includes among these Hawks of various kinds and "sand iguanas." The latter factor is condemned also in the following note from Mr. J. Nash, a kangaroo-shooter of ten years' experience from Nanango north to Mackay and all through the central west. Mr. Nash, as a keen bird-lover, says with sorrow that he has only seen the "Ground Parrot" twice during the last decade. "I only saw very few of them along

* *Euphemia elegans.*

the Cherwal River, about four or five miles north of Howard, and a few on the Isis River. This was about the year 1910, so there is only a very remote chance of them being left. Now," he proceeds, "these lovely birds have been (or are being) exterminated by iguanas. It is no trouble at all for the 'goanna' to dip into their nests and take either the eggs or young. The same thing applies to the nests of many birds which build on branches. I know what I am saying to be correct, as I have repeatedly shot 'goannas' in the act of robbing nests, and other shooters have told me the same thing. . . . I say most emphatically that the iguana does more harm to our birds in one nesting season than is counter-balanced by all the good it does during the remainder of its life."

While admitting the general soundness of these observations, it has to be remembered that natural enemies of the "Ant-hill" Parrot were just as numerous in the days when the bird held its own. A similar consideration must apply also in regard to a note that the aboriginals were wont to pull the young Parrots out of their ant-hill homes and roast them for food. What appears to me to be more feasible as a cause of the decimation is contained in a letter from Mr. H. Griffith, of Jimboomba, near Beaudesert, who offers the interesting suggestion that considerations of food, affected through human agency, may have been the primary cause of the sad thinning-out of this Ground Parrot. "In this district," he says, "the settlers burn the grass annually, and that at a time when the seed is ripe. The grass must grow thinner, I fancy, leaving only the tough old roots established. Do you think this wholesale burning-off, which has been going on for years, has caused starvation among the Ant-hill Parrots or a wholesale movement to the west, where, perhaps, drought and fires have again helped to further the work of destruction?" Then there is the question of loss of food through natural causes. Mr. Barnard expresses the view that the big drought of 1902 wiped out the Fairfield birds, and Mr. Brenan says: "As the birds lived entirely on grass seed, the big drought would have levied a heavy toll." The force of these contentions is obvious, and is very little lessened by the prevalence of Cockatoos and Warbling Grass Parrots (Budgerigahs), which are birds of the west rather than the coastal grass, and essentially communistic.

But there is yet another element that has contributed to the tragedy of the "Ant-hill" Parrot. This factor is pointed to by Mr. Griffith in a further note, in which he says: "We have a pensioner living here, aged 97 years, who at one time trapped birds for a living. He knew the Ant-hill Parrot well, and says that he got ten shillings each for them; but that was years ago. He mentioned to me that he once set his traps to catch some of these birds at the nest, and on going up to it in the evening found that a large black snake had entered. Fancy trapping the parent birds, though, when the young were helpless!" Further evidence upon the point comes from Mr. R. Illidge, a Brisbane

veteran, who states: "I did not regard *Psephotus pulcherrimus* as a rare bird in the Brisbane district, though it was very local. Between Kelvin Grove and Bowen Bridge, on some open forest country, I frequently saw the birds, usually in pairs, but sometimes in little parties of perhaps half a dozen. I saw some trappers out there one year, and after that the birds seemed to have entirely disappeared from the locality." These are only solitary instances. Many more might be gathered readily enough. Moreover, it was not sufficient for the trappers to supply Australian aviaries and cages with Paradise Parrots; the beautiful birds, as we have seen, were shipped away indiscriminately to Britain, the Continent, and possibly other countries.

Having in mind, therefore, the effect of trapping, the burning of grass, and the ravages of domestic cats gone wild, it seems moderately clear that the "most beautiful Parrot that exists" has been brought to the very verge of extinction by human agency, following upon Nature's indiscretion in bestowing upon it the fatal gift of beauty without adequate means of defence or protection. It is all very lamentable. It is more; it is a national tragedy. Both the citizens and governing authorities of Queensland have neglected a definite duty—a duty to helpless beauty—in allowing these pretty birds to be sacrificed. Whether it is too late to make amends cannot well be said; but the authorities showed the right spirit, while these inquiries were progressing, in extending full protection to the "lost" species and all other members of the genus *Psephotus* and the kindred genus *Euphema*.

ARE OUR PARROTS FAILING?

Finally, let us look for a few moments at the position of Australian Parrots generally. Mathews expresses the view (*Birds of Australia*, 1917) that these birds "have shown signs of extinction in a very rapid manner." I agree with him. It seems to me that the Parrots of the mountains, the King and Crimson species, for instance, are holding out fairly well. So also are several of the broad-tailed Rosellas. Among the Grass-Parrots the little Budgerigah (*Mclopsittacus undulatus*) and the Red-rumped Parrot (*Psephotus hematonotus*) are still fairly common. Aside from these two latter species, however, there is not one of the Grass or Ground Parrots that has not "slipped" very seriously. Where now is the Night Parrot? How rarely the Green Ground Parrot is reported! What has become of the regal *Euphema splendida*, the Scarlet-chested Grass-Parrot? (Once a plentiful species, only one company has been recorded in recent years, and that a small lot in South Australia.)

And what of that Paradise Parrot in miniature, *E. pulchella*, the Turquoise or Chestnut-shouldered Parrot? The late A. J. North, who had a wide circle of correspondents, wrote in 1911 that he had for years received inquiries from aviculturists con-

cerning this bird, but had not been able to afford them any information, the last specimen received at the Australian Museum (Sydney) being dated 1886. This of a species which John Gould had found quite common in N.S.W. in the forties,* and which Diggles, writing in the sixties, alluded to as "this beautiful but common species!" Two years later (in 1913), Mr. W. H. Workman, M.B.O.U., wrote to *The Emu*,† from Dublin, drawing attention to "the disappearance from the bird-markets during the last twenty years of the beautiful little Turquoise Parrakeet," and expressing the fear that the species had "gone the way of the Dodo and the Passenger Pigeon." "If our worst fears are realised," added Mr. Workman, "and this little bird has gone for ever, I think it would be of interest to ornithologists all the world over if a short history of the species were published in *The Emu*." The editors of *The Emu* appraised the question as an important one, and asked members of the R.A.O.U. for notes upon the species, either from past or present experience. There was no response. Two years later appeared A. J. Campbell's inquiry ("Missing Birds"), to which allusion has been made earlier. Again there was no response. All this caused Mathews to write in his big work (vol. 6, p. 549) that the Chestnut-shouldered Parrot was probably extinct, "and of its life history we do not know much." Readers of *The Emu* will remember that since then (last year, I think) a small company of the Turquoise Parrots was reported not far from Sydney. I have not heard, however, of any attempt being made to follow out Workman's suggestion in regard to fostering the breeding of the birds.

The extinction of a species is an appalling thing. How much more ghastly is the extermination of a genus! Such a possibility confronts us in regard to the *Euphema* Parrots. Mr. W. B. Alexander, M.A., C.F.A.O.U., tells me he thinks Parrots are failing the world over; but he would be the last to admit that because of that belief we should sit down with folded hands. The idea that such birds must have their day and cease to be can well be left to the trappers and dealers, gentlemen who mix fatalism with finance. The question is, then, what are the ornithologists of Australia going to do about this matter of vanishing Parrots? Surely it is a subject well worthy the attention of the annual congress of the Union! Meanwhile, let us, without reflecting on the claims of true science, dispute the dangerous idea that a thing of beauty is a joy for ever in a cage or a cabinet; and disdain, too, the lop-sided belief that the moving finger of Civilisation must move on over the bodies of "the loveliest and the best" of Nature's children.

* "All those who have travelled in the 'bush' of New South Wales," says Gould in his *Handbook* of 1865, "will recognize in this lovely species an old favourite, for it must often have come under their notice."

† Vol. XII., p. 207.

A Method of Taking a Bird Census

By Professor J. BURTON CLELAND, M.D., University,
Adelaide.

For some years I have had in view the possibility of obtaining some crude idea of the actual and relative numbers of the individuals of various species of Australian birds by recording those met with during progressive journeys made by various means of locomotion. The idea was that if, whilst walking, driving, or motoring through the country, a score was kept, as one keeps the runs at cricket, on a sheet of paper or the back of an envelope, of the numbers of each species seen, eventually where sufficient ground had been covered results of some value might be expected.

At Easter time in 1917, this scheme took concrete shape at Broken Hill, whilst on a motor run in the country with Dr. W. MacGillivray, R.A.O.U. This journey is recorded as A1 in my series. The desired results were easily and accurately tabulated, and 84 individuals of eight species recorded over a distance of 15 miles traversed in 1½ hours. The country was mostly open saltbush plain, and the view for small birds estimated at about 100 yards or less, and for large birds about 400 yards. Thirty-three individuals of *Epthianura aurifrons* (the Yellow-fronted Bush-Chat) were counted over the 15 miles with a lateral view of the disturbed birds of about 100 yards on each side—i.e., over an area of roughly a little less than two square miles. One may say, therefore, from the birds actually seen that the density of the population of this species was at least 17 per square mile. Using this as a basis and on the assumption that the rest of the saltbush country of this district was on an average similarly populated, one could by ascertaining the extent of this type of vegetation from the Survey Department, obtain if such was desired a very conservative estimate of the numbers in the district. The figure obtained would evidently be, in this case, surprisingly high.

In an article on "The Birds of the Pilliga Scrub" (*Emu*, vol. xviii., p. 272), I gave details of the method adopted when making a bird-survey of this area. By September, 1919, I had been collecting data for 2½ years, had notes of about 90 "journeys," in which I had traversed over 1200 miles, and it seemed an opportune time to bring the subject under notice at the Annual Conference of the Royal Australian Ornithologists' Union at Brisbane, with the objects of explaining the scheme, of obtaining views as to its reliability and value, of receiving suggestions as to improvements, and of inducing others to co-operate. As the idea seemed to meet with acceptance and some interest, and those who employed the method during the excursions seemed satisfied as to its relative reliability, I have in this paper summa-

rised the observations so far made. As pointed out by others during the discussion, not only is a crude idea obtainable in this way as to the numbers of our birds, but by recording results at the present time and making the same journeys again after, say, some years' interval, some idea might be obtained as to whether any species was decreasing markedly in numbers, holding its own, or increasing. What interesting results might not be obtained a century later!

In my previous paper, which should be consulted, I have indicated clearly how the type of vegetation necessarily affects the extent of the lateral view during the journey. Similarly the size of the bird and its habits, such as not being easily disturbed or *vice versa* will modify materially the distance from the road at which it can be recognised. Thus as regards certain species, such as Magpies, and Black-and-White Fantails, easily recognisable or continually on the move, the results recorded in my tables probably approximate very closely to the actual numbers present in the area under review, whilst in the case of other kinds, such as Tree-Tits (*Smicrorhis*) and White-plumed Honey-eaters in the tree-tops, the numbers actually seen are doubtless merely a tittle of those which escaped notice. I have given, however, data as regards all birds seen, and we can say, as regards the figures, that at least these numbers were in the area and in many cases probably very many more.

The question may be asked as to the reliability of the identifications. I can lay no claim to infallibility, and am perfectly aware that in my returns some mistakes must have occurred. I have, however, avoided these as far as possible, and when in doubt have expressed this either by a question-mark or by recording the genus only, or by merely noting the birds seen as unidentified. Even with these precautions, however, some wrong identifications have probably been made.

As regards the mode of progression, driving in a buggy or motoring give apparently about the same results, though the advantage is slightly in favour of the former as more time is allowed for observation. When walking, the number of small birds keeping to the trees is increased, as the trees can be carefully scanned, whilst birds calling can be searched for. Some means of progression is, of course, necessary so as to avoid counting the same birds again, and with the same object in view the track of the journey must not interlace. I have, however, in this census considered a return journey over the same ground as two journeys, and have labelled such second journeys (a) and a rare third journey as (b). The object has been to test the reliability of the method. Clearly, if the birds had not left the neighbourhood of the route followed, one should see the same individuals on each occasion if conditions were ideal. My full tabulated list shows that in such return journeys the numbers of species seen and the numbers of individuals of these observed do approximate fairly well on the whole with each other

—certainly as well as one might expect. If such double or triple journeys were lumped as one, it would probably be the correct procedure to consider, as the numbers of birds occupying the area traversed, the highest number for each species seen in any of the journeys, inferring that the lower numbers meant that some individuals had been missed. Another explanation might, however, be forthcoming, namely, that additional birds had entered the area. As far as the results of this census are concerned, we can look upon such out and return journeys as being independent but parallel ones, traversing the same kind of country and corresponding to adjacent "traverses" in a forest survey. It may be thought that during these journeys, birds are disturbed, and, flying in front of the vehicle, may be counted again and again. My experience has been that the birds usually fly off to one or other side rather than in front, and that with ordinary care it is only rarely that the same bird is counted again.

The different districts in which the journeys were made have been indicated by alphabetical letters as follows:—A. Broken Hill district (1); B. Adelaide hills (2 + 1 return journey); C. Sydney district (1); D. Eastern Riverina and South-Western slopes, N.S.W. (6 + 3 returns); E. Western slopes and edge of plains, N.S.W. (6 + 3 returns); F. Moss Vale district to coast, N.S.W. (10 + 2 returns); G. North coast of N.S.W., from Newcastle to Tenterfield—Lismore (24 + 4 returns); H. Scone district (2 + 1); I. Boggabri—Narrabri—Moree, etc. (21 + 5); J. Brisbane district. (1 + 1); K. Dalby district, Q. (1 + 1).

Where a long journey has been made, for instance one of a hundred miles by motor car, this has been split up for convenience into separate journeys of twenty miles or so each, such divisions frequently corresponding with changes in the type of country. Altogether 74 different "routes" have been traversed, giving with the return journeys a total of 95 "journeys." The distance travelled was approximately 1320½ miles. The shortest "journey" was only half a mile, and the longest 60 miles. As these journeys have by force of circumstances been of very uneven length, it would be necessary before attaching the same value to the figures for each journey, to reduce all to a common standard, as, for instance, the number of birds per 100 miles. Obviously space would not permit of this being done here, and, in the case of very short journeys, such a calculation might give far too high a value for the species seen, and would ignore entirely species in the locality which were not seen.

As in some "districts" only one or a few "journeys" have been made, and these perhaps short ones, stress must not be laid on the absence from the census of certain species for such districts. Thus only one short journey is tabulated for the Sydney district. The Magpie-Lark (*Grallina cyanoleuca*), a common bird in the neighbourhood, did not happen to be observed. Had it been seen, this species would have been observed in 9 instead of 8, of the 11 districts.

Turning now to the birds recorded, the value of the records will depend on several factors. It has already been mentioned that some birds, by sitting "tight," give results far below the actual numbers present. Others of migratory habits, such as Bee-eaters (*Merops*) and Wood-Swallows (*Irtamus superciliosus* and *I. personatus*) may be seen in numbers or not seen at all according to the time of year. Other species, Water Fowl, for example, are strictly confined to certain types of country. Some species—*e.g.*, Welcome Swallows (*Hirundo neoxena*) are rarely seen away from the habitations of man. Again, a single large flock of birds (*e.g.*, White Cockatoos) seen once on a journey, may give a wrong idea of the distribution of the species when compared with such a widely distributed species as the Black and White Fantail (*Rhipidura leucophrys*) never seen in flocks. To overcome this last difficulty, I have kept a record in my notes, but have not reproduced here, of every instance in which the number of birds seen at one time has reached double figures. The Martins seen in journeys G. 40 (229) and G. 41 (1275) were, for instance, in large groups as follows:—22, 25, 37, 11, 11, 11, 12 and 25, 33, 14, 38, 12, 90, 10, 13, about 150, 130, 40, 10, 18, 75, 250, 177, 31, 15, 30, 36, respectively.

In the 1329½ miles traversed, approximately 160 species of Australian birds and 13,469 individuals of these species were noted. In addition, 1097 Sparrows, 903 Starlings, and 118 Gold Finches were counted.

The most widely and uniformly distributed Australian species was the Magpie-Lark (*Grallina cyanoleuca*), being seen on 80 journeys out of 95 in eight of the eleven districts, the individuals totalling 765. As this is a conspicuous bird, easily identified and easily disturbed, this figure is probably one of the most accurate in the tables. In the districts where it commonly occurs, one would expect to see one of these birds in a little less than every two miles.

Next in wide and uniform distribution comes the Black and White Fantail (*Rhipidura leucophrys*), 317 individuals being seen on 69 journeys in nine districts.

One is glad to see the Magpie—White or Black-back—(*Gymnorhina tibicen* or *G. hypoleuca*) figuring in 66 of the 95 journeys, with 565 individuals. Walking along our roads, we may expect to meet with one of these birds in a little less than every 2½ miles. As this is a conspicuous bird, easily recognised at a distance, the field of vision for it may be considered on an average as being nearly a quarter of a mile on each side of the road—sometimes of course more, but in forest land less. One may therefore estimate that the 1329½ miles over which they were seen comprised an area for vision of about 600 square miles, and that this extent of country was tenanted by at least 565 Magpies, or 1 to a little over 1 square mile. As their distribution is wide and relatively uniform, it is perhaps safe to say that in Eastern Australia (leaving out the drier interior), the

Magpie population is about equal to the area in square miles.

Welcome Swallows (*Hirundo neoxena*), now in great part confined to the neighbourhood of human dwellings, where they can easily find suitable nesting sites, were seen in 58 journeys in ten districts, and numbered 595. It was not possible to separate satisfactorily the Tree-Martins (*Hylochelidon nigricans*) from the Fairy-Martins (*Hylochelidon ariel*). One or other was seen on 49 journeys in eight districts, and the number of individuals counted, 2919, was far greater than for any other species. This was largely accounted for by the great numbers seen resting on the telegraph wires in January, 1918, on a visit to the North Coast of New South Wales.

The field-loving Australian Pipit (*Anthus australis*) was found, to my surprise, in 59 journeys in nine districts, 285 individuals being seen. The Brown Flycatcher (*Microeca fascians*) is also widely distributed, with 237 individuals on 54 journeys in eight districts; 126 Laughing Kingfishers (Jackasses) were seen on 46 journeys in seven districts, being about one bird to every ten miles over the whole distance travelled. These birds often "sit tight," so that a number probably escaped notice. It is probably a conservative estimate to reckon that one Laughing Jackass occupies each five square miles of Eastern Australia.

It is remarkable that only 96 *Accipitriformes* (Hawks, etc. of all kinds) were seen, and these only in 31 journeys in six districts. Though on the routes travelled over they were, with several exceptions, rare birds, it is of course realised that in some districts not visited they are numerous. Nevertheless, one considers the small number seen with some surprise, coupled perhaps with apprehension when the role that many play in vermin-destruction is borne in mind. The figure 96 is probably substantially correct. Even when resting, the birds often perch on a dead tree or other conspicuous place, so that they are not easily missed. Making due allowance, however, for missing a number of Hawks, and reducing the range of vision in consequence to a quarter of a mile on each side, one finds that the population of Hawks is about one for each seven square miles of country.

I do not propose to consider individually any of the other species observed. Readers may draw their own inferences from the tables submitted. The figures as regards many species are necessarily not of much value, owing to the birds being confined to certain specified areas, such as swamps, rivers, dense brush, etc., or being found in large flocks as in the case of Galahs (Rose-breasted Cockatoos). Taken in conjunction with other species, however, they form an interesting record.

Space permits details only of twelve of the commonest species, showing the numbers seen on one journey in each of the eleven districts with the return journey in the last district shown as a check. This table illustrates the method of recording but does not record all the birds seen on a particular journey. The full table is preserved in the R.A.O.U. library, Melbourne.

Table † showing the distribution and numbers of twelve of the most widely distributed birds met with on these journeys

	A1	B2a	C4	D7	E12	F25	G40	H50	I54	J73a	K74	K74a	Districts	Journeys	Total
Miles traversed ...	15	3	1	19	20	19	42	7	16	9	30	30	—	—	1329½
Species of Native Birds	8	16	10	34	22	26	21	20	25	13	28	38	—	—	About 160
Total Native Birds ...	84	39	24	383	204	202	380	120	268	74	275	268	11	95	13,469
Total Hawks, Eagles, &c. (<i>Accipitriformes</i>) ...	3	—	—	10	1	—	1	1	22	—	7	5	9	47	133
Rosella (<i>Platycercus eximius</i>) ...	—	—	—	—	2	5	—	3	—	—	—	—	—	—	—
Kookaburra (<i>Dacelo gigas</i>) ...	—	—	—	2	3	4	—	1	1	—	2	6	7	46	126
Welcome Swallow (<i>Hirundo neoxena</i>) ...	—	2	1	—	—	11	64	4	—	11	4	16	10	58	595
Martin (Tree and Fairy) (<i>Hyolichidon</i>) ...	—	—	—	11	3	—	229	24	70	26	27	26	8	49	2919
Brown Flycatcher (<i>Microeca fascians</i>) ...	—	2	2	—	2	3	8	—	1	2	2	8	8	54	237
Black and White Fantail (<i>Rhipidura leucophrys</i>) ...	—	1	1	3	1	4	6	1	2	—	2	1	9	69	317
Magpie-Lark (<i>Grallina cyanoleuca</i>) ...	—	—	—	27	26	9	35	6	16	7	16	11	8	80	765
Noisy Miner (<i>Myzantha garrula</i>) ...	—	—	—	3	1	41	—	6	1	4	19	26	8	55	793
Pipit <i>Anthus australis</i> ...	13	14	—	11	4	1	4	1	—	—	2	1	9	59	285
Crows ...	—	—	—	10	2	5	3	—	4	1	7	5	7	41	168
Magpies (<i>Gymnorhina</i>) ...	—	3*	—	57	5	12	3	—	17	—	33	32	8	66	565

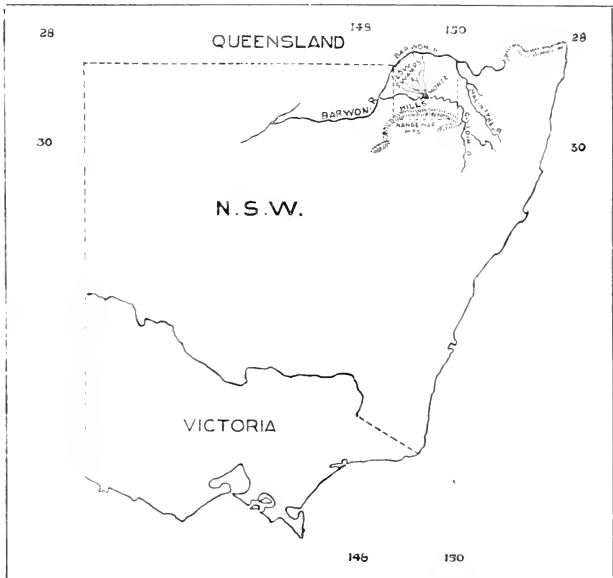
* Under *Gymnorhina* denotes that the species was *G. hypoleuca*. (White-backed) the others being *G. tibicen* (Black-backed).
† The full table is preserved in the R.A.O.U. Library, Melbourne.

Birds of the Moree District

By F. C. MORSE, R.A.O.U., Moree, N.S.W.

The district of Moree is situated in the extreme N.W. boundary of N.S.W. It comprises an area of 6870 square miles.

With the exception of the eastern boundary, it is all flat country, varying from large open plains to dense forests of belar (*Casuarina*) and brigalow. The Gwydir River runs through the centre of the district, and after passing the town spreads out in numerous narrow channels and broad swamps, the water eventually finding its way through these into the Barwon River, 70 miles further west.



Owing to the diverse nature of the country—hills, thick forests and large swamps—bird life is varied and numerous.

My observations extend over a period of thirteen years, during which time I have noted 216 species, which number, I am sure, could be added to by working the hilly to mountainous country of the eastern boundary, but I have never had an opportunity to do this. Naturally types would exist there that do not occur on the plains. My only visit has been of a fleeting nature—a hurried run through by car.



White Egret - *Egretta alba*, nest and young.

Photo. by F. C. Morse, R.A.O.U.

I am indebted to Mr. H. A. Mawhinney for notes on the breeding of several species, but of those birds enumerated two only have not come under my personal observation.

Dromiceius nova-hollandiæ. Emu.—Plentiful, especially on the larger holdings, where they have more scope. In the prickly pear country, they are very numerous, subsisting on the fruit of this plant, which is going to be the means of protecting them for many years to come.

Alectura lathamii. Brush Turkey.—In the N. and N.E. portions of the district, where the prickly pear is extensive, these birds are very numerous, and as this same type of country embraces a large portion of Southern Queensland, their preservation is assured.

Coturnix pectoralis. Stubble Quail.—After a succession of good seasons, these birds are here in countless thousands. I don't think this is caused by a large influx from other parts, but through their own wonderful powers of propagation. The breeding season lasts from August to the end of March, each hen laying from eight to thirteen eggs, and no doubt she will bring out two or three broods in a season.

Synoicus australis. Brown Quail.—Not numerous, confining themselves more to the swamp and margins of creeks and rivers.

Turnix varia. Painted Quail.—Thinly distributed all through the lightly timbered country.

Turnix pyrrhotorax. Red-chested Quail.—This year (1922) they are numerous on the open plains. Started breeding October, and there are still eggs to be found. Nests are always hooded over.

Turnix velox. Little Quail.—Not so plentiful as the former species; but still fairly numerous. They seem to prefer the lightly timbered land to the open plains.

Geopelia humeralis. Bar-Shouldered Dove.—Is thinly distributed through all the pine belts.

Geopelia placida. Peaceful Dove.—Not numerous except in the eastern quarter, where no doubt they are attracted by the wheat.

Geopelia cuneata. Diamond Dove.—Thinly distributed over the greater portion of the district. For its size this bird has a remarkably loud call.

Phaps chaleoptera. Bronzewing.—Thinly distributed through the western portion, but very numerous round the margins of the brigalow and belar forests, where they collect to feed on the berries of a bush known as the wild currant.

Histiophaps histrionica. Flock-Pigeon.—I have on two occasions seen a single bird. History relates that before the advent of the sheep, they at times came here in thousands. One old identity informed me that during the eighties "they were breeding in such numbers in his horse paddock that he could have filled a washing tub with the eggs."

Ocyphaps lophotes. Crested Pigeon.—Very numerous over the whole district. In the 1919 drought I began feeding a couple of pairs in the garden, and by the end of a few weeks 80 birds used to turn up every morning for breakfast.

Leucosarcia melanoleuca. Wonga-Wonga.—In the same type of country as that favoured by the Brush Turkey, these birds are still fairly plentiful.

Hypotaenidia philippensis. Buff-banded Rail.—Numerous during summer months; they appear to arrive with the Snipe during August. Breed freely in the swamps.

Perzana fluminea. Spotted Crake.—In 1917 I found a single egg of this species; but until the present year was unable to find another. However, in October, my boys and I found three nests in one day. The birds are not easily flushed, so are seldom seen; but are probably more numerous than one would suppose.

Porzana plumbea. Spotless Crake.—During one of our camps on the watercourse, Mr. Mawhiney secured a specimen of this bird, but that is the only one I have seen.

Perzana pusilla. Baillen's Crake.—Plentiful, breeding from September to February.

Tribonyx ventralis. Black-tailed Water-Hen.—Common. One pair nested in a kerosene box placed near a tree.

Gallinula tenebrosa. Black Moor-Hen.—Very numerous; breeding freely during spring months.

Porphyrio melanotus. Bald Coot.—Very numerous in the vicinity of the high sags and tall rushes. Nests and eggs are very similar to previous bird.

Fulica atra. Coot.—Very numerous where there are open spaces of water; breeds freely during spring months.

Podiceps ruficollis. Black-throated Grebe.—Plentiful in all quiet waters. During the spring of 1921, several nested in a small lagoon close to my house, and it was here I first witnessed the old birds carrying the young under their wings, which they continue to do for the first fortnight.

Podiceps poliocephalus. Hoary-headed Grebe.—Not numerous; there are certain lagoons where a few pairs are generally to be found. Breeds during summer months.

Podiceps cristatus. Great Crested Grebe.—Rare, and up to the present I have been unable to find a nest, though I know they breed here, as on one occasion while fishing in a large quiet lagoon, an old bird swam out of the high reeds opposite me followed by three young.

Chlidonias leucoparcia. Whiskered Tern.—These graceful little birds can often be seen flitting and skimming over the surface of the large lagoons, no doubt breeding in some quiet spot.

Erythrogonys cinctus. Red-kneed Dottrel.—Plentiful round the margins of the lagoons, preferring the still to running water, nesting freely on small muddy islands. They do not, as has been previously stated, coat their eggs with mud as a protection.

Lobibyx nova-hollandiæ. Spur-winged Plover.—Numerous.

Zonifer tricolor. Black-breasted Plover.—Numerous, prefers the more open and barer ground of a drier nature than that favoured by the Spurwing.

Charadrius melanops. Black-fronted Dottrel.—Numerous.

Peltehyas australis. Australian Dottrel.—I have only seen a single living bird of this species, and that was during the drought of 1919. Mr. Mawhiney often reports them from his quarter, but he tells me he only sees them on one little gravelly plain.

Himantopus leucocephalus. White-headed Stilt.—Plentiful about the swamps, where they breed in colonies.

Recurvirostra nova-hollandiæ. Red-necked Avocet.—Rare visitor. I have, on two or three occasions, seen a pair of these birds during droughts, each time they have been wandering about in the swamps caused by the overflow of artesian bores.



Upper—White-necked Heron (*Notophox pacifica*) on nest.

Lower—Black-throated Grebe (*Podiceps nigricollis*) standing on floating nest.

Photos. by F. C. Morse, R. A. O. U.

Glottis nebularius. Greenshank.—A shy and rare visitor; it is hard to approach, and when it rises it usually circles high overhead, all the time uttering a loud call.

Pisobia acuminata. Sharp-tailed Stint.—Numerous during the summer months round the margins of lagoons and swamps.

Gallinago hardwicki. Australian Snipe.—Very numerous from August to March. Large bags are often secured by sportsmen along the watercourse. I know of three guns accounting for one hundred and fifty birds in one day.

Rostratula australis. Painted Snipe.—Thinly distributed through the swamps and marshes, choosing the quiet places for breeding purposes. In the heat of summer can often be found in some shady nook a hundred yards or more from water.

Garecla maldivarum. Oriental Pratincole.—In March, 1920, while driving in the north-east quarter of the district, I flushed a small band of five Pratincoles from the roadside. In this same quarter Mr. Mawhiney often sees them, and at all times of the year, so the probability is they breed there.

Burhinus grallarius. Southern Stone-Curlew.—The wail of the Curlew can still occasionally be heard, but the intervals between are becoming longer and the birds rarer and rarer. This can be attributed to the fox, to which this bird falls an easy prey.

Eupodotis australis. Australian Bustard.—Like the previous bird, is becoming scarcer and scarcer; but the fox is not the only reason for this; the advent of the motor car has sounded the death knell of the old turkey. A bird so timid that one can seldom approach within a hundred yards of it on foot or horseback; will permit itself almost to be run over by a motor car full of men and bristling with guns.

Antigone rubicunda. Broiga (Australian Crane).—Numerous, but also suffering from the depredations of the fox. In drought time they go to the prickly pear country, and subsist on the fruit.

Threskiornis molucca. White Ibis.—Very numerous; breeding in many parts of the watercourse, either among the sags or on polygonum bushes, and recently we found them nesting in numbers in the koobah trees twelve or fifteen feet from the ground.

Threskiornis spinicollis. Straw-necked Ibis.—Very numerous. There are several large rookeries along the watercourse, where many thousands nest on the polygonum bushes. Breeding lasts from October to January if the water continues running.

Platalea regia. Black-billed Spoonbill.—Numerous. Nests in company with Cormorants or Ibis; if with the former, chooses the highest branches of the tall gum trees; if with the latter, is quite satisfied to make a nest on a polygonum bush three or four feet above the water.

Platalea flavipes. Yellow-billed Spoonbill.—Not as numerous as the previous species; but like its relative, is satisfied to take a lowly or elevated position for nesting, according to the habits of the other birds it is in company with, which are more often Pacific Herons and Cormorants than any other species.

Xenorhynchus asiaticus. Jabiru.—This bird has been twice recorded, and although I did not see it personally, there can be no doubt as to its identity by description. The last record was during the past winter, when one was seen on the McIntyre River during a flood.

Notophox novæ-hollandiæ. White-fronted Heron.—Very numerous. During the present season they started building in July and continued till December.

Notophox pacifica. White-necked Heron.—Very numerous. I know of one very large herony that I have visited on several occasions, where some hundreds of birds breed annually.

Nycticorax caledonicus. Nankeen Night-Heron.—Very numerous. Several large heronies exist, where the birds breed in great numbers.

Dupetor flavicollis. Yellow-necked Mangrove-Bittern.—I once saw a single specimen of this species fly from some tree roots overhanging the water; the action of flight caused such a commotion among the small birds, many of which gave chase, that I conclude the bird was quite foreign to them.

Betaurus poiciloptilus. Australian Bittern.—When camped at one of our favourite spots near the sags, the boom of the Bitterns could be heard from all quarters in the direction of the swamp, but, try as we would, we could not flush a single bird, and, in my many rambles in this quarter, I have seen only one.

Chenopsis atrata. Black Swan.—Numerous. Breeding from July till September.

Anseranas semipalmata. Pied Goose.—Not numerous; breeds in the densest parts of the sags during August and September.

Chenonetta jubata. Manded Goose.—Numerous; usual breeding months July and August.

Dendrocygna javanica. Whistling Duck.—At times very plentiful. This bird is known locally as the "red whistler"—a good descriptive name, which can be more appreciated when the two species are seen together.

Dendrocygna eytoni. Plumed Whistling Duck.—Very numerous in spring and summer. Nests are often found out on the plains a mile or two miles from water. Usually breeds in October, but I have just heard of a nest of seventeen eggs found in January.

Anas superciliosa. Grey (Black) Duck.—Very numerous; in favourable seasons breeds for nine months out of the twelve, either in trees or on the ground, sometimes fully a mile from water.

Virago gibberifrons. Grey Teal.—The most numerous of all the family. I have never found a nest anywhere but in hollow spouts. They breed for fully nine months, and lay as many as seventeen eggs, twelve to fifteen being a common occurrence.

Virago castanea. Chestnut-breasted Teal.—An occasional visitor in small numbers.

Spatula rhynchotis. Blue-winged Shoveller.—Never in large flocks, but thinly distributed all over the district. Nests close to the swamps in long grass or herbage.

Malaerhynchus membranaceus. Pink-eared Duck.—On occasions large flocks of these are to be found. They favour the quiet backwaters and lagoons, where they nest in all sorts of places; shallow hollows, tops of stumps and forked limbs are equally favoured. The eggs are always enveloped in down. Eight eggs seem to be the maximum clutch.

Stictonetta naevosa. Freckled Duck.—An occasional visitor. At a battue in aid of the Red Cross which I attended, two of these birds were bagged, and among the twelve shooters present (all old residents of the district) one only had seen the Ducks before. On our last trip to the Glossy Ibis rookery (February 19th, 1922), we saw a flock of about 20 of these and secured four specimens, one of which was undoubtedly an immature bird.



Upper—Black-tailed Water-Hen (*Tribonyx ventralis*) approaching nest in box.

Lower—Pink-eared Duck (*Malacorhynchus membranaceus*) on nest in tree-stump.

Photos. by F. C. Morse, R.A.O.U.

Nyroca australis. White-eyed Duck.—Very numerous; always builds a nest in a tussock of reeds or grass in the water; often makes use of a Coct's or Moor-Hen's nest.

Biziura lobata. Musk Duck.—Plentiful in the larger reaches of water. The power of flight of this bird is sometimes doubted. Some years ago I happened to be sitting on the verandah with others in the moonlight, when a large body banged on the roof and rolled down the iron into a flower bed below; where we all had a good inspection of the culprit—an old Musk Duck.

Phalacrocorax carbo. Cormorant.—Fairly plentiful. Nests in rookeries with other species, but always selects the highest positions.

Phalacrocorax ater. Little Black Cormorant.—Very numerous; breeds freely in large rookeries.

Phalacrocorax varius. Pied Cormorant.—Not numerous. I have never yet found their nests.

Microcarbo melanoleucus. Little Pied Cormorant.—Very numerous. Large rookeries at many places on The Watercourse.

Anhinga novaehollandiae. Australian Darter.—Not numerous; but their cackle can be heard at all the larger lagoons. I have never found them nesting in colonies. Sometimes half a dozen nests can be located within a hundred yards of one another, but many birds are quite solitary in their habits.

Pelecanus conspicillatus. Australian Pelican.—Numerous; has an unpleasant habit of swallowing young Ducks or anything else that comes within reach.

Circus assimilis. Spotted Harrier.—Rare; odd pairs arrive during flush seasons when Quail are plentiful. Quite recently one appeared, the first we have seen for four years. This bird should not be called a Swamp Hawk; he is always to be found working the open plains. I have never seen him near the swamps.

Circus approximans. Swamp-Harrier.—A true Swamp Hawk; always to be found working to and fro over the sags, but I have never seen one away from the watercourse.

Astur fasciatus. Australian Goshawk.—Rare; seldom to be found away from the rivers, where it seems to favour the tall timber, in which it nests.

Uroaetus audax. Wedge-tailed Eagle.—Plentiful throughout the district.

Hieraetus pennatus. Little Eagle.—Rare; a few birds are occasionally to be found where rabbits are plentiful.

Haliastur sphenurus. Whistling Eagle.—Very numerous on all the rivers and watercourses. They appear to be quite friendly with the other birds, often nesting in the same tree or in close proximity to the heronies.

Lophoictinia isura. Square-tailed Kite.—I have seen an odd pair or an occasional bird of this species, but they do not remain here for long.

Gypoictinia melanosterna. Black-breasted Buzzard.—During the 1919 drought a pair of these birds remained about here for some months, causing much consternation among the Magpies, which were nesting at the time.

Elanus axillaris. Black-shouldered Kite.—At odd times I have seen a good many of these birds scattered through the district, but only when field mice are plentiful.

Falco peregrinus. Peregrine Falcon.—Fortunately for the Ducks this slaughterer does not often appear here. I have seen only three, two of which were amusing themselves Duck killing. I recorded in "The Emu" some years ago the fact that Mr. Mawhiney and myself witnessed a single bird kill, apparently only for sport, twelve Ducks in about half an hour.

Falco hypoleucus. Grey Falcon.—A rare visitor. The only time I have seen them was seven years ago, when I came across a little band of five amusing themselves chasing Pigeons.

Falco subniger. Black Falcon.—When the Quail are plentiful, a fair number of these birds come to the district. I have only two records of their breeding here. Mr. Mawhiney has twice taken eggs from the same tree, which was probably the same bird on each occasion.

Falco longipennis. Little Falcon.—Thinly distributed all over the district. Quite recently I saw one attempt to catch a Black-breasted Plover, but was very surprised to note that the Plover, owing to its wonderful dodging, got right away.

Eracidea berigora. Brown Hawk.—Numerous. The sneak-thief among the Hawk tribe. Have several times seen one stealing young birds from the nests, more especially young *Grallinas*.

Eracidea occidentalis. Striped Brown Hawk.—I often see birds which are apparently referable to this race in company with the former kind.

Cerchneis cenchroides. Nankeen Kestrel.—Numerous. Nests in hollows or just as readily in an old nest of a Raven or Magpie.

Ninox boobook. Boobook Owl.—Rare. I do not remember ever having seen one, but can occasionally hear them.

Ninox connivens. Winking Owl.—Rare. Last winter one took up his quarters close to the house in a bilga tree, his retreat being disclosed by the leg of a chicken found lying beneath; and on the following evening he made another attempt at a poultry supper. So very reluctantly, and acting on instructions from a higher authority, I brought the gun into use.

Tyto alba. Barn-Owl.—After a succession of good seasons, there is usually a plague of mice, at which times these Owls are numerous. Although seldom seen in daylight, numbers are flushed from the roadside when one is motoring at night. Their screech is distinctly disagreeable, and, if heard in large cities, the police force would be searching for murderers.

Trichoglossus moluccanus. Blue Mountain Lorikeet.—A rare visitor; occasionally a little band can be seen feeding on the blossoms of the Moreton Bay ash.

Trichoglossus chlorolepidotus. Scaly-breasted Lorikeet.—I have one record in my note book of a visit paid by a small band of these in 1917, and like the previous birds they were feeding on the blossom of the Moreton Bay ash.

Glossopsitta concinna. Musk Lorikeet.—Plentiful at times in the eastern quarter, when one of their natural foods is in abundance—the native apple tree (*Angophora*) blossom.

Cacatua galerita. White Cockatoo.—Fairly numerous in spring along the Gwydir and Barwon rivers, where they nest in the big trees.

Cacatua roseicapilla. Galah.—Very plentiful through all the district.

Leptolophus hollandicus. Cockatiel.—In good seasons in countless numbers.

Aprosmictus erythropterus. Red-winged Parrot.—Fairly well distributed throughout the district. Their food is principally the seeds of various trees, such as the leopard, white wood and prickly acacia.

Platyercus adscitus. Pale-headed Rosella.—Not numerous; more often found among the big gums of the rivers.

Platyercus eximius splendens. Yellow-mantled Rosella.—During the winter and early spring a few of these birds are to be found, but they always leave before summer sets in, and take up their quarters in the eastern parts of the district, where wheat is grown.

Barnardius barnardi. Ring-necked Parrot.—Thinly distributed all over the district.

Psephotus hæmatogaster. Blue-bonnet Parrot.—Plentiful.

Psephotus varius. Many-coloured Parrot.—In 1918, I came across several pairs of these birds along the Barwon River. I don't know whether they are permanent residents or not, as I have had no further opportunity of investigating, but it is the only time and place I have seen them.

Psephotus hæmatonotus. Red-backed Parrot.—Not numerous in the western quarter, but plentiful in the wheat growing area.

Melopsittacus undulatus. Budgerygah.—Countless numbers of these pretty little birds are here in some seasons.

Podargus strigoides. Tawny Frogmouth.—Plentiful, but not often seen.

Egotheles cristata. Owlet Nightjar.—Plentiful, but, like the previous bird, not often seen.

Eurystomus orientalis. Australian Roller.—A few pairs migrate annually to the large trees of the river bank to breed.

Dacelo gigas. Kookaburra.—Numerous.

Halcyon pyrrhopygius. Red-backed Kingfisher.—Not numerous. Seldom seen away from the rivers, where they tunnel in the banks for nesting purposes.

Halcyon sanctus. Sacred Kingfisher.—Plentiful from October to March, after which they all go away.

Merops ornatus. Rainbow Bee-eater.—For the past five years we have made a note of the arrival of these birds, and during that time the first was seen between the 22nd and 25th September; never earlier or later.

A dozen pairs or so remain close to the house to breed each year, but the wily fox has added the young to his menu, and except those actually nesting in the garden, all fall victim to this omnivorous feeder. He gets them in the same manner as he does young rabbits by simply digging a perpendicular hole to the nest. No effort is wasted in following the burrow from the entrance.

Eurostopodus guttatus. Spotted Night-jar.—On rare occasions I have flushed one of these birds. I fancy they are birds of passage, as they disappear entirely.

Chaetura caudacuta. Spine-tailed Swift.—Often noted passing usually the herald of stormy weather.

Micropus pacificus. White-rumped Swift.—During the summer months large flocks often seen passing.

Cuculus pallidus. Pallid Cuckoo.—Plentiful; a few birds remain here all the winter.

Cacomantis flabelliformis. Fantail Cuckoo.—During the winter, I have seen numbers of these in the large Casuarina forests; no doubt many hibernate here. They disappear in summer, and I have no record of an egg being found.

Mesocallius osculans. Black-eared Cuckoo.—Rare; odd pairs occasionally seen.

Chalcites basalis. Narrow-billed Bronze Cuckoo.—Very numerous.

Lamprocoecyx plagosus. Bronze-Cuckoo.—Not plentiful, and, like the Fantail, does not remain here to breed.

Scythrops novaehollandiae. Channelbill.—Only seen occasionally, sometimes at intervals of years; but I do not think any pass without advertising themselves by their loud call.

Hirundo neoxena. Welcome Swallow.—Plentiful.

Ceramceca leucosternum. White-backed Swallow.—Until the last decade this bird was unknown in the district, now they are permanent residents in the extreme eastern quarter.

Hylochelidon nigricans. Tree-Martin.—Very numerous; occasionally makes use of a little mud to plaster up the mouth of a large hollow, in which they are nesting. A pair also built quite a respectable mud nest this year in my hayshed, a thing I did not think they were capable of.

Hylochelidon ariel. Fairy Martin.—Very numerous.

Microceca fascians. Brown Flycatcher.—Numerous.

Petroica multicolor. Scarlet-breasted Robin.—Rare in brigalow and belar of N.E.

Petroica goodenovii. Red-capped Robin.—Numerous.

Melanodryas cucullata. Hooded Robin.—Rare in brigalow and belar of N.E.

Smicronis brevirostris. Short-billed Tree-tit.—Rare in brigalow and belar of N.E.

Gerygone albogularis. Bush-Warbler.—Rare.

Gerygone (?).—There is a more common species here than the previous one, but I am not sure of its identity yet; it certainly is not the Southern Bush-Warbler (*G. fitsea*).

Eopsaltria australis. Yellow-breasted Shrike-Robin.—Plentiful in the belar and brigalow forests.

Falcunculus frontatus. Shrike-tit.—Fairly plentiful along the rivers and watercourses.

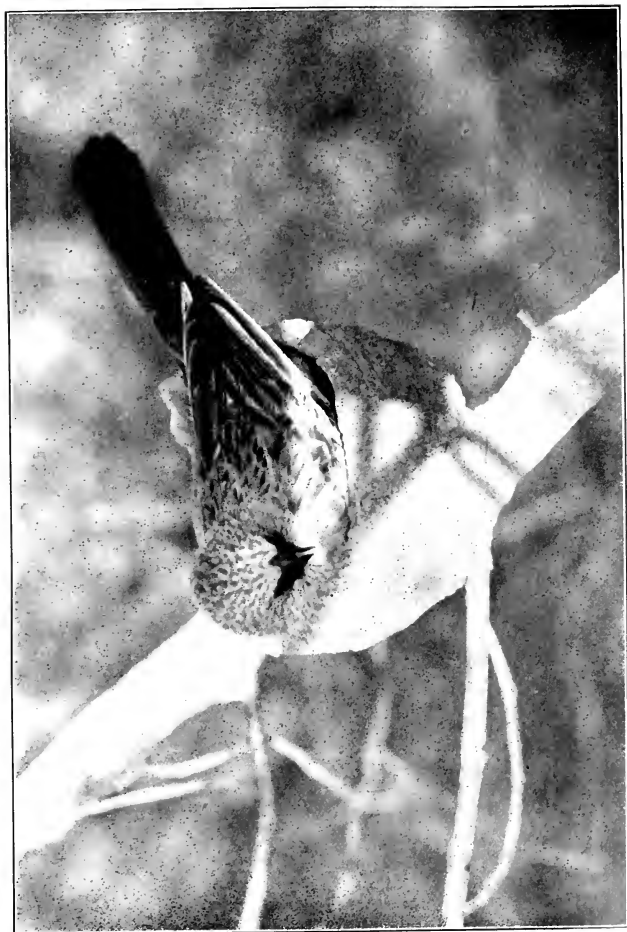
Oreoica gutturalis. Crested Bell-Bird.—Numerous in parts of the district.

Pachycephala pectoralis. Yellow-breasted Whistler.—Not numerous. Only to be found in the densest belar forests.

Pachycephala rufiventris. Rufous-breasted Whistler.—Very plentiful all through the district.

Rhipidura flabellifera. White-shafted Fantail.—Numbers of these little birds pass here in August, a few remaining to nest in the large belar forests.

Rhipidura rufifrons. Rufous Fantail.—Very rare. I cannot recall ever seeing more than two of these little birds, though Mr. Mawhiney reports them occasionally from his quarter, but he has been unable to find them nesting.



Apostle-Bird (*Struthiodica cinerea*) on nest; see page 36.

Photo. by F. C. Morse, R.A.O.C.

Rhipidura leucophrys. Black and White Fantail.—Very numerous. Last spring there were no less than nine nests (all being used) within 100 yards of the house.

Seisura inquieta. Restless Flycatcher.—Plentiful; more especially near the water.

Myiagra rubecula. Leaden Flycatcher.—Very rare, but few pairs remain in the district to breed each summer, though they do not appear until the weather is hot.

Pteropodocys maxima. Ground Cuckoo-Shrike.—Fairly plentiful. Nesting commences in August and lasts till October, seldom later.

Graucalus novae-hollandiae. Black-faced Cuckoo-Shrike.—Numerous. These birds are late breeders, not beginning till October; but nests can often be found as late as January.

Graucalus mentalis. Little Cuckoo-Shrike.—Fairly numerous along the rivers, but seldom seen elsewhere.

Campephaga tricolor. White-shouldered Caterpillar-eater. — Numerous in the late spring and summer; some birds remain here all through the winter, though the majority go north. Several returned soldiers have told me that the note of the male is just like a burst of machine gun fire. Why not call him the Machine Gunner?

Pomatostomus temporalis. Grey-crowned Babbler.—Very numerous throughout the district.

Pomatostomus superciliosus. White-browed Babbler.—Very rare. I have never seen these birds in the district, but since I started writing this, Mr. Mawhiney rang me up to say he had just found them breeding. This is also the first record he has of them.

Cinlorhamphus cruralis. Brown Song-Lark.—Numerous. The flight of the male bird of this species is more like the aerial movements of an aeroplane than that of any other bird I know of. Prefers the open plains.

Cinlorhamphus mathewsi. Rufous Song-Lark.—Numerous; but prefers the lightly timbered country; more especially large ring-barked timber.

Epthianura albifrons. White-fronted Bush-Chat.—On occasions, and at certain favoured spots, these little birds are to be found, but they are not numerous.

Epthianura tricolor. Crimson Bush-Chat.—Not numerous, and, like the former bird, favouring certain localities, preferably the tall thistles, where they breed.

Epthianura aurifrons. Orange Bush-Chat.—My first sight of these pretty little birds in the district was on the return trip from R.A.O.U. camp at Wallis Lake. When driving home from Garah, two flew from the roadside. Subsequently I saw numbers of them, and Mr. Mawhiney found them breeding in the prickly acacia bushes on the plains.

Acrocephalus australis. Australian Reed-Warbler.—Very numerous along "The Watercourse," where the abundance of sags and tall reeds is all they desire. Many can be found in the mid-winter in this favoured place.

Megalurus gramineus. Little Grass-Bird.—Numerous, especially in the swamps, where the polygonum bushes grow.

Chthonicola sagittata. Speckled Warbler.—In the more heavily timbered lands in the N.E. we saw a fair number of "specks" on one of our excursions. Black-eared Cuckoos were also more numerous there than elsewhere, but we could find no "specks'" nests, consequently no Cuckoo's eggs.

Acanthiza nana. Little Tit-Warbler.—Fairly plentiful in the sandal-wood scrubs.

Acanthiza chrysorrhoa. Yellow-tailed Tit-Warbler.—Numerous.

Acanthiza pyrrhopygia. Red-rumped Tit-Warbler.—Rare. This little bird, owing to its quiet, retiring nature and modest appearance, could easily be mistaken for several other species, and in this way overlooked, but its nest is quite unique, and usually in an exposed position—a distinct invitation to the Bronze-Cuckoo.

Acanthiza uropygialis. Chestnut-tailed Tit-Warbler.—Plentiful; generally to be found in little bands; always nests in a hollow with a tiny entrance.

Sericornis frontalis. White-browed Scrub-Wren.—On the extreme eastern boundary, where there are shaded gullies running from the hills, I have seen little bands of these birds, but farther west they do not care to go.

Malurus cyaneus. Blue Wren-Warbler.—Not numerous, but fairly well distributed.

Malurus leucnotus. White-winged Wren-Warbler.—This beautiful little bird is to be found in small companies all over the open plains, more especially where there are roly poley bushes, in which they build their nests.

Malurus lamberti. Variegated Wren-Warbler.—Fairly plentiful.

Artamus leucorhynchus. White-breasted Wood-Swallow.—Numerous.

Artamus superciliosus.—White-browed Wood-Swallow.—Numerous.

Artamus personatus. Masked Wood-Swallow.—Numerous.

Artamus cinereus. Black-faced Wood-Swallow.—Numerous.

Artamus minor. Little Wood-Swallow.—Rare. A few pairs of these little birds distribute themselves over the district each spring; they seem to prefer the ring-barked belar country, where they nest in some hollow spout. This district must be about their "furthest south"; 80 miles N.W. they are plentiful.

Colluricincla harmonica. Harmonious Shrike-Thrush.—Plentiful.

Grallina cyanoleuca. Magpie Lark.—Plentiful.

Aphelocephala leucopsis. Whiteface.—Plentiful; one of the earliest and latest breeders. I have found nests early in July and as late as March.

Neositta chrysoptera. Orange-winged Nuthatch (Tree-runner).—Numerous in the belar forests.

Climacteris picumna. Brown Tree-Creeper.—Plentiful in the open forest country; begins nesting as early as June.

Climacteris leucophaea. White-throated Tree-Creeper.—Thinly distributed in the belar forests. I have never seen them elsewhere.

Climacteris erythrops. Red-browed Tree-Creeper.—Very rare; an odd pair in the N.E. quarter. In 1920, Mr. Mawhiney found one pair breeding; the nest was fairly low in the cleft of a boonary tree.

Zosterops lateralis. White-eye.—In the autumn months I have several times seen little bands of these birds about, but they do not seem to remain long, and I have never seen or heard of their nesting in the district.

Dicaeum hirundinaceum. Mistletoe-Bird.—Not numerous.



White-winged Choughs (*Circorax melanorhamphus*), nest and young; see page 36.

Photo. by F. C. Morse, R.A.O.U.

Pardalotus assimilis. Orange-tipped Diamond-Bird (Pardalote).—Numerous. Dr. D'Ombraïn described this bird in *The Emu* of July, 1921. The note is always chip-chip.

Pardalotus striatus. Red-tipped Pardalote.—Not numerous, but to be found along the rivers in eastern extremes. Their note is quite distinct from that of the previous species; it sounds like wit-e-chu.

Pardalotus punctatus. Spotted Pardalote.—Rare. On rare occasions I have seen these little birds. Their note is also quite distinct from those of the previous two.

Melithreptus gularis. Black-chinned Honey-eater.—Rare. The only spot I have seen them in any numbers was along the McIntyre River.

Melithreptus brevirostris. Brown-headed Honey-eater.—Not numerous, but being such unobtrusive little birds, may be more plentiful than one supposes. They move about in little bands from one blossoming tree to another, and the only note uttered is a very tiny one when in flight.

Plectorhyncha lanceolata. Striped Honey-eater.—Plentiful.

Myzomela nigra. Black Honey-eater.—In the spring of 1918 numbers of these little birds appeared, remaining for about a month, feeding the while on honey from the sandalwood (*Eremophila mitchelli*). That short visit is the only time I have ever come in contact with them.

Grantiella pieta. Painted Honey-eater.—At times fairly plentiful in certain parts of the district, but I think their movements are influenced by the fruiting of the mistletoe, on which they seem entirely to feed. Mr. Mawhiney and E. Rickman found several of their fragile nests in the belar and myall trees in 1920. This year none are about, and there is likewise no fruit on the mistletoe.

Stigmatops indistincta. Brown Honey-eater.—The identity of this bird is doubtful. In a little gully full of flowering banksia, we (that is, Dr. D'Ombraïn, myself and others) saw a pair of small brown Honey-eaters with long, curved bills. I thought they were of this species; the Dr. says not. They were building a nest at the time, and as we were returning by the place a fortnight later, we decided to make further investigation then; but when we did return, the trees had ceased flowering, and the birds had gone. Whatever they were, they had no right there.

Meliphaga fusca. Fuscous Honey-eater.—Where the hills give way to the plains at the extreme eastern boundary the Fuscous Honey-eater is to be found, but the flat country marks his boundary line.

Meliphaga virescens. Singing Honey-eater.—Plentiful. Their increase is checked very much by the Pallid Cuckoo, which is very partial to their nest. They overcome this difficulty in a measure by nesting continuously from September to March.

Meliphaga penicillata. White-plumed Honey-eater.—The most plentiful of all. Numerous throughout the district.

Myzantha garrula. Noisy Miner.—Plentiful.

Myzantha flavigula. Yellow-throated Miner.—I think even more plentiful than the previous species.

Acanthagenys rufogularis. Spiny-checked Wattle-bird.—Numerous.

Entomyzon cyanotis. Blue-faced Honey-eater.—Not numerous.

Philemon corniculatus. Friar-Bird.—Fairly numerous along the rivers, but scarce elsewhere.

Philemon citreogularis. Yellow-throated Friar-Bird.—Numerous in the spring and summer, but disappears entirely during the colder months.

Anthus australis. Australian Pipit.—Not numerous.

Mirafra javanica. Horsfield Bush-Lark.—Numerous on the open plains when the seasons are good.

Zonaginthus guttatus. Spotted-sided Finch.—Like all the representatives of the Finch family, only here in good seasons. At present very plentiful.

Teniopygia castanotis. Chestnut-eared Finch.—At times in thousands, making their nests in low hollows or prickly acacia bushes.

Steganopleura bichenovii. Banded Finch.—Rare.

Aidemosyne modesta. Plum-headed Finch.—At present very plentiful. Nesting in the black thistles and roly poly bushes.

Aegintha temporalis. Red-browed Finch.—Only extends to the eastern boundary of the district among the hills.

Oriolus sagittatus. Australian Oriole.—Not numerous; prefers the belar forests.

Chlamydera maculata. Spotted Bower-Bird.—Owing to this interesting bird's destructive habits in the gardens, they are not nearly so plentiful as formerly, except in the prickly pear country, the fruit of which plant keeps them out of mischief elsewhere.

Corvus bennetti. Short-billed Crow.—An occasional visitor, whose presence can always be detected by the very different "caw" from that of the Ravens.

Cervus coronoides. Raven.—Plentiful. In spite of guns, traps, and other means of destruction, the old Ravens, I am glad to state, seem as plentiful as ever.

Struthidea cinerea. Grey Jumper.—Plentiful. The most homely bird we have, and generally looked on as a garden pest. The society often take possession of a *Grallina's* nest for their own purposes.

Corcorax melanorhamphus. White-winged Cough.—In times when mud for building purposes is scarce, they often overcome the difficulty by using soft cattle droppings.

Strepera graculina. Pied Bell-Magpie.—Plentiful in the prickly pear country, no doubt attracted there by the fruit.

Craicticus nigrogularis. Black-throated Butcher-Bird.—Numerous. I always think the note of this bird is the most beautiful of all our songsters, but it is heard to advantage only at daybreak in the spring.

Craicticus torquatus. Collared Butcher-Bird.—Numerous.

Gymnorhina tibicen. Black-backed Magpie.—Numerous.

In this list I have omitted two species, both migrants, of whose identity I am not certain, but they were probably a Whimbrel and a Sanderling.

Egret and Glossy Ibis Rookeries

By F. C. MORSE, R.A.O.U., Cooalla, Garah, N.S.W.

For many years I have been firmly convinced that the Glossy Ibis (*Plegadis falcinellus*) bred somewhere along the 70 miles of Watercourse in this district, and, in company with Mr. H. A. Mawhiney, I have spent many days in search of their nests.



Glossy Ibis, nest and eggs.

Photo, by F. C. Morse, R. A. O. U.

On almost every trip we made to various points in this vast expanse of swamps the birds were seen, but no sign of a nest was found. To help us in the quest, we questioned every person we met living anywhere near the wet area. Most of them did not even know the bird. We were fortunate in at last meeting Mr. S. A. Freeman, who has a block of land in the Ibis country, and a telephone message on December 2nd from him to the effect that "Glossy Ibises were going to and fro past his camp daily, and apparently their headquarters was at a large Straw-necked Ibis rookery," had Mr. F. McCallum, R.A.O.U. (who happened to be with me at the time), quickly preparing for a trip. We reached Mr. Freeman's camp next day about 2 p.m., and started a mile walk through shallow water towards the polygonum swamp, in which the Straw-necks (*Threskiornis spinicollis*) were breeding. This swamp covers a large area, through which we hunted for the remainder of the afternoon, but could not even see a bird of the Glossy species. We returned to camp very disappointed, but decided next day to work the northern portion of the swamp on which we had not yet touched. Carrying out these intentions, we had no sooner reached the polygonum bushes than a flock of Glossies rose just in front of us. Hurrying over to the spot, we could see several nests, mostly containing recently hatched young or eggs just chipping. One nest contained four eggs and one young just out of the shell. In all we counted seventeen nests in close proximity, but could find no more further out. The nests were all very low down from two feet to six inches above the water, well back in the bushes, an outer ring of Straw-neck and White Ibis nests almost obscuring them from view. They were all built of the green, wiry ends of the polygonum bushes. After taking a few photos, all of which I lost through dropping the camera in the water, we made back to the camp, and that afternoon walked a couple of miles in another direction, hoping to locate some more Glossies in that quarter, but without success.

Next day, when six miles on the homeward track, we pulled up, leaving the car by the roadside, walked about two miles through fallen belar to another portion and quite a different type of swamp lands. In this place the channel was not more than a quarter of a mile wide, but a dense growth of eumung (*Acacia varians*) trees, with their spreading branches, almost covered up the water way. These trees do not grow more than 30 feet in height.

We were no sooner in this area than we were in the midst of hordes of birds—Egrets, Herons, Spoonbills, Cormorants and White and Glossy Ibis. The last were in great numbers, and nests were in evidence on all sides. Some contained large young, which on our approach, scrambled away up the branches. Other nests were in process of construction, and there were eggs and young in all intermediate stages. Having satisfied ourselves

that we had at last found the long-sought spot, we made our way homewards with the intention of returning at an early date.

The following week-end, December 9th, saw us again on the same spot, this time accompanied by Mr. Mawhiney. We worked the swamp both east and west for about half a mile, but did not reach the end of the nesting area. For this reason, it would be impossible even to guess at the number of Glossies breeding here, but we concluded that we had seen three or four hundred nests.

The Glossies' nests, viewed from below, are indistinguishable from those of the Plumed Egrets. They are certainly built by the occupants, as we saw many birds carrying material. They are all constructed of the leafy ends of the eumung trees, some placed on old nests, others built in forks or branches of the trees from seven to twenty feet above the water level. They measure from 11 to 15 inches in width, with an egg cavity of two inches in depth. Clutches, usually three or four; two nests contained five, and one six eggs.

White, Plumed, and Little Egrets (*Egretta alba*, *intermedia*, and *garzetta*) were also breeding here, the former two in great numbers. Of the Little Egret we could find only one small colony of perhaps thirty to fifty birds. These also were in all stages. In some nests the young were fledged, while other birds were only now building.

Clutches of the White and Plumed were usually three, often four, while those of the Little were usually four or five.

On December 17th heavy rain fell, and the country was once more flooded, and we were unable to get to the place again till February 17th of this year. Birds were still apparently as numerous as ever. A few nests still contained eggs, but there was evidence on all sides that breeding had practically ceased. The water was drying off, and many of the occupied trees were now on dry land.

We were rather alarmed at hearing what we took to be pea rattle shots every now and then, and thought some marauders or murderers had got among our birds, but we were much relieved to find it was only eggs popping in the drying mud.

This most interesting spot is probably the largest heronry in New South Wales. There are hundreds of thousands of birds breeding here. It is on the extreme portion of four different holdings. The land itself is of very little value for grazing purposes, and probably very little or no objection would be raised to its being proclaimed a sanctuary. The total length is not more than three miles, of an average width of about a quarter of a mile.

In conclusion, I would like to mention that this is the only place where I have seen the White Ibis nesting among the trees, many nests being fully 20 feet from the ground. They usually occupy quite a lowly position.



Plumed Egret (*Egretta intermedia*), nest and young.

Photo. by F. C. Morse, R.A.O.U.



Little Egret (*Egretta garzetta*) at nest; see page 38.

Photo. by F. C. Morse, R. A. O. U.



Bird Notes from Boree (New England Plateau)

By Mrs. S. P. W. NORTON, R.A.O.U., Tamworth, N.S.W.

Boree is situated on the top of the New England Tableland, N.S.W., 50 miles south of Armidale. It is 3500 feet above sea-level, and the winters are bitterly cold. In wet seasons heavy falls of snow are fairly frequent, and in dry years the frosts are very severe. During July and August, 1919—a drought year—the thermometer frequently fell to 12 deg. or 15 deg. Fahr. at night (20 deg. of frost), and by day piercingly cold westerly winds would blow.

The summer sun is scorching, but the shade temperature is not high, and the nights are cool. The country is slightly hilly, with wide, clear valleys between. The hills are thickly clothed with stringybark trees, with large patches of bracken-fern here and there; the haunt of Tits and Wrens. A great deal of the country is ring-barked, and covered with dead trees and fallen logs.

A small creek runs through the property. It flows only during winter or wet seasons. At other times it is merely a succession of small waterholes from two to five feet deep, fringed with a low growth of rushes round a muddy margin. One or two waterholes have gravelly edges. These are frequented by Dottrels. Along the creek flats grow white gum and "peppermint" trees. Among these the Noisy Miners, Magpies and Butcher-Birds make their home.

On one portion of the creek is an "island"—a piece of higher ground surrounded by marshy land. On this the timber has been left green and thick. It is not more than 150 yards long, by, say, 75 yards wide, yet on that one spot in October, 1919, I found the following nests:—Scarlet-breasted Robin, 5 nests; Flame-breasted Robin, 1; Satin Fly-catcher, 1; White-throated Fly-eater, 1; White-shafted Fantail, 1; Harmonious Thrush, 2; Rufous-breasted Whistler, 1; Black and White Fantail, 1; Yellow Tits, 2; Wattle Bird, 1; Friar-Bird, 1; Soldier-Birds (Noisy Miners), 3; Magpie-Lark, 1.

It was the richest little spot in birds and nests I have known. Away from the creek the back country is watered by small dams, the haunt of Herons and Dottrels.

The house is situated on a rather stony hill, overlooking the creek, though some distance from it, and is surrounded by *Pinus insignis* trees, ever-green hedges and a fruit orchard. To the west is a natural breakwind of thick-growing peppermints. Twenty five miles due east of Boree, the N.E. tableland breaks off abruptly in precipitous cliffs and very steep mountain sides, descending rapidly several thousand feet to the coastal country. This eastern side is known as the "Falls country," as the water-courses flowing eastward all plunge over into deep gorges and

canons forming in many places very fine waterfalls, and really magnificent canyons, some with sheer bare cliff sides, others beautifully clothed in brush and pine scrubs. The "Falls Country" is wild and rough and thickly timbered. Forests of casuarina abound and Lyre-Birds, Satin Bower-Birds and so on are plentiful, but since the boundaries of "Boree" do not extend to this country I have not included any of the birds found there in my list.

These are only the birds actually seen *by myself* on "Boree" during the spring and summer of 1919, and autumn and winter of 1920.

Coturnix pectoralis. Stubble-Quail.—Very common most of the year. One little chap lived in the garden for weeks, and became so tame he would come to be fed every morning.

Ocyphaps lophotes. Crested Pigeon.—A pair spent a few hours in the garden during December. Evidently in migration; none seen since.

Gallinula tenebrosa. Black Moor-Hen.—Occasionally seen about the creek, but not common.

Podiceps ruficollis. Black-throated Grebe (Dabchick).—A few always to be found on the dams and the creek.

Lobibyx novæ-hollandiæ. Spur-winged Plover.—Always plentiful about the creek and flats. A pair bred not twenty feet outside our garden fence on a stony hillside.

Zonifer tricolor. Black-breasted Plover.—Not so common as the Spur-wing, but fairly plentiful. A pair of these birds bred quite near the house and beside a main road, along which motor cars and other traffic passed frequently all day.

Charadrius melanops. Black-fronted Dottrel (Sand-Piper).—A pair of these birds were almost always to be found at each dam and water-hole.

Burhinus grallarius. Southern Stone-Plover.—These birds used to be extremely common about here, but since the coming of the fox they have become very rare, and through the whole year I only heard one calling during a night in November (1919).

Threskiornis molucca. Straw-necked Ibis (Dry-weather Bird).—Present in immense flocks during the late summer and autumn months.

Platalea flavipes. Yellow-billed Spoonbill.—Four seen about the creek in February.

Notophox novæ-hollandiæ. White-fronted Heron.—A solitary bird, always lives about the dam near the house. Others are often seen along the creek.

Notophox pacifica. White-necked Heron.—Usually a very rare bird here, but during this year (1919), no doubt owing to the abnormal conditions created by the prolonged drought, several solitary birds took up positions on the little water-holes and dams. Each bird seemed to keep entirely to his chosen place, and to have no intercourse with the others. One shared—apparently most amicably—the small dam near the house with the old White-fronted Heron.

Nycticorax caledonicus. Nankeen Night-Heron.—All through the summer one slept by day in a gum-tree near the house; flying to the creek at dusk.

Anas superciliosa. Black Duck.—Always in small flocks on the creek water-holes, and in October numerous pairs were breeding among the rushes growing all along the muddy margins of the creek.

Chenonetta jubata. Maned Goose.—Small flocks always about the water-holes. Also bred among the dead trees along the creek banks.

Phalacrocorax fuscescens. White-breasted Cormorant (Shag).—A pair were always about the creek.

Phalacrocorax ater. Little Black Cormorant.—A few often came on to the creek for a few days at a time.

Pelecanus conspicillatus. Pelican.—Four of these birds appeared on the dam near the house late one evening, and after resting there all that night and next day departed; none seen since.

Urcaetus audax. Wedge-tailed Eagle.—Occasionally seen sailing in the sky.

Haliastur sphenurus. Whistling Eagle.—Extremely common; sometimes after rabbit poisoning, literally in hundreds feasting on the carcasses.

Ieracidea berigora. Brown Hawk.—Often seen, but not plentiful.

Cerchneis cenchroides. Nankeen Kestrel.—Always a few pairs about. In February there came a plague of grasshoppers and for a few days the Kestrels were around in dozens, snapping up the pests. It was a charming sight to watch them wheel and hover and swoop.

Ninox boobook. Boobook Owl.—One lived in a tree near the house; it called every night, and was sometimes seen.

Glossopsitta concinna. Musk Lorikeet.—Large flocks appeared during the period of the flowering of the eucalypts, and remained till the bloom was over, shrieking all day, and roosting in close ranks all over the branches of a tall dead tree near the house at night.

Calyptorhynchus funereus. Black Cockatoo.—A flock of about a dozen lived in the stringy-bark ridges, where they tore long strips of bark from the trees. About March they all go east to the "Falls" country to the casuarinas to breed. They return in June or July.

Cacatua galerita. White Cockatoo.—Large flocks attacked the crops in February and March.

Platycercus elegans. Crimson Rosella.—Not often seen so high as this, but very plentiful a little farther to the east in the "Falls" country. A pair took up their residence in the garden during the summer, and were most destructive to the fruit, especially the raspberries.

Platycercus eximius. Rosella.—One of the commonest birds here. Always about. This summer especially they were present in large flocks, and were most destructive to the crops.

Podargus strigoides. Tawny Frogmouth.—A pair build each year in a gum-tree quite near the house, and are always about.

Eurystomus orientalis. Australian Roller (Dollar Bird).—Pairs were frequently seen during the summer.

Acelolobus gigas. Laughing Kingfisher.—Very common. During the winter they were frequently found lying dead in the bush. Probably the long drought and lack of food were responsible.

Halycon sanctus. Sacred Kingfisher.—Several pairs were about during the summer.

Chaetura caudacuta. Spine-tailed Swift.—Often seen winging their way high overhead.

Cuculus pallidus. Pallid Cuckoo.—Fairly plentiful; more often heard than seen; very often called all night.

Cacomantis flabelliformis. Fan-tailed Cuckoo.—Sometimes seen in the bush.

Chalcites basalis. Narrow-billed Bronze-Cuckoo.—One pair only seen the summer.

Lamprocyx plagosus. Bronze Cuckoo.—Often seen. In March and April they were to be seen in little flocks of ten or so in the bush.

Scythrops novæ-hollandiæ. Channel-bill.—One was heard flying and calling overhead just before a storm, but was not seen.

Hirundo neoxena. Welcome Swallow.—Very numerous in spring and summer. Building all round the verandahs and in the out-houses. Generally they leave us about April, but this year did not go till June.

Hylochelidon nigricans. Tree Martin.—Very common in summer. In the autumn huge flocks gathered and mingled with the Welcome Swallows. The telephone line was one continuous black row of Martins and Swallows all day long. Soon after they seemed to depart together.

Petroica multicolor. Scarlet-breasted Robin.—Very common in summer in the bush, and in winter in the open. In October I found five nests of this species on one little point of land running out into the creek. They generally build in stringy-bark saplings, but also on dead limbs of small trees. The hen-bird about here is much more brightly coloured than in the lower country. Her breast has a small patch of really bright vermilion red; quite a different shade from that of the male bird.

Petroica phoenicea. Flame-breasted Robin.—Only occasionally seen here; not at all common.

Petroica goodenovii. Red-capped Robin.—A rare bird about here. Sometimes seen in the stringybark scrub. A pair came into the garden this summer, and seemed inclined to build in one of the fruit trees. A brutal cat killed the male, and the little hen-bird remained alone in the garden all the summer. She took possession of the tree which she and her mate had chosen and chased all other little birds out of it in the most pugnacious way. After evicting some little Tit or Finch, she would sit on a top-most twig and warble a funny, gurgly, almost inaudible, little song of triumph. She became very tame, and would flit about after me when I was working in the garden, sitting on a stake or fence and watching me, but I never saw her eat a worm. She left in April.

Melanodryas cucullata. Hooded Robin.—One only seen during the summer, in the clear ring-barked country.

Gerygone albogularis. White-throated Flyeater.—The sweet song of these tiny birds was to be heard all through the summer in the bush, where they also nested.

Eopsaltria australis. Yellow-breasted Shrike-Robin.—One pair only observed in the stringy-bark.

Falcunculus frontatus. Yellow-breasted Shrike-Tit.—Two pairs only observed in the stringy-bark ridges in March. They tore the bark from the branches with their stout bills while searching for insects.

Pachycephala pectoralis. Golden-breasted Whistler.—Several pairs were observed in the stringy-bark ridges in the spring and summer.

Pachycephala rufiventris. Rufous-breasted Whistler.—Always to be seen and heard all through the summer months, but leaving us in the winter.

Rhipidura flabellifera. White-shafted Fantail.—Often seen in the bush, and very occasionally visited the garden.

Rhipidura leucophrys. Black and White Fantail (Willie Wagtail).—Very common. A very amusing pair built every year in the garden, and were extremely tame and friendly, often coming right into the rooms through an open window.

Myiagra cyanoleuca. Satin Flycatcher.—In October (1919) one pair nested by the creek.

Graucalus novae-hollandiae. Black-faced Cuckoo-Shrike.—Plentiful during the summer months in the bush.

Campephaga tricolor. White-shouldered Caterpillar-eater.—Plentiful during the summer months, mostly frequenting the open ring-barked ridges.

Cinclorhampus mathewsi. Rufous Song-lark.—A pair lived in the garden for some weeks during the summer. They then departed and no more were seen.

Epthianura albifrons. White-fronted Chat.—A small flock roosted all through the winter months in the thick hedges in the garden, flying out into the adjoining fields by day. In spring they disappeared.

Acrocephalus australis. Reed-Warbler.—Very plentiful about the river banks about six miles from Boree where they were nesting as late as January (1920). None to be found about this creek.

Acanthiza nana. Little Tit-Warbler.—Not common, but sometimes seen in the bush.

Acanthiza pusilla. Brown Tit-Warbler.—Very common in small flocks in the bush.

Acanthiza lineata. Striated Tit-Warbler.—Not common, but sometimes seen in the bush.

Acanthiza chrysorrhoa. Yellow-tailed Tit-Warbler.—Common. Two pairs always live in the garden, where they breed, and are most useful, destroying large quantities of aphids and grubs.

Acanthiza reguloides. Buff-tailed Tit-Warbler.—Sometimes seen in the bush, where I distinguished them from the Yellow-tail by their characteristic little nest, sometimes built in a fence post-hole or in a creek in a tree-trunk.

Sericornis frontalis. White-browed Scrub-Wren.—One pair only were observed in October among the low tea-tree by the creek where they built.

Malurus cyaneus. Blue Wren-Warbler. — Common among the bracken on the hills, but never came to the garden.

Artamus superciliosus and *A. personatus*. White-browed and Masked Wood-Swallows.—Were present in large flocks (together) in October. Later the Masked disappeared, and a few pairs of White-browed remained and nested (in company) close about the homestead. In March and April the White-browed again appeared in numbers, but the Masked were not seen again.

Artamus cyanopterus. Dusky Wood-Swallow.—Rather rare here; only two pairs observed during the year.

Grallina cyanoleuca. Magpie-lark.—Always living and breeding along the creek.

Colluricincla harmonica. Grey Shrike-Thrush (Harmonious Thrush).—Common in the hills; one became very tame during the winter, and came to the house for crumbs with the "Soldier" Birds.

Neositta chrysoptera. Orange-winged Nuthatch (Treerunner).—A flock of six was seen one afternoon running head first down the upper branches of a dead gum.

Nesitta pileata. Black-capped Nuthatch.—One pair only seen in open, ring-barked country.

Climacteris picumna. Brown Tree-Creeper.—Common in the bush. They chiefly frequent the dead timber country.

Climacteris leucophaea. White-throated Tree-Creeper.—Very common. They chiefly confine their range to the green timber. Found breeding (young ones) as early as August 4th this year (1920), when the weather was still extremely cold.

Zosterops lateralis. Silver or White-eye.—Only once observed a few in the garden eating aphids from the rose-bushes. Not at all common here.

Pardalotus striatus. Red-tipped Pardalote.—A very common little bird; to be heard calling "wit-e-chu" all the year through and building in both tree hollows and holes in banks.

Pardalotus punctatus. Spotted Pardalote.—Fairly common; coming down into the low bushes during the winter, where they were often seen.

Melithreptus lunulatus. White-naped Honey-eater (Black-cap).—Very numerous in the eucalypt trees.

Glyciphila albifrons. White-fronted Honey-eater.—A small flock appeared one day and remained all that day in the eucalypts near the house, but were not seen again.

Meliphaga chrysops. Yellow-faced Honey-eater.—Our commonest Honey-eater; very plentiful all through the summer, building in the garden and wreaking havoc on soft fruits. They leave us about June and go to the east.

Meliphaga leucotis. White-eared Honey-eater.—Fairly common in the stringy-bark country, where several nests were discovered in October, all placed very low down in "suckers" growing from the trunks of burnt trees.

Myzantha garrula. Noisy Miner (Soldier-Bird).—Very common among the "peppermint" gums, but not seen among the stringy-bark.

Anthochaera carunculata. Wattle-Bird (Chock. Gill-bird).—Very common and very destructive to fruit during the spring and summer. They breed here and depart east about April.

Philemon corniculatus. Friar-Bird (Leather-head).—Very common and troublesome among fruit during the spring and summer. They breed here and leave about April.

Anthus australis. Australian Pipit (Ground Lark).—Very common on the clear flats and crop lands. They seem to congregate together in the autumn, when flocks are to be seen in the crop lands.

Zonaginthus guttatus. Spotted-sided Finch. Common. Nine pairs build in the garden and live there all through the summer months. They split up into very small flocks or pairs, and retire to the bush for the winter.

Egintha temporalis. Red-browed Finch.—Rare here, but sometimes seen in the bush.

Corcorax melanorhamphus. White-winged Chough.—Small flocks are always to be found in the stringy-bark ridges, and their big mud nests are common.

Strepera graculina. Pied Bell-Magpie (Black or Port Macquarie Magpie).—Not common here, but very numerous a few miles to the east.

Corvus coronoides and *C. eccila*. Australian Raven and Crow.—Often about, and breeding in the hills.

Cracticus torquatus. Collared Butcher-Bird.—Two pairs always inhabit the belt of eucalypts near the house and nest there each year.

Gymnorhina tibicen. Black-backed Magpie.—About our commonest bird; very plentiful all the year round.

Introduced Birds.

Passer domesticus. Sparrows.—Up to 1920 had not taken up residence at Boree, though plentiful in the township of Walcha, five miles distant.

Carduelis carduelis. Goldfinches.—Occasionally seen.

Sturnus vulgaris. Starlings.—Becoming very numerous.



Little Barrier Island from Mt. Archeria.

Photo. by W. R. B. Oliver, F.L.S., F.Z.S., R.A.O.C.

The Birds of Little Barrier Island, N.Z.

By W. R. B. OLIVER, F.L.S., F.Z.S., R.A.O.U., Dominion Museum, Wellington, New Zealand.

The Government of New Zealand has wisely set aside for the preservation of the indigenous birds of that country three wooded islands each of considerable size and with mountainous features. Little Barrier Island is situated near the northern, Resolution Island near the southern extremity, and Kapiti Island near the middle of the Dominion. Each is eminently suited to bush birds; and this is all that is required of an island sanctuary, for shore and open country birds are mostly wanderers, and could not be depended on to reside permanently in a small area. One has only to visit one of these sanctuaries to realise the success which has followed the protection afforded. Birds which are rare or even quite extinct on the mainland are on Little Barrier Island abundant and quite fearless of the visitor. From early dawn to dusk the forest rings with their songs. Happiness and prosperity seem to reign everywhere. Yet the bird life is not without its tragedies. Life may be easy for most, but a toll is taken by Harriers, which pay visits from the mainland, by a few resident Bush Hawks, and, worst of all, by some cats introduced by former settlers and now reverted to a semi-wild state.

Little Barrier Island originally belonged to a Maori tribe, from whom it was acquired by the Government for the purpose of a bird sanctuary. "After considerable difficulty and many vexatious legal delays, the Crown at last obtained peaceable possession of the island of Hauturu, or Little Barrier. This, however, was not carried out without the help of the Permanent Force, and the residence on the island for some months of one of the torpedo-men, and eventually the removal by a specially chartered vessel of all the live-stock on the island claimed by the Maoris."*

Little Barrier Island lies some fifteen miles due east of Rodney Point. Its length from north to south is given as $4\frac{1}{2}$ miles; its breadth from east to west as $3\frac{1}{2}$ miles. With the exception of a boulder flat on the south-west side, the whole surface is rough and mountainous, and densely covered with vegetation. A boulder beach surrounds the island, making the landing workable only on the leeward side or in fine weather. Viewed from the sea it presents the appearance of a truncated cone, and, knowing its volcanic origin, one would expect to find a crater. But the island is a deeply dissected pile of fragmentary rocks, and a distinct crater cannot be recognised, though probably occupying the head of Weka Gully, immediately under the south-east side of Mt. Archeria. The main feature of the island consists of two high sinuous ridges forming an irregular T. One of these runs from Ngatamahine Point in the north along the east side of the island

*Appendix to Journals of House of Representatives, 1897. C1, p. 124.

to East Cape in the south. At each end of this ridge, a bold rock with precipitous sides stands out above the general level of the ridge. The northern rock is known as Orau,* the southern as Bare Rock or Wekaweka. This ridge gives off spurs with intervening gullies to the east. From its central and highest point, Tirikakawa, a spur leads away westward following an S-shaped course as far as The Thumb, or Herikohu. About its centre this ridge culminates in Mt. Archeria, 2450 feet above sea level, the highest point in the island.

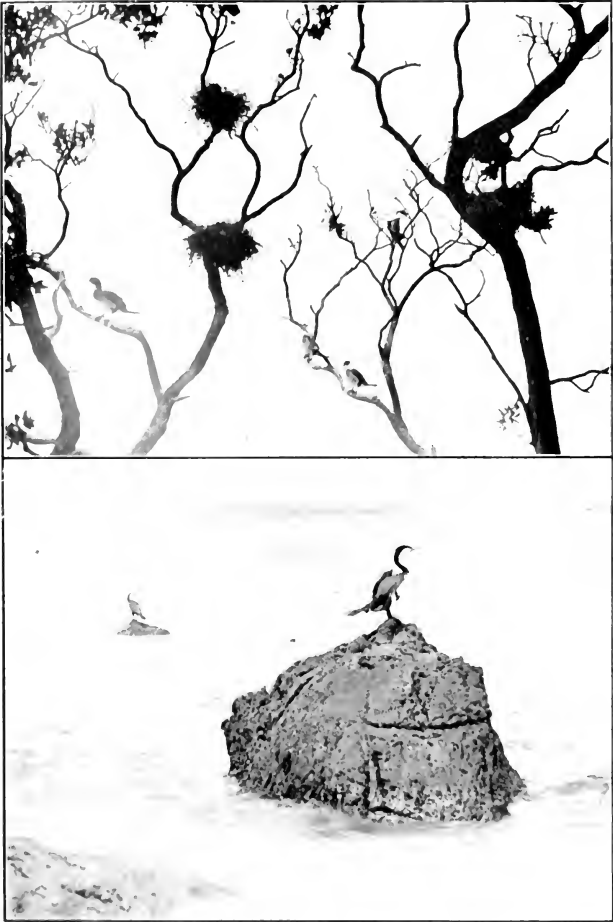
The greater portion of the island consists of a breccia, or agglomerate of a rather loose matrix enclosing angular fragments, frequently of large size, of lava rocks. Only in two places that I visited did I find the lava in situ. From the weathering of such loose material is produced a series of deep gullies alternating with high ridges radiating from the centre of the island.

The peculiar coastline, unsatisfactory both for landing and fishing operations, is entirely due to the nature of the rock of which the island is composed. The sea is constantly wearing away all sides, producing high, vertical cliffs subject to slips. The loose matrix is soon washed away, and the lava fragments are ground to smooth boulders by rubbing against each other, thus leaving a boulder beach at the foot of the sea cliffs. This beach continues without interruption along the whole coastline of the island. Many of the gullies near where they enter the sea have sides of the same nature as the sea cliffs; that is to say, a creek runs through a deep, narrow gorge. Hence it happens that on most of the coastline on the north side of the island, although a landing may be effected on the boulders, no further progress can be made, for most of the gullies give no access to the interior.

The only level ground in Little Barrier Island is a shingle flat about fifty acres in extent on the south-west side. The main portion of this flat is fairly level and supports vegetation consisting of sedges, grasses, manuka and pohutukawa. The area near The Spit is terraced and ridged in a direction parallel to the south side. The whole flat appears to have been thrown up by the sea, mainly, if not entirely, from the south-east.

The whole island, with the exception of a portion of the shingle flat, which is occupied by sedges and grasses, is covered by forest. This consists of a variety of associations ranging from dry manuka scrub on the coast ridges to wet moss-forest on the high slopes and ridges. The distribution of the different types of forest can be made out from the trig. station on Mt. Archeria; and all kinds are passed through in going from the sea coast to the summit. Along the coast the ridges are occupied by tall manuka scrub with undergrowth of sedges, and this passes

*The native names are taken from a map published in App. Jour. H.R., 1900. They may not be used here as intended by the map, which is so incorrect as to make it impossible to be sure of their correct application.



Upper—Pied Shags and nests on top of sea cliffs.

Lower—Pied Shags drying their wings on rocks along shore, Little Barrier Island.

Photos. by W. R. B. Oliver, F.L.S., F.Z.S., R.A.O.U.

towards the interior into high manuka forest with coprosma mainly as undergrowth. The gullies near the coast are occupied by rata-tawa forest. Further inland rata-tawa forest still occupies the gullies and lower slopes, but the ridges support kauri-beech forest. This latter is of a rather dry type, containing in its lower portion many large manuka trees. All the upper portion of the island is covered with a damp, shady forest, in which tawa, tawhero, pukatea, tawari and heketara are the most abundant. This forest is characterised by its undergrowth of large-leaved shrubs, such as kanono, patete and *Meliccytus macrophyllus*, and also by its richness in ferns and mosses. On the southern sides of the hills it is always damp and cool. Altogether the forests on Little Barrier Island provide all situations from comparatively dry ridges to cool, damp gullies. The wealth of filmy ferns, mosses and liverworts on the higher slopes bears evidence that moist conditions obtain there throughout the year.

In addition to the species of birds listed below, all of which are indigenous, the Brown Kiwi (*Apteryx australis*), Haast's Kiwi (*A. haasti*), and the Kakapo (*Strigops habroptilus*) have been transferred to the island, while the following introduced species have made their way over from the mainland—Sparrows, Thrushes, Blackbirds, Starlings, and Greenfinches.

Eudyptula minor. Little Blue Penguin.—This bird is fairly common in Hauraki Gulf, and is said to breed round the coast of Little Barrier Island. Several dead specimens were noticed on the rocks.

Sula serrator. Gannet.—Fairly common, but does not breed on Little Barrier Island, preferring small isolated rocks such as Gannet Rock, off Waikeke Island.

Phalacrocorax carbo. Black Cormorant (Shag).—A visitor only to the island.

Phalacrocorax (Hypoleucus) varius. Pied Cormorant (Shag).—There is a colony of Pied Shags breeding on the cliffs on the south coast. They build large, untidy nests of sticks in forks of bare and exposed branches of pohotukawa* trees overhanging the tops of the sea cliffs. The nesting sites continue as headquarters for both young and adult for many months. In March they were seen sitting on the branches together. During the daytime they go short distances fishing, or sitting on rocks along the shore, sunning themselves or drying their wings, but they always return to the nesting places in the evening. The young differ from the adult chiefly in that their colours are not developed, especially the white on the throat and breast, which are always more or less grey.

Microcarbo melanoleucus. Little Pied (White-throated) Cormorant.—Known as a visitor only to Little Barrier Island.

Pelecanoides urinatrix. Diving Petrel.—Plentiful in Hauraki Gulf.

Halobæna cærulea. Blue Petrel.—Reischek obtained a specimen on Little Barrier Island.†

Prion turtur. Fairy Dove Petrel.—Buller has recorded that this species was found breeding in burrows on Little Barrier Island.‡ It is common enough in Hauraki Gulf.

* *Metrosideros tomentosa.*

† Iredale, Aust. Av. Rec., vol. 2, p. 25.

Precellaria parkinsoni. Black Petrel.—The Black Petrel breeds in large numbers on the higher ridges of Little Barrier Island. It lays a single egg at the end of a burrow two or three feet long. In late February many burrows were noticed high up on the hills, but I did not see anything of the birds. Reischek records these birds cleaning out their old burrows in November. The first egg was found on 28th November, after which several eggs were found with the female always sitting.‡

Pterodroma macroptera. Great-winged Petrel (North Island Mutton Bird).—This species is common in Hauraki Gulf and the Bay of Plenty, breeding on many of the islands. It usually makes its burrows just at the top of sea cliffs. In March I found many burrows on the south coast of Little Barrier Island. Reischek found this species breeding, and records that a single egg is laid in each burrow in September.

Pterodroma (Cookilaria) cooki. Cook Petrel.—This is by far the most abundant of the Petrels breeding on Little Barrier Island. Everywhere on the hillsides and ridges about midway between sea coast and summit their burrows are to be found. Reischek, who gives an account of their breeding habits, found eggs in November. Judging from what I saw of the remains of birds killed by cats, they were fully fledged by the end of February. A considerable number must be killed by cats, as birds with breasts and heads eaten were encountered in various parts of the bush. I collected several skulls, wings and feet, and from these am able to identify the species.

Puffinus carneipes. Fleishy-footed (Pink-footed) Shearwater.—This appears to be the northern representative in New Zealand of the Sombre Petrel (*P. griseus*). Authentic records include the seas from the Bay of Plenty, where it breeds on Karewa Island, to the vicinity of the Three Kings.

Puffinus assimilis. Allied Petrel (Shearwater).—Two small species of *Puffinus* occur in New Zealand waters—the present species and *P. gavia*, which is somewhat larger. At all times of the year one or both species are to be seen flying near the surface of the sea off the northern coasts, but he would be an expert who would distinguish the species on the wing. *P. assimilis* was found breeding at high elevations on the northern portion of Little Barrier Island by Reischek.* Birds collected by Reischek have been examined by Iredale and the identification confirmed.††

Puffinus gavia. Brown Petrel (Fluttering Shearwater).—I did not see the Brown Petrel, but as it was taken on Little Barrier Island by Reischek* it must be included in the list as breeding on the island. This species has been named *Puffinus reinholdi*.‡ and, later, *Reinholdia reinholdi*‡ by Mathews on the grounds that Forster's description of *P. gavia* applies to *P. assimilis* and that specimens of the latter species have been examined from near Queen Charlotte Sound, the type locality of Forster's *P. gavia*. I have recently examined live specimens of the Brown Petrel from near Durville Island. In the flesh they are much darker than dried skins and Forster's description "supra coerulescenti-nigra" is not very far from the truth, so that Mathews' argu-

Macronectes giganteus. Nelly (Giant Petrel).—This species may occasionally be obtained off shore in Hauraki Gulf.

‡ Buller, "Birds N.Z.," Ed. 2, vol. 2, p. 210, 1888.

§ Reischek, Trans. N.Z. Inst., vol. 18, p. 88, 1886.

¶ Reischek, Trans. N.Z. Inst., vol. 18, p. 92, 1886.

** Buller, "Birds, N.Z." ed. ii., vol. 2, p. 239, 1888.

†† Iredale, "Aust. Av. Rec.," vol. 2, p. 19.

*Trans. N.Z. List, vol. 18, p. 93, 1886.

‡Birds of Australia, vol. 2, p. 74, 1912.

‡Austral Avian Record, vol. 1, p. 107, 1912.

ment loses much of its force. Further, this species is common about Cook Strait and westward, whereas *P. assimilis* is not known from these waters unless Mathews' specimen is authentic. I do not think, therefore, that there is sufficient reason to sink the name *gavia* as a synonym of *assimilis* and found a new one for the Brown Petrel.

***Sterna striata*.** White-fronted Tern.—The common Tern of New Zealand coasts is abundant in Hauraki Gulf, and usually seen in small flocks.

***Hydroprogne caspia*.** Caspian Tern.—Occasionally seen in Hauraki Gulf; usually only a few (two to six) together.

***Larus dominicanus*.** Black-backed Gull.—This fine bird is one of the most conspicuous species in our coastal waters. The young, which is quite differently coloured, is thought by many to be a distinct species and referred to as Sea Hawk. This species breeds in unfrequented places on open slopes near the coast, building a large nest of grass on the ground. Two eggs are usual, though clutches of three are common enough, and are laid in November. A few nests are built each year on Rangitoto, while Shakespear states that it breeds on the north-west point of Little Barrier Island.

***Larus novæ-hollandiæ*.** Silver (Red-billed) Gull.—Common in Hauraki Gulf as elsewhere on the coast of New Zealand. Flocks of these birds and the White-fronted Tern follow the schools of common mullet (*Agonostoma forsteri*) which are also pursued under water by the Kahawai (*Arripis trutta*).

***Hæmatopus unicolor*.** Black Oyster-catcher.—Noted on Little Barrier Island by previous observers. I did not see it. Oyster-catchers are usually met with on sandy coasts. At Kaipara Heads I have seen pairs of black birds, pairs of pied birds, and mixed pairs. The suggestion at once occurs that the present species may be merely a melanistic form breeding true. Other members of this category are the Black Fantail (*Rhipidura fuliginosa*) and the Bronze Shag (*Hypoleucis chalconotus*) both of which are known to breed with pied species though intermediate forms are not known.

***Porzana pusilla*.** Little Crake (Marsh Rail).—This species is inserted on the authority of Shakespear, who states that he has seen two examples.

***Lamprocoeyx (Chalcocoeyx) lucidus*.** Shining Cuckoo.—Plentiful during the summer months. No eggs have yet been found on Little Barrier Island.

***Urodynamis taitensis*.** Long-tailed Cuckoo.—Like the preceding species, this is a summer migrant. Occurring commonly on Little Barrier Island among a populous avifauna, it is said to rob the nests of other birds, taking both eggs and young. It has not itself been detected breeding on the island.

***Circus approximans*.** Allied Harrier.—According to the caretaker, Mr. R. Nelson, the Harrier breeds on Little Barrier Island, but owing to his efforts not many are now to be seen. As protector of the other birds, Mr. Nelson takes every opportunity to destroy or frighten away predaceous species. Harriers are now chiefly as visitors from the mainland. On one occasion during my visit I noticed three.

***Nesierax novaeseelandiæ*.** Bush Hawk.—This fierce bird of prey is present on the island, but is not often seen.

***Ninox novaeseelandiæ*.** Morepork Owl.—The Morepork is very common, but is not seen in daylight. From dusk throughout the night its call can be heard from all directions. Small birds doubtless form a portion of its fare, but it is more frequently observed catching night-flying insects. Though invisible when settled, it can be seen flying into the air from its perch, making quick movements and returning again to the same or a nearby resting place. It is probably capturing moths which the human eye in the dim light cannot detect.

A detailed examination of the stomach contents of the Moreporks from Little Barrier Island, made subsequently to my visit, showed that their food consists almost entirely of insects. In all the (six) stomachs examined no other kind of food was found. Remains of a large beetle, *Stethaspis suturalis*, formed the bulk of the contents.

Nestor meridionalis. Kaka.—This species of Parrot was observed in small numbers chiefly in kauri forests on the ridges. On noticing the visitor, they invariably utter warning screeches, then circle high overhead, and with further harsh cries disappear in the bush.

Cyanorhamphus novaeseelandiae. Red-fronted Parrakeet.—Small flocks met with throughout the bush from sea level to summit.

Cyanorhamphus auriceps. Yellow-fronted Parrakeet.—Stated by the caretaker to be seen occasionally.

Hemiphaga novaeseelandiae. Pigeon.—Frequently met with in the bush, attracting attention by their noisy flight. During the summer time there is abundance of fruits on which they feed. These include the taraire, tawa, nikau, karamu and puriri. In the winter, Pigeons are obliged to subsist mainly on leaves, of which they devour large quantities. Mr. Nelson has observed them eating the leaves of *Muehlenbeckia complexa* and *Coprosma rhannoides*, both of which are common on the lower ground.

Halecyon (Sauropatis) sanctus. Sacred Kingfisher.—The Kingfisher is quite common along the shore, and goes a little way inland on the shingle flat and up the gullies. Its main fare is probably composed of insects. On the shingle beaches, however, a small black lizard is very common, and this the Kingfisher is quick enough to catch, and so materially adds to its fare.

Acanthisitta chloris. Rifleman.—The caretaker, Mr. R. Nelson, states that he occasionally comes across this species in the bush. I did not see it.

Miro longipes. North Island Wood-Robin.—Extremely rare on the mainland, these friendly birds, thanks to the protection afforded by the sanctuary, are plentiful throughout the forest on Little Barrier Island. They are usually encountered singly or in pairs, but so quiet and gentle are they in their movements that their presence is not detected until one stops and listens, when, perhaps within a yard or two, one hears the movement of a leaf. They appear to like human company, of which they are quite fearless, and will come hopping along and turn over dead leaves looking for insects almost at one's feet, every now and then turning their heads to look at their newly-made friend.

Myiomoira toitoi. North Island Tomtit.—Equally fearless and plentiful as the Robin, Tomtits are much more restless and quick in their movements. They appear to be incessantly flying about from twig to twig, resting for a moment in all sorts of attitudes, all the time on the lookout for insects, while occasionally peering at the visitor.

Rhipidura flabellifera. White-shafted (Pied) Fantail.—Very common everywhere on the island. They always make their presence known to the visitor, hopping about and twittering within a few feet of him, without, however, interrupting their chase for small insects, which they catch on the wing.

Maorigerygone igata. Grey Warbler.—Fairly common in the bush. Its call is more often heard than the bird is seen as it does not, like the Fantail, Robin and Whitehead, seek out the visitor.

Anthus novaeseelandiae. Pipit (Ground Lark).—A few are found on the shingle flat.

Mohoua albicilla. Whitehead.—This species is common throughout the bush, being usually seen in small flocks. As soon as the visitor



Nest of the Korimako or Bell-Bird in Manuka, Little Barrier Island.

Illustration communicated by W. R. B. Oliver, R.A.O.U.

is discovered, they crowd round him with much chattering and excitement. But in a little while, their curiosity being satisfied, or having decided that no harm is intended, they continue on their way. They build their nests in the bush on the lower levels.

***Creadion carunculatus*.** Saddleback.—The Saddleback has not been seen on Little Barrier Island since 1882, so may be presumed to be extinct in that locality. It was first noted in 1862 by Layard, who saw but a single specimen, which he procured.⁵ In December, 1867, Hut-ton landed on the east coast of the island, and recorded it as being very common.† Lastly Reischek states that it was rare in 1880, and still scarcer in 1882.‡

***Anthornis melanura*.** Bellbird.—This is without doubt the most common species of bird on Little Barrier Island. Everywhere from dawn to dusk the forest rings with their musical notes. They seem most noisy when feeding; but sometimes they appear to collect together in a tree for the express purpose of singing. On such occasions they take no notice of the visitor who stops to listen with amazement at an impromptu concert of rich, sweet music. Many of their calls resemble those of the Tui, in fact probably the species mimic each other, so that the most practised bushman cannot be sure of the bird until he has actually seen it. There are several distinct calls, the birds in each locality answering one another with the same notes. Thus in passing through the bush one may hear a certain call in one place and a different one further on. Returning, it may be found that the birds in the first locality have changed their tune. The Bellbirds are quite fearless, and, altogether disregarding the visitor, incessantly search for insects, nectar and fruit. They may be observed from a distance of a few yards, climbing about the trunks and branches of trees, carefully examining every chink and crevice for insects and spiders. They love the peaches in the caretaker's orchard, and their delight is expressed by a continuous whistling to one another. But they destroy more peaches than they eat, for partly eaten fruit is often knocked off and is left on the ground to rot.

***Prothemadera novaeseelandiae*.** Tui.—The Tui is very common, though not so often seen as the Bellbird. Besides a number of calls indistinguishable from those of the Bellbird, TuIs have many characteristic of themselves. They are frequently seen in pairs, often chasing one another through the bush with a swift, noisy flight. Often they fly high over the bush when moving from place to place.

***Notiomystis cincta*.** Stitchbird.—This beautiful species is now quite extinct on the mainland. On Little Barrier Island, where only it survives, it frequents the forest high upon the mountain slopes. In passing up the tract to the summit a few can nearly always be seen. On discovering the visitor, they act much in the way that Whiteheads do. They come hopping excitedly towards him, calling "tee-tee-tee . . ." until quite close. When their curiosity is satisfied or resentment overcome, they may sit on a twig and preen their feathers, or else continue their search for food, which consists of nectar from flowers, succulent fruits and insects. A nesting site chosen was a hole in a tree. Here they built year after year, merely making up a new nest on top of the old one.

***Zosterops lateralis*.** Silver-eye (Waxeye).—Very plentiful, usually seen in small flocks. They make small hanging nests in manuka scrub on the lower slopes. Like the Honeyeaters already mentioned, they feed on soft-bodied insects, nectar from flowers, and succulent fruits. In the caretaker's orchard they pick out the pulp from holes in peaches and figs made by Bellbirds and TuIs.

* "Ibis," 1863, p. 244.

† Trans. N.Z. Inst., vol. i., p. 104, 1869.

‡ Trans. N.Z. Inst., vol. xix., p. 188, 1887.

Notes on Sea Birds between Sydney and England

By A. S. LE SOUEF, C.M.Z.S., Zoological Gardens, Sydney.

During a voyage from Australia to London I took daily notes on the birds seen in the hopes of further supplementing the work already done in this direction by Captain MacGillivray, Dr. Ferguson and Mr. Alexander.

I took a record of the temperature day by day, and find that has something to do with the range of the Wandering Albatross. Between Sydney and latitude 20 south, off the west coast of Africa, the temperature ranged from 50 to 65 degrees, and Albatrosses were seen every day. We approached the equator with a strong, cool, southerly wind, which kept going until we reached latitude 21 deg. 38 min. south, when it fell, and the temperature rose to 70 deg. between 4 and 5 p.m. and between 20 and 30 Wandering Albatrosses left the ship, apparently going south again.

This was confirmed by Captain Crawford, of the ss. *Makura*, who states that he had seen the Wandering Albatrosses as far north as the island of Hopai, in the Friendly Group, which were in much the same latitude as Cardwell, Queensland; this was during a strong southerly gale.

An interesting observation was that on the second day out from Sydney, when in the vicinity of Cape Howe, I noted several Cape Petrels (*Daption capensis*). Their dappled coloration, the conspicuous white mark on the wing and peculiar butterfly-like flight make them unmistakable.

When 1400 miles from Durban and 700 miles south of Madagascar, a Curlew-Sandpiper came on board, and stayed for two days. I took a description of the bird, and it was kindly identified for me by Mr. T. Wells, of the South Kensington Museum, London, as *Érolia ferruginea*, the Curlew-Sandpiper.

When in latitude 21 deg. 38 min., south longitude 6 deg. 12 min. east, and 500 miles from Madagascar, a small Tern (*Sterna longipennis*) was flying round the ship.

Several land birds were blown off land and came aboard off Cape Finisterre, Spain, including two Thrushes, and some Stonechats. Some of these stayed on the ship until we reached London.

These observations cover the latter half of September, and the first part of October.

Owing to the difficulty of recognising Petrels (*Puffinus*) on the wing, I have not attempted to differentiate them. From the time of leaving Sydney, September 14th, to leaving Albany, they were in sight, sometimes in enormous numbers, more especially in

rough weather. Twice in the vicinity of Albany I saw a "large Black Petrel with white line under primaries and fluttering flight." This bird approached the ship from afar, flying high, and after circling round went off again. It was a stoutly built bird with nothing like the graceful movements of the Shearwaters.

Several times a bird with a soft grey back and white breast was noted in the Bight.

Spectacled Petrels (*Procellaria conspicillata*), with white chin and sometimes white face, were numerous from Durban to about 20 degrees south in the Atlantic. Their actions were much the same as those of the Shearwaters, but, unlike these, they followed the ship.

The pretty little Cape Petrel (*Dauphin capensis*) was noticed on many occasions between Cape Howe and Durban. They were never numerous. They often followed the ship for a day, and had a flight distinctive from that of any other sea bird.

Pions were noted on several occasions between Melbourne and Albany. Once during a storm, thousands of them were flying slowly round and round the ship.

Surely the Wandering Albatross (*Diomedea exulans*) is the most numerous sea bird. They were our constant attendants from Sydney to latitude 21 deg. south in the Atlantic. The difference between the birds in the Indian Ocean and the Atlantic was most marked. In the Indian Ocean large birds were often noted with wings white with the exception of the primaries, but off the west coast of Africa all birds, and there were often dozens round the ship, had the wings brown with the exception of the olecranal mark, and they certainly seemed to be smaller. Between Auckland and Sydney in February only a few birds were noted, and they had the wings light up to the olecranal mark. Comparing their pace with that of the ship, I judged that they flew at about 30 to 40 miles an hour.

After the Wanderer, the Black-browed (*Diomedea melanophrys*) was the most numerous Albatross. They were seen from Sydney to two days out from Albany, and then not noted again until after leaving Durban. This species flies proportionately slower than *D. exulans*. In overtaking the ship they kept up with the larger bird, but took a more direct course.

The White-capped Albatross (*Diomedea cauta*) was identified once, the day after leaving Melbourne.

Grey-headed and Yellow-nosed Albatrosses (*Diomedea chrysostoma* and *D. chlorhynchus*) were more or less in constant attendance from Sydney till within a thousand miles from Durban (longitude 75 deg., latitude 30). Only one Yellow-nosed Albatross was seen after this, between Durban and Capetown.

Sooty Albatrosses (*Phaethria fusca*) were noted sparingly from the Australian Bight to within three days' sail of Durban. Only one light form was noted, and that on October 1st, two days out from Albany.

Between San Francisco and Honolulu many *Diomedea immutabilis* and one *D. nigripes* were seen. These birds were smaller, rather more active, and with a more irregular flight than any of our species.

What I took to be the White Tern (*Gygis alba*) was often seen between Fiji and Auckland. I have a note, "Most beautiful bird, with a very irregular flight, continually checking and changing direction, sometimes 100 feet up or just over the water; wing beats about 120 to the minute."

Round the Lamp

By R. STUART-SUTHERLAND, F.Z.S., R.A.O.U., The Lighthouse,* Cape Foulwind, Westport, N.Z.

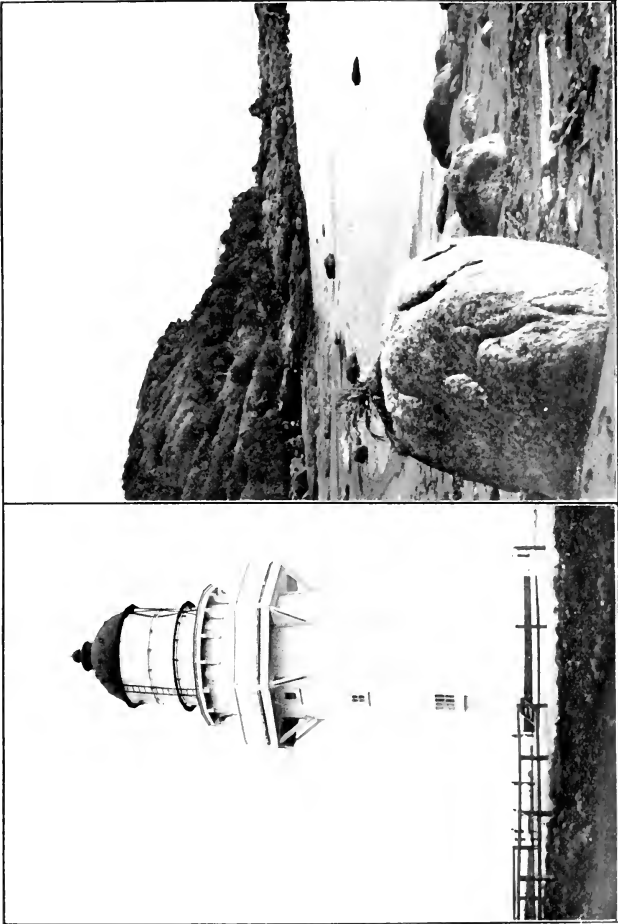
The moth round the candle is familiar to all, but the large flocks of nocturnal sea-birds, wheeling round and round the lighthouse in the long, lonely watches of the night is a sight seen by very few, and entirely unknown to many. On bright, clear nights the dim, shadowy forms of the Petrels are occasionally seen crossing the beams of light; not a sound is heard, although the birds are as frequent then as on any thick, misty night, when the shifting rays of the powerful light appear as long, thin shafts piercing the thickening air.

The lighthouse stands 180 feet above high-water, on Puysegur Point, at the south-western corner of the South Island. The light itself is a revolving one, and shows only outward over the sea; that is to say, the panes on the landward side are darkened. These blind panes, which occupy about one-third of the actual window area of the lantern, suddenly cutting off the light dazzling a bird approaching the tower along the beams, save many unfortunates from an untimely end, for as the particular beam of light in which the bird happens to be travelling is cut off, the bird usually has time to turn aside, or at most strikes the tower at an angle, and is often only slightly injured.

In circling around the lighthouse, the bewildered birds usually follow the revolutions of the light, though sometimes when the mist closes in during the early part of the night—meaning that is within two hours or so of sunset—the various Petrels are noted flying toward the tower from a southerly or south-westerly direction—the direction of Windsor Point and the Solander Islands.

It is rather difficult to offer any explanation as to the manner in which the light attracts the birds, but that they are abso-

* Until recently at the lighthouse, Puysegur Pt., N.Z.



The Lighthouse, Puysegur Point.

Paradise Beach, with the Lighthouse in the distance.

Photos. by R. Stuart-Sutherland, F.Z.S., R.A.O.U.



Upper— A Dove-Petrel injured by striking the lighthouse.
Lower— Coast scene near Fuysegur Pt. Lighthouse.

Photos by R. J. Sutherland, F.Z.S. R.A.O.U.

lutely powerless to resist the attraction is very evident. To take a typical case, what I always refer to as "a bird night"—namely, the night of December 6th, 1921, or, perhaps, more correctly, I should say the early morning of December 7th.

The weather for this particular day and night was logged as "Wind, S.E. to N.E.; very light, with thick, misty rain, to dense fog." I reached the lighthouse at midnight (my watch was from midnight to daylight), and very few birds were about, though their shrill cries could be heard as they flew around below, and only an occasional crash against the windows told of the thickening and closing in of the fog.

At about 1 a.m., following five or six loud crashes, I went out on to the balcony to see what was doing. Where the long, thin shafts of light were broken up by the eddying clouds of mist, perhaps some sixty or more yards from the tower, the flocks of Petrels were wheeling swiftly round and round. Suddenly, with a shrill, piercing call, a bird would partially turn aside, and fly rapidly toward the windows. The bewildered creature could be seen quite plainly as it came nearer, struggling desperately to turn aside; but its efforts were of no avail: it crashed against the iron frame of one of the windows, and was instantly killed. I picked up the bird as it dropped down on to the balcony, and found it was a Mottled Petrel (*Pterodroma inexpectata*), a species somewhat rare here, and of which I have secured only five specimens in three years.

Climbing the ladder to the coping around the lantern itself, I saw seven Grey-backed Storm Petrels (*Garrodia nereis*), only one of which was apparently injured, the unlucky one having broken its wing. The birds were crashing in rapidly now, Broad-billed Dove-Petrels (*Prion vittatus*) being by far the most plentiful. Nine of these struck the panes in less than half that number of minutes, and of this nine, two were killed outright, and three were badly injured.

Curiously, very few birds are injured about the head. Of all the specimens of various species which I have dissected in three years, I have noted only about a dozen, and these were mostly Mutton-birds (*Puffinus griseus*). The injuries were broken wings, broken legs, badly smashed bodies, or, much more rarely, broken necks.

Sitting inside the tower, one can tell by the sound of the crash the species to which the unlucky bird belongs. I cannot record that the windows have been broken on any occasion, which fact is somewhat surprising when one considers the great force with which a Mutton-bird strikes. I have been told that at the Moeraki lighthouse the panes have been more than once smashed by Black Swans (introduced from Australia), but although these birds are sometimes observed during the day in this district, none has so far been noted at night. Apart from the numerous Petrels of several species, some few land birds have at odd times been noted around the light, but apparently the

situation is out of the line of any migratory streams, for the appearances are very erratic.

The following is a complete list of the birds observed around the lighthouse whilst the light has been burning during the period March, 1919, to January, 1922.

Names according to Sir W. L. Buller's "Supplement to the Birds of New Zealand," 1905, in brackets, following the R.A.O.C. Checklist name where it differs:—

1. **Prion vittatus.** Broad-billed Dove-Petrel. Whiroia.—Sometimes in hundreds, and observed during every month of the year.

2. **Prion banksi.** Banks Dove-Petrel.—Rather uncommon.

3. **Prion desolatus.** Fairy Dove-Petrel. Titi wainui.—Plentiful, but not quite so common as the Broad-billed. Three only of the four species of Dove-Petrels have been noted, *P. ariel* not having so far been taken.

Professor Mills Loomis lists all the four under one species (*Pachyptila vittata*) but after having carefully examined numerous specimens, I can hardly agree with this finding. He says: "I have searched the literature in vain for a description of constant characters separating '*P. banksi*,' '*P. desolata*,' and '*P. brevirostris*,' from '*P. vittata*.' So far as the evidence shows, the variations upon which these supposed species rest are inconstant, and therefore are not of specific significance; an absence of intergradation, not degree of variation, gives specific value to characters. The series before me is a meagre one, but it strengthens the conviction that the variations are all within the limits of a single species. Ample series from breeding stations alone will determine the precise nature of the variations."

The professor may be right, but all the birds I have examined were readily distinguishable—that is to say, there was no doubt as to which species a specimen belonged, for I find the sizes of the bills of the different species to be constant, and moreover the species differ as to general dimensions.

Hutton and Drummond are two authorities who cannot be overlooked, and they give,

Key to the Species.

- | | | |
|------|--|----------------------|
| (1). | Wing from flexure, 9 to 10 inches. | <i>P. vittatus.</i> |
| | Wing from flexure, 8 to 9 inches. | 2 |
| | Wing from flexure, 6 to 7 inches. | <i>P. ariel.</i> |
| (2). | Upper mandible convex on the margin. | <i>P. banksi.</i> |
| | Upper mandible straight on the margin. | <i>P. desolatus.</i> |

The professor gives a series of measurements, and his largest and smallest specimens give the following:—

	Wing.	Tail.	Culmen.	Upper mandible.		Tarsus.
				Depth.	Width.	
Sex ♂	216.	103.	35.9	14.5	20.1	33.2
Sex ♀	169.	86.	23.3	7.8	9.5	29.

The following are the measurements of two of each species, taken "in the flesh," especially for this article:—

		Length.	Wing.	Tail.	Culmen.	Width at base of mandible.	Tarsus.
<i>P. vittatus</i>	♂	279.	234.	106.	36.	23.5	33.
"	♀	271.	231.	105.	34.5	22.	33.
<i>P. banksi</i>	♂	253.	218.	101.	29.	13.5	33.
"	♀	253.5	217.	100.	27.	13.	31.
<i>P. desolatus</i>	♂	241.	204.	97.	25.5	7.	29.
"	♀	242.	204.	96.	25.	7.	30.

For the present then I prefer to retain the separate species. The localities of the two specimens which I have quoted from Professor Loomis are given as (1) Chatham Islands, and (2) Nelson, N.Z. Judging from these localities and from the measurements, I should say that the species were: (1) *P. vittatus*, and (2) *P. ariel*.

As I stated before, I have not so far taken *P. ariel* at Puysegur Point, but Hutten and Drummond describe the bird as follows:—"Similar in colour to the others, but with a paler crown. Bill much narrower and more compressed; the sides of the maxilla nearly straight. Chin fully feathered. Length of the wing, 6.8 in. (172 mm.); of the tarsus, 1.2 in. (30 mm.). Breeds on the northern part of New Zealand."

4. *Pelecanoides exsul*. Diving Petrel. Kuaka.—Very plentiful, but only so, generally speaking, when the fog drifts up before midnight. Only on one or two occasions have these birds been observed around the tower after midnight. Over 250 were counted on the lighthouse balcony one evening in July, 1920. There is only one species for N.Z. I stated this belief over two years ago in an article published in the Christchurch (N.Z.) "Weekly Press." The measurements of a typical pair are:—

		Length.	Wing.	Bill.	Tarsus.
<i>P. exsul</i>	♂	203.	126.	16.	25.
"	♀	201.	127.	14.	24.

5. *Puffinus assimilis*. Allied or Forster's Shearwater. [Hakoakoa (sometimes)].—Hakoakoa is the native name usually applied to *Megalestris antarctica*, the Skua, Sea Hawk, or Sea Hen. Only two Allied Petrels have been killed against the tower, and both were males. One was killed August, 1919, and the other February, 1921. The two specimens are alike—upper surface dark slaty, and under surface white—save that one has the region around the vent dull brownish, whilst the other has this particular part pure white. The bill is black and 29 mm. in length, and the feet are dull brownish flesh colour. The complete measurements in the flesh of the two specimens are as follows:—

		Length.	Wing.	Bill.	Tarsus.
<i>Puffinus assimilis</i>	♂	299.	194.	29.	35.
"	♂	284.	192.	29.	31.

These birds are, I believe, the *P. obscurus* of Professor Loomis. Sir W. L. Buller (Supplement) and Hutten and Drummond ("Animals of N.Z.") list *P. obscurus* and *P. assimilis* as distinct species. They are apparently the light and dark phases of one form.

6. *Puffinus griseus*. Mutton Bird. Sooty or Sombre Shearwater. Titi. Oi.—Plentiful, but somewhat erratic in their appearances during the months of December, January, February, and March. A curious fact in connection with the Mutton-Birds is that on one night all the specimens killed against the lantern will be males, whilst on another night all will be females. These birds breed in the near vicinity, on Crayfish (Steep-to) Island, and it is possible that the sexes take turn about to secure food. Females containing partly developed eggs have been killed in early December. Young birds of the year can be distinguished from old ones by the colour of the legs and feet. Old birds have these parts bluish, whilst young ones have them brownish olive. The measurements of a typical pair are as follows:—

		Length.	Wing.	Bill.	Tarsus.
<i>Puffinus griseus</i>	♂	433.	310.	49.	55.
"	♀	429.	304.	50.5	54.

7. *Pterodroma (Estrelata) cooki*. White-winged (Cook) Petrel.—Only two specimens. One (female) in May, 1919, and one (male) in October, 1920. Measurements—

		Length.	Wing.	Bill.	Tarsus.
<i>P. cooki</i>	♂	314.	239.	27.	29.
"	♀	316.	237.	27.	28.

8. *Pterodroma inexpectata (Estrelata gularis)*. Mottled or Scaled Petrel.—So named, I take it, on account of the scale-like marking on the forehead. On December 27th, 1920, one struck the panes and broke its wing. It proved to be a female, and contained an egg just ready to be laid. The egg is dead white in colour, and measures 54 x 38 mm. Since that date upwards of a dozen have been accidentally killed. Three in March, 1921; five in August, 1921; two in September, and two in December. These birds breed in the district, and, like the Mutton-Birds, all the examples killed on one night are of the one sex. The measurements are as follows:—

		Length.	Wing.	Bill.	Tarsus.
<i>Estrelata gularis</i>	♂	346.	257.	26.	31.
"	♀	344.	256.	26.	32.

The correct name of this species apparently should be *Pterodroma inexpectata* (Forster). The common name generally in use in New Zealand is Rain-Bird.

9. *Garrodia nereis*. Grey-backed Storm-Petrel. Reereo.—The most seen on any one night was nine. Very few of these birds are killed outright, mainly, I suppose, by reason of their very light weight. Mostly a wing or a leg is broken. Storm-Petrels are purely nocturnal. Uninjured birds kept during the day very rarely attempt to fly away. Examples injured in October, November and December have the generative organs much enlarged. The following are the measurements of a pair injured at almost the same moment (1.30 a.m., December 7th, 1921):—

		Length.	Wing.	Bill.	Tarsus.
<i>Garrodia nereis</i>	♂	169.	137.	16.	31.
"	♀	170.	137.	15.	31.

10. *Pelagodroma marina*. White-faced Storm Petrel.—Rather uncommon, only four having been taken in a period of nearly three years. One (female), May, 1919; two (females), January, 1920, and one (male) September, 1920. Measurements—

		Length.	Wing.	Bill.	Tarsus.
<i>Pelagodroma marina</i>	♂	199.	149.	17.	27.
"	♀	198.	150.	17.	28.

11. *Demiegretta sacra*. Blue or Reef Heron. Matuku.—On January 8th, 1920, one of these Herons was seen flying round and round the tower. The lamp had only been lighted about half an hour; the night was quite clear, and the weather very calm and settled. Sitting inside the lighthouse, I heard a peculiar and very loud call—a loud and long-drawn "quar, qu-ar, qu-a-ar," just like the quack of the domestic Duck, only louder, longer drawn and unfinished. The bird was not more than ten feet from the lighthouse balcony, and was plainly visible. It flew round for about twenty minutes, and then made off towards Sealers' Creek, but returned again shortly after 11 p.m., circled around again as before for some little time, and then flew towards Preservation Inlet.

12. *Urodynamis taitensis*. Long-tailed Cuckoo. Koekoea.—During February, 1921, during dull, thick weather, one of these Cuckoos was observed on the coping around the lantern. It was uninjured. Seeing that the two Cuckoos observed in New Zealand are truly migratory, it is rather surprising perhaps that more examples are not noted. The birds of New Zealand are strictly protected, so readers will realise what I mean when I say that I had no luck on the above two occasions.

13. *Limosa novae-zealandiae*. Godwit. Kuaka.—(Note.—Kuaka is also the native name in many places applied to the Diving Petrel.) Rather uncommon; about a dozen observed in three years, but only one killed. The bird was in fine plumage and condition. The measurements are as follows:—

		Length.	Wing.	Bill.	Tarsus.
<i>Limosa novae-zealandiae</i>	♀	430.	236.	114.	57.

14. *Zosterops cerulescens (lateralis)*. Silver-eye or Wax-eye. Tauhou.—Common at times, perched on the grating and hand-rail around the lantern. They are usually noted in the early morning, an hour or so before daylight. Only a very few are killed. Observed during the months of April, May, June, September, October, and December. Most plentiful in the district during June.

15. *Anthus novae-zealandiae*. New Zealand Pipit or Groundlark. Pohoi.—Only one killed. The species is observed at Puysegur only during December and January.

16. *Halcyon vagans*. Kingfisher. Kotare.—One only observed, perched on the hand-rail early morning, March 29th, 1921. This is a resident species, but I know of only three pairs in the district round about Puysegur Point.

17. *Turdus philomelus clarkei*. Thrush (imported).—Small flocks of a dozen to a score on rare occasions observed perched on the hand-rail and always crowded together as if for warmth. May, June, July and August are the usual months.

18. *Turdus merula merula*. Blackbird (imported).—Rather uncommon, a single one only having been observed on two occasions—June, 1919, and August, 1921.

Field Notes on the Black Bell-Magpie *Strepera fuliginosa*

By Miss J. A. FLETCHER, R.A.O.U., Woodbridge, South
Tasmania.

My sister and I were able to spend a couple of weeks in early January of this year with our friends, Mr. and Mrs. Wilson and family, who live at The Steppes.

The altitude of this place is a few feet short of 3000 feet. It is on the road to The Great Lake, being about 12 miles from Miena, the settlement on the southern end of that vast sheet of water.

A mile from the Steppes is the Lagoon of Islands, for a wonder most aptly named. This lagoon is 8 miles round, and towards its eastern shores there are numerous small tea-tree and rush-covered islands.

Until the autumn of last year this was a great resort of many water birds. Then, however, a fire swept through, and running round the edges, burnt out the favourite feeding area. Owing to drought conditions then prevailing all the shallower flats were quite dry.

The birds did not return for the breeding season, evidently finding the reedy expanses of the Lake of the Woods, a few miles over the hills, a good hunting ground. I was disappointed to find this the case, and as an injured foot forbade the rough scrambling necessary to reach the lake, I therefore resigned myself to watching the Black Mags, and the birds of the immediate forest.

Though so elevated and subject to heavy falls of snow in the winter time, this tract of country is one of the worst for snakes I have explored in Tasmania, and in other parts I have had many and vivid experiences with these brutes. Here, they simply did not make any attempt to move out of the way. Pondering over this I came to the conclusion that they were so used to the presence of sheep that human footsteps did not alarm them.

This characteristic of theirs was a decided drawback to exploring, for in a boulder and stick-strewn ground it was easy to tread on one of these lazy wretches when one's eyes were roaming the tops of trees for possible nests.

The breeding season was over at the time of my visit. The bush, however, was noisy with the cries of young birds of many species. I found a great variety of nests for so elevated a district. Had the waterways been accessible to me, I should have added many more species.

In this paper I shall confine myself to a few facts about the Black Bell-Magpie (*Strepera fuliginosa*). Readers of *The Emu*,

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Young being fed by a Black Mag. —the Black Bell-Magpie
(*Strepera fuliginosa*).

Photo. by Miss J. A. Fletcher, R.A.O.U.

October, 1921, may remember a few notes of mine, dealing with winter conditions of these birds which frequent The Steppes.

A flock of nearly eighty *Streperas* stay round the homestead from April until about early September, separating in the latter month to take up the control of their breeding areas. Unlike the White-backed Magpie (*Gymnorhina hypoleuca*), these areas are closer together, in fact, overlap. Evidently, sterner conditions of livelihood make the birds more tolerant of one another. Another aspect may be that the near neighbourhood of one breeding pair with a second tends for better protection against the many species of Hawk frequenting these uplands.

From the observations of my friends, I know that the same pair remain faithful to each other, year after year.

The site for the nest, as a rule, varies each season, but always in their chosen haunts. Some of the nests must be well constructed, for I was shown those of several years previous, in which young had been reared, and which still might be taken for this just finished season's nest.

Each bird assists in the construction of the nest, which is commenced about the beginning of October, sometimes in September, much depending on the duration of winter conditions.

Occasionally an old nest is trimmed up and made to do duty a second time. The old pair of Black Mags. that have for 7 or 8 years frequented the house, had their young hatched by the beginning of November, bringing them to house surroundings by the first week of December. Here the little ones stayed midst the shelter of the trees whilst their parents fossicked about for their food, which included pieces of meat, cake or bread crumbs, the latter preferred with jam or sugar upon it.

When the young Mags. grew bigger they flew to meet their parents as soon as they heard the long flute-like whistle. Each parent seemed to feed one particular child, and it was interesting to watch which fledgling would become excited after an old bird's signal.

The Black Mags. are so destructive on chickens that these must be kept in the barn until their feathers grow, after which they are generally left alone. My friends have given up trying to keep turkeys or ducks, it being impossible to rear any ducklings owing to the fondness of these birds for a duckling diet.

One morning during my visit, the hens escaped from the barn. In less than fifteen minutes the old Mags. had caught three chickens, one of the chicks being well feathered. They would have probably taken the lot if not noticed.

An hour later, my sister and I were down in one of the paddocks when I noticed the two young Mags. sitting in a tree, with the mother and father flying from different directions and feeding them.

I watched the latter and saw him go to a log, look about, then run its length, hop off the end, and stepping backwards, tug, tug. Next, he flew back to his child, carrying something which

resembled a chicken's leg. So I went along to inspect his larder. There I found part of the biggest (feathered) chicken most ingeniously fixed by the outstretched wings tucked in and under the splintered ends of the log. The body of the chicken was being slowly pulled to pieces in such a position that it gave the bird extra power in his tugging. I set my camera and waited a long time, hoping to photo the old fellow tugging, but though he perched on the log, he would not come in the range of the lens. As it was getting late I had to leave, but took a shot of the fixed chicken. This, however, was not sharp enough to reproduce.

I called in at the female's reserve and found the remains of some of the entrails suspended on a spur on a log.

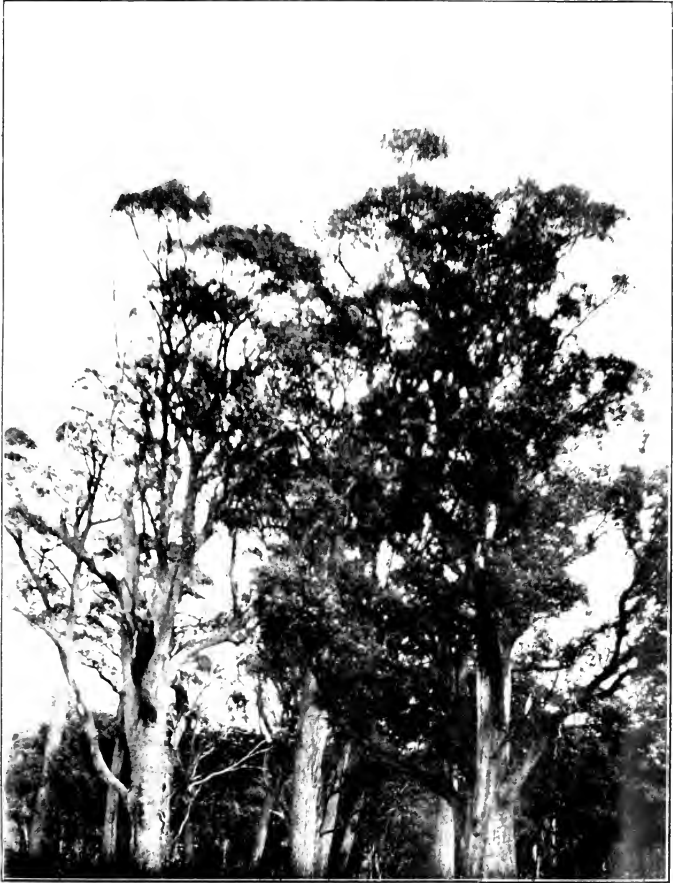
The young *Strepera's* clothing was in a state of a mixture of long dusky down and rapidly growing feathers. In the fortnight of my visit all the breast and under feathers replaced the down. The tails were well grown. One bird I took for the daughter was slightly smaller, less bold and she had less white on her tail than her companion. They were only beginning to learn to pick up for themselves. After the first week of my stay the mother ceased feeding the little hen-bird, and so the father took on both of the children. As I left he, too, was beginning to train his charges to feed themselves. He would bring a piece of meat, for instance, drop it in front of one of them. If the youngster squawked he made no attempt to feed it. At last, losing patience, he would fly off, his son following with loud cries. If hungry, the latter returned and had a try to feed himself, and by degrees found he could do it quite well. Occasionally the parents were absent for a long while. Then the little ones sat in a special corner of a large willow growing near the door. It was quaint to hear them trying to imitate their parents' various calls. This queer little gurgle, low as if afraid of others hearing it coming out of the heart of the tree, sounded eerie.

The adult female *Strepera's* coat was distinctly rusty, but her mate possessed a very fine black one.

Once the male bird took a buttered crust from my hand. Another morning he hopped into the doorway, and seeing the table set for breakfast, perched on the corner of the table, sat with his head on one side watching while I cut him a piece of bread, buttered, and as a great treat sprinkled some sugar over it. He wouldn't take it from me, evidently a little nervous of the house enclosure, but as soon as I placed it on the table he hopped along, picked it up and flew off.

The situations of the nests, I found, varied. Some were fairly low, quite an easy climb, while others, as in the photo enclosed, were very high up as high as 70 feet.

Many of the lower nests were too awkwardly placed to photograph, and others too difficult to focus upon.



Swamp Gum Trees (*Eucalyptus stuartiana*) in which Black Bell-Magpies (*Strepera fuliginosa*) nest. The nest is in the fork under the clump of twigs second from top.

We went on to The Great Lake, and in many places I spotted nests of Black Magpies or Hill Bell Magpies—Jays (*Strepera arguta*) built in the fine cider gums (*Eucalyptus gunnii*, Hooker).

On the way to Bothwell there is a nest on a limb spanning the main road.

Before concluding I might mention that the one Jay (*Strepera arguta*) which frequents The Steppes homestead brought a mate this season, and when I was there I saw them with their family.

New Sub-species of Tit-Warblers (*Acanthizae*)

By A. G. CAMPBELL, J.P., R.A.O.U., Croydon, Victoria.

While examining a long series of *Acanthizae* to determine the limits of certain species, I discovered that important geographical regions are unrepresented although distinct sub-species occur therein. The following* offer good grounds for separation:—

Acanthiza pusilla leeuwinensis. Sub. sp. nov.

Upper surface dark brownish olive, tinged on rump with medal bronze (dark orange citrine); frontal patch less marked than in *A. p. pusilla*, but tawny to the base of feathers; forehead crescents ochraceous tawny with dark spots beneath and dusky fringes, like these of *A. p. macularia*; upper tail coverts and base of tail cinnamon brown; throat white with black striations heavier than in *A. p. pusilla*; flanks tawny olive; under tail coverts cinnamon buff; tail with black subterminal bar .3 inch wide, tips edged white on inner web; central feathers with an obscure dark spot (rudimentary bar) near tip; bill and legs brown; basal half of lower mandible light; eyes red. Length, 3.8 in.; bill, .35 in.; wing, 1.9 in.; tail, 1.7 in.; tarsus, .8 in.

Type male (103) from the collection of the late A. W. Milligan, and now in the Royal Australasian Ornithologists' Union's Collection, Melbourne. Taken 26/4/1911 at Wilson's Inlet, South West Australia, by F. Lawson Whitlock, R.A.O.U., collector.

Co-type female (253) in "H. L. White Collection,," National Museum, Melbourne. Similar to male, but tail tips more broadly marked with white on four outer feathers; under tail coverts darker ochraceous tawny; axillaries warm buff. Taken at Augusta, S.W. Australia, 6/4/1919, by T. Carter, R.A.O.U., collector.

I have seen similar skins from Irwin's Inlet, S.W. Australia. This is an interesting link between the *Acanthiza* of eastern and western Australia, and cannot be confused with *Acanthiza apicalis*.

*As *Acanthiza (Motacilla) pusilla* does not appear to have a definite type locality assigned to it, I hereby declare Port Jackson, New South Wales, to be the type locality (see White, "Journal of Voyage to New South Wales," p. 257, 1790).

The same thing applies to *Acanthiza nana*, and I also declare Port Jackson, New South Wales, the type locality (see Vigors and Horsfield, "Trans. Linnæan Society, London," vol. xv., p. 226, 1827).

In another article I propose to deal with the natural causes which apparently affect the distribution of the *Acanthizae*.—A.G.C.

Acanthiza pusilla cambrensis. Sub sp. nov.

Upper surface brownish olive tinged on back and rump with medal bronze; forehead crescents tawny with dark spots beneath and dusky fringes like those of *A. p. macularia*; upper tail coverts brussels brown, the colour running well down the tail particularly on the outer webs; throat heavily striated with black, flanks buffy olive, becoming tawny on the lower portion; under tail coverts warm buff; abdomen and axillaries straw colour. Tail with subterminal black bar, .3 inch wide, no white edging to tips, central feathers with a small dark spot; bill and legs dark brown, base of lower mandible lighter; eyes red. Length, 3.9 in.; bill, .35 in.; wing, 2.1 in.; tail, 1.7 in.; tarsus, .8 in.

Type male (13) in collection of Edwin Ashby, Esq., R.A.O.U., Adelaide, taken at Cape Jervis, South Australia, 6/4/1917. Another skin (no sex) in the same collection, from Lucindale, S.A., is somewhat lighter in plumage, and has striations on throat and breast smaller and greyer.

Acanthiza pusilla dawsonensis. Sub. sp. nov.

Upper surface light olive, becoming dark citrine on back and rump; frontal and forehead feathers clay coloured to the base with faint dusky fringes only; upper tail coverts dresden brown; under surface mostly white; striations confined to throat, small, faint and grey; flanks buffy citrine; under tail coverts and axillaries white. Tail with black subterminal bar .3 inch wide, with distinct white edges to inner webs; central feathers with a dark spot near tip; bill and legs black; eyes light brown. Length 3.9 in.; bill, .32 in.; wing, 2.0 in.; tail, 1.8 in.; tarsus, .7 in.

Type male (224) in the "H. L. White Coll.," Nat. Mus., Melbourne, taken at Rio Station, Dawson River, Queensland, 13/10/1918, by H. G. Barnard, R.A.O.U.

Acanthiza nana belltrees. Sub. sp. nov.

Upper surface brightest dark citrine with yellowish tinge toward rump; very small light frontal spot on forehead; dark subterminal bar on tail; ear coverts fuscous with fine white shaft streaks; throat cinnamon buff with fine white shaft streaks; breast and abdomen bright strontian yellow; primaries yellow on outer webs at base; sides of breast, flanks yellowish citrine; eyes yellowish white; bill brown; legs black. Length, 3.6 in.; bill, .3 in.; wing, 1.9 in.; tail, 1.5 in.; tarsus, .7 in.

Type male (150) in "H. L. White Coll.," Nat. Mus., Melbourne, taken at Scone, N.S.W., 20/6/1917, by S. W. Jackson, R.A.O.U. Co-type female (151) also in "H. L. White Coll.," Nat. Mus., Melbourne, taken at "Belltrees," Scone, N.S.W., 20/6/1917, is similar.

Acanthiza apicalis crema. Sub. sp. nov.

Upper surface drab, becoming buffy brown on rump; forehead crescents very indistinct; upper tail coverts cinnamon brown; narrow subterminal bar on tail, .5 inch wide; tips white; throat striations very faint greyish; flanks tinged light buff; under tail coverts warm buff; axillaries and abdomen white; bill and legs black; eyes light grey. Length, 3.8 in.; bill, .32 in.; wing, 1.9 in.; tail, 1.8 in.; tarsus, .75 in.

Type male in the National Museum Collection, Melbourne, taken at Kychering Soak, East-West Rly., S. Aust., 17/12/1908. Though only a single skin, it represents the real desert form of a widely distributed interior species. Analogous specimens are found in *G. u. cremus* from the same locality. The desert tone so pervades all the skins that it is not easy to tell one species from the other. I have

seen another skin (6961) in the private collection of the late A. W. Milligan, taken at Ebano, West Australia, which answers to the above description. Wing, 2.0 inches.

Geobasileus uropygialis moora. Sub. sp. nov.

Upper surface olive brown tinged with sepia on the back; forehead feathers blackish tipped with crescents of white; crown tinged russet; upper tail coverts and base of tail tawny; broad black band on tail; tips white; under-surface white crossed by band of grey on breast; flanks tinged light buff; faintest dusky fringe on some feathers of throat; under tail coverts and axillaries white; bill and legs black; eyes white. Length, 3.8 in.; bill, .35 in.; wing, 2.1 in.; tail, 1.5 in.; tarsus, .8 in.

Type male (62) in collection of Edwin Ashby, Esq., Adelaide, taken at Watheroo, near Moora, West Australia, 6/11/1920.

This bird comes from inside the coastal belt of good rainfall, and has the upper surface and breast as dark as *G. u. uropygialis* but upper tail coverts and base of tail lighter (tawny), as well as under tail coverts and axillaries white like those of *G. u. condora*, the bill being larger than either. It represents the extreme western race separated from the type in the extreme east by the vast eremian region with its pallid form.

Geobasileus uropygialis erema. Sub. sp. nov.

Upper surface pallid drab; wings drab; forehead crescents very few; upper tail coverts and base of tail lightest cinnamon (some of the coverts tipped light buff); broad dark band on tail, tips white; under-surface white; flanks tinged light buff; bill and legs black; eyes white. Length, 3.3 in.; bill, .3 in.; wing, 1.9 in.; tail, 1.4 in.; tarsus, .7 in.

Type male (312) in the National Museum Collection, Melbourne, taken at Kychering Soak, East-West Railway, S. Aust., 17/12/1908. Co-type female (304) in the same collection from the same locality is similar, while still another specimen has a pervading cinnamon tinge especially on edges of secondaries and tail tips.

This is the extreme eremian or true desert form of the species, which I cannot find recorded as such. It has decreased in size from the pallid form, *G. u. condora*, become still lighter, and taken on the prevailing tone of the red ironstone desert.

Geobasileus chrysorrhous pallescens. Sub. sp. nov.

Upper surface buffy olive; forehead feathers fuscous black, each being tipped with white; frontal spot (confined to lores) and over eyes white; crown plain fuscous; wings and tail drab, tail having a broad bar of black and faint white base, upper tail coverts wax yellow, darker than in *G. c. chrysorrhous*; the colour running on to the outer webs of the tail; tips buffy white; throat buffy white, with slight dusky fringe to some feathers; breast pinkish buff; flanks and under tail coverts and axillaries with distinct wash of yellow; bill and legs black; eyes white. Length, 3.7 in.; bill, 0.48 in.; wing, 2.3 in.; tail, 1.5 in.; tarsus, 0.75 in.

Type male No. 36 (303) in National Museum Collection, Melbourne, was obtained by the Horn Expedition, Levi Ranges, Central Australia, in 1895.

This represents the far interior pallid race.

Geobasileus chrysorrhous westernensis. Sub. sp. nov.

Upper surface olive tinged with citrine like *G. c. chrysorrhous*; crown fuscous black; forehead feathers sparsely tipped white; fron-

tal spot and above eye white; upper tail coverts strontian yellow; base of tail light with outer webs yellow; tail mostly black with distinct white edging to inner webs near tips also on outer web; throat and abdomen white; breast chamois; flanks washed with yellow; under tail coverts and axillaries primrose yellow; eyes white; bill and legs black. Length, 3.7 in.; bill, 0.35 in.; wing, 2.2 in.; tail, 1.6 in.; tarsus, 0.7 in.

Type male (82) in the collection of Edwin Ashby, Esq., Adelaide, S.A., taken at Watheroo, near Moora, West Australia, 5/11/1920. Another specimen in the same collection has a larger bill, .4 in.

This represents the coastal and darker race in W.A. as distinct from *G. c. pallidus* (see Emu, vol. iii., p. 111).

Geobasilus chrysorrhous mallee. Sub. sp. nov.

Upper surface olive tinged with citrine especially on rump; crown fuscous faintly edged with grey; forehead black, a few feathers tipped white; frontal spot small and over eye white; upper tail coverts strontian yellow; base of tail light with outer webs yellow; tail mostly black with tips whitish; throat white; breast and axillaries cream buff; flanks dark olive buff; under-tail coverts cream buff; bill and legs black; eyes brown, tinged cream. Length, 4.0 in.; bill, .32 in.; wing, 2.3 in.; tail, 1.5 in.; tarsus, .75 in.

Type male (131) in "H. L. White Collection," Nat. Mus., Melbourne, taken at Kow Plains, N.W. Victoria, 7/9/1912. Two other specimens, both males, from the same locality are similar.

This represents a smaller and darker race found in the Mallee region, where it is not plentiful. The Mallee is of tertiary age, and in a dry belt geographically distinct from the Victorian and South Australian higher land, where its nearest congeners are found.

Correspondence

To the Editors of "The Emu."

Sirs, — In vol. xxi., page 187, in Mr. Whitlock's notes, he says, "I find no mention of the name 'Nullarbor,'" etc.

Now in 1878 I was attached to a railway survey party in Northern Queensland Townsville-Charters Towers survey—and Mr. E. Delisser, the surveyor in charge told me that he had been out west of Port Augusta looking up country for the South Australian Government some years previously. He described the great plain, and as there was not a tree to be seen, he named it "Nullarbor," from the Latin words *nulla* and *arbor* (no tree). Mr. Delisser also told me he discovered the water at Fowler's Bay, and called the place "Eucla," as the blacks when questioned about water used to point west and say "Eucla."—Yours, etc.,

H. W. FORD.

9 Freeman Street, N. Fitzroy, Victoria, 26/1/22.



Dusky Wood-Swallow removing egg-shell from the nest after emergence of the young.

Photo. by R. T. Littlejohns, R.A.O.C.

Camera Craft

The Dusky Wood-Swallow—From Egg to Bird.—On the 29th November I spent half a day at the nest of a Dusky Wood-Swallow (*Artamus cyanopterus*) at Ringwood. Two days earlier Mr. L. G. Chandler had located the nest, which then contained three eggs. When I arrived at the spot at mid-day on the 29th, the nest contained one young bird and still three eggs. One additional egg, larger and lighter in colour than the others, had been laid in the meantime.

At the first visit I found the female bird much more trustful than is usual with Wood-Swallows. She showed little hesitation in visiting her nest while the camera was 20 inches away. Probably this was due to the advanced state of incubation of the eggs. On the second occasion the female bird showed still greater anxiety, and I allowed her to sit undisturbed while I waited for the male to bring food to her on the nest. This little service he had performed two or three times previously, and I particularly desired to make a record of it.

But when he came near she took it as a signal to have a spell, and allowed him to feed the young bird. I watched the eggs closely during the next quarter of an hour, and moved a few feet away when the female came back. Up till that time there was no sign of chipping, but the female stood on the edge of the nest and pecked carefully at one of the original eggs. Very soon the shell was in two pieces, and between these sections I could see a second young bird struggling. Then the mother carefully pushed one portion of the egg clear of the new arrival, took the shell in her beak and flew away with it, dropping it fifty yards away. I was so interested in the incident that I quite forgot to expose a plate. The head and shoulders of the young bird were still in the remaining part of the shell (the wide end), which adhered to its shoulders. On her return the adult bird made no attempt to remove this portion of egg-shell, but settled very carefully on the nest again.

After a quarter of an hour I roused her and found that the young bird was then free, though head and shoulders were still in the egg. On her return the female again pushed the shell aside, and took it in her beak. But this time I was ready, and before she carried it away I exposed a plate. Unfortunately the plate had been in the camera for nearly an hour, and was badly light struck. The wind had also moved the camera slightly, and had interfered with the focussing.

The young bird was hatched at about 1.30 p.m., and, up till 4.30 p.m. had not been fed. The other young bird, which I judged to have hatched the day before, was fed six times during the same period.—R. T. LITTLEJOHNS, R.A.O.U., Melbourne.

Home Life of the Bronzewing (*Phaps chalcoptera*).—On December 10th, 1921, in the bush on the foothills of the Dandenong Ranges, I saw an old nest of the Ring-tailed Possum. On kicking the tree, a Bronzewing looked over the side. A short climb revealed the Pigeon's nest—the usual frail structure—placed in a depression on the old debris about twenty feet up. The two white eggs were in an advanced stage of incubation.

On December 19th two helpless nestlings covered with down were in occupation. I spent much time in preparing for photographing the nest, a ladder being necessary to elevate the camera. As no long ladder was available, two short ones were joined, but proved clumsy and unsafe. During these preparations the bird sat tight, but when the ladder was raised, she left hurriedly.

Next day arrangements were completed, and a leafy bough was fastened to the ladder. In the afternoon I found all was well and the camera was lashed to the top of the ladder. While clearing branches away, the lens was removed. After covering the camera with the focussing cloth and camouflaging it with branches, I went away so as to allow the bird to become accustomed to this formidable object near its nest.

On December 21st I was pleased to see the bird on the nest apparently unconcerned about the camera. The replacing of the lens, however, scared the bird, and I left the locality to allow her to quieten down. When I returned, the bird was still absent, and I climbed to the camera and had an uncomfortable wait of fully two hours, but she did not return. I exposed a plate on the nest and young, fearing the bird had deserted them.

Late in the afternoon, as the young were showing the effects of exposure, I removed the camera.

On December 23rd, the bird was on the nest, and faced the camera. A distance release for the shutter was fixed up, and the camera was left all night. About 9 o'clock it was very dark, and threatening rain, so I went to cover the camera with my oilskin coat. Though I was very careful, the bird flashed off the nest and away. However, next morning she was again on the nest.

Early on the morning of the 25th I removed the cap of the lens. When I returned later, the bird was absent; evidently it had not returned to the nest after my early visit. After several hours, I re-covered the lens and the bird returned. In the evening I uncovered the lens and left it uncovered all night, though I was afraid moisture might settle on the lens and spoil the picture.

On December 26th, I was delighted to see the sitting bird before the lens at last. In the evening I polished the lens, the bird leaving the nest while I climbed the ladder. Usually she would allow me to climb only a short distance up the ladder before leaving the nest. Generally she sat in about the same position, almost side on to the camera. The beautiful greenish-bronze sheen on her wings shone in wonderful contrast with



Bronzewing on Nest built on top of an old nest of the Babbler.

Photo. by D. F. F. Thomson, R.A.O.U.

the sombre surroundings. She would look at the observer with head up, in the alert, enquiring attitude depicted in the photograph, apparently ready to leave the nest on the slightest alarm. When leaving, she would rise, as a rule, with a great clatter of wings and vanish in the bush. At other times she fluttered to the ground and vibrated her wings rapidly, either in simulation of injury, or, possibly, to remove the cramped feeling due to long sitting on the nest. After a short time, she flew away. On one occasion, I flushed two pairs of Bronzewings close at hand and went to the nest expecting to find the bird absent, but she was still brooding. When not molested, I believe that the Bronzewing sits very closely, probably feeding the young—by regurgitation—at long intervals only.

It appears that the birds do not search for seeds at random, but have regular feeding haunts, usually where seeds to which they are partial are abundant. To these feeding grounds they evidently return again and again. At all events, the birds are flushed repeatedly from the same spots. Apparently they are very fond of the seeds of *Acacias* and the introduced gorse.

On December 27th everything was in readiness, but the weather was very cloudy, and the light poor. However, a prospect of a break in the fleecing clouds with the chance of a short burst of sunlight offered. After a fair wait, I was able to expose one plate on the sitting bird. She did not leave the nest as the shutter went up, but stretched her neck enquiringly.

Apparently the climax was reached when I went aloft to change the slides, for the bird left, and, I believe, never returned. I was exceedingly sorry to think that the photograph cost the lives of the helpless nestlings. However, Mr. A. J. Campbell inclines to the belief that the bird was probably shot, as she would not willingly desert her young.

Fortunately, the single exposure was successful. After my experience at this nest, I certainly do not expect to have another such opportunity with the Bronzewing at home.—S. F. F. THOMSON, R.A.O.U., Canterbury, Vic.

State Secretaries' Reports

QUEENSLAND.

Provision having been made in the Animals and Bird Act of 1921 for the promulgation of Regulations to improve the working of the Act, the Government has, with the concurrence of naturalists, issued an important series of orders governing the control of fauna, both native and introduced. These came into effect before the shooting and trapping season opened in Southern Queensland at the beginning of April. Trappers of native birds or animals are now required to pay a fee of five shillings per annum, and dealers must pay ten shillings each year. Every

dealer and other keeper of native fauna are required to keep records on specially-prepared forms. It is also incumbent, on pain of licences being revoked, that shops and cages be kept in a clean condition, that the captives be regularly fed and watered, and that only a limited number be kept in one cage. Trappers are not permitted to use at night, for the purpose of killing or capturing birds or animals, electric torches, acetylene lamps, or flash lights of any kind whatever. (The Act itself specifically prohibits the use of cyanide—what bushmen term "flour"—or any other poison, so that operations at night are limited to trapping. This stricture does not meet with the approval of shooters of the unfortunate koalas and opossums.)

Another notable Order-in-Council is one bringing into effect, for the first time, a limitation on game-bags. The numbers of particular birds which any one person may take or kill or have in possession during one day are as follow:—Quail, 25; Wild Ducks, 20; Wild Geese, 10; Pigeons, 10; Plovers, 10; Plain Turkeys, 2; Scrub Turkeys, 2. In the case of Pigeons, the Squatter (*Geophaps scripta*), and the fine King Pigeon, or Wompoo (*Megaloprepia magnifica*) are excepted, these two decimated species being now protected for the whole year. Under the old Acts it was customary to list all protected birds and animals. Now only the non-protected and partially-protected species are listed. These providing a less lengthy list, and being better known than most of the totally-protected species, the reader can grasp the position at a glance; so that there can be no plea of "didn't know it was protected." The only birds not protected at any period in Queensland are the introduced birds, also the White Cockatoos, the Cockatiel (*Leptolophus*) the Galah, the Budgerigar, and the Rosella Parrots (all regarded as cage-birds) and the Cormorants, Crows, and Currawong (Pied Bell-Magpie), all of which are in dis-favour as being troublesome.

Sanctuaries continue to be proclaimed, notably about Rockhampton, where members of the Central Queensland Native Birds Protection Association are going on with their good work. Mr. H. Tryon, a member of the Council of the R.A.O.U., who was in Rockhampton recently, and who was welcomed by the Association, states that he has not seen aquatic birds to better advantage than about the Rockhampton sanctuaries. Prior to that, Mr. W. B. Alexander, another member of the Council, who spent a day or two at Rockhampton on his way to the prickly pear laboratory at Westwood, was driven about the district lagoons by officers of the Association. Mr. Alexander was well pleased with all he saw. Previously, again, the State Secretary was similarly entertained by officers of the Association, under whose auspices he lectured when *en route* to Dunk Island.

The value of native birds was not lost sight of by the Australian Forestry Conference which sat in Brisbane in April, and to which the State Secretary was a delegate from the Queens-

land section of the Empire Forestry Association. One of the sessions of the Conference was held at Imbil, adjacent to the great Brooloo State Forest, about 100 miles north of Brisbane, and at that gathering instructive reference to birds was made by Mr. W. R. Petrie, deputy forester and capable bush naturalist. In the course of "Some Notes on Problems of Silviculture in Queensland," Mr. Petrie stated: "The harm done by insects can I am convinced, be controlled by increasing our bird life: the Scrub Turkey not only destroys the casual cockchafer beetle and larva by eating, but prevents immense numbers from doing harm by supplying conditions which induce them to congregate in huge nests to be eaten later. This bird is accused of preventing hoop pine regeneration by scratching, but as its most drastic scratchings (to form its huge nest) are not commenced for six or seven months after hoop pine seed-fall, and discontinued long before the next fall, I think that more good than harm is done by giving the seed a better chance of coming in contact with the mineral soil."

A. H. CHISHOLM,

State Secretary.

Stray Feathers

Bird Territories.—In *The Emu* for April, 1922 (vol. xxi., part 4, pages 258-9, Mr. Charles Barrett states that, in studying the Warblers, Eliot Howard "became aware of the fact that each male isolates itself at the commencement of the breeding season, and exercises dominion over a restricted area of ground." "Here" Mr. Barrett interpolates, "is an untilled field for Australian observers." Also, quoting again from Eliot Howard, "Often enough the males fight after they have mated, or a male with a nest building may attack an unmated bird which ventures into his territory. The evidence in support of the theory of territory in bird life is lucidly discussed in Eliot Howard's work."

I dealt with the subject of bird territories in the story of the Blue Wren, or Superb Warbler, in my book, "Friends and Foes in the Australian Bush," published in London and Australia by Messrs. Whitcombe and Tombs in 1914. The story was first published in *The Sydney Mail* in 1911, and reappears in "Spotty the Bower Bird" published last year. I have not seen Eliot Howard's book, but believe that it was published only recently.

When following this matter, many years ago, I found that even Crows hunted over restricted areas. One marked bird I had under observation in the north-west corner of New South Wales led to the discovery of a roosting tree. The marked Crow was always with one small company, and that company roosted every night in one particular tree, though there were hundreds of similar trees about. The birds hunted over miles of country

through the day, but always made home at night. Some of the members at times did not reach the roost tree till a good while after nightfall. The benighted ones called frequently on their homeward flight, and were answered by those that were already home. Other birds have special roost trees as well as Crows.

Every squattage homestead in the back country has its own flock of Crows. Individual members sometimes become so well known to stockmen that they are known as Joe and Jerry, and so on. I have often seen a small company, or a couple, chasing another Crow through the air, evidently an intruder. But when a dead beast was discovered, Crows were called to the feast from every point of the compass. When the banquet was over, generally about sunset, each group departed the way it came. Some of these groups, after a late meal, travelled twenty miles or more to their home camp. In the open western regions, where their flight can be followed for miles, and many camping places are known, their movements are easily noted.—E. S. SORENSON, R.A.O.U., 104 Sydenham Road, Marrickville, N.S.W.

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Owl Calls.—While reading lately an anonymous article in an English journal on "Spring's First Footfall," I was interested in this part: "The sibilant note of the Barn-Owl, the sad cry of the Wood-Owl, the *cat-call* of the Little Owl," because our small Spotted Owl of Tasmania has at times, when excited, a note just like the mewling of a cat. Are these "cat-calls" characteristic of the small Owls all the world over? The Spotted Owl (*Ninox nova-zealandic*) is fairly plentiful in my locality, which is well-timbered, and I often hear him at night through the open window; he frequently announces his approach by a series of calls, "Ohhh! Ohhh! Ohhh! Ohhh!" like a person much surprised or shocked. One summer night a pair came into a gum just back of the cottage, and apparently sat close together on one of the branches. He called, "More-pork" rapidly about sixty times in succession, but in a somewhat subdued tone, while she kept up a sort of droning accompaniment. This little insight into Owl courtship was rather entertaining, although too brief. Not long ago I saw it stated in an Australian paper that no bird calls "Morepork!" but that the call should be represented as "Morepoke!" or "Boobook!" This is a mistake as far as our island is concerned, for the Spotted Owl says "Morepork!" as plainly as a human being could pronounce the words.—H. STUART DOVE, F.Z.S., R.A.O.U., Tasmania.

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The Birds and the Crops.—A Story of the Egret in Egypt.—Did you ever hear the story of how Major S. S. Flower, director of the Egyptian Zoological Service, saved the beautiful

Egret from Extinction in Egypt? "In 1911, when the last little colony of Egrets was in danger of being wiped out by plume hunters, guards were placed around the one last nesting-place, and Major Flower organised a great series of village meetings, where the following lesson was well rubbed in: 'Egrets kill the cotton worm that ruins your crops. The plume hunters kill the Egret for gain and take the money out of the country. See to it.' The appeal succeeded.

"From a few captive Egrets in the Zoological Gardens fifteen Egrets were hatched in 1913. Major Flower estimates that these fifteen have now 5000 living descendants, and the fifteen ancestor birds are still alive and breeding. The one protected colony has grown to 200,000, and the birds have gone back to the old nesting-places from which the plume hunters exterminated their forebears. The most wonderful part is this: The 200,000 birds have saved the Egyptian cultivators £2,000,000 in the past season alone by keeping down the cotton worm. Major Flower pointed out that it would seem as if each bird were worth £10 a year to Egypt. They work across a field hunting down the pest."

* * *

Is Albinism Connected with Sex Characteristic?—A specimen of the Small Yellow-tailed Tit-Warbler (*Acanthiza chrysorrhoa*) was recently obtained by me at Parwan, Victoria. Its plumage first attracted attention when the bird was seen feeding on insects on the ground with several other members of its own species. Its coloration indicated that its plumage was metamorphosing to a phase of albinism. When dissected, two experts were unable after minute examination to sex the bird. It would be interesting to know whether there is anything abnormal with the sex organs in cases of albinism in birds to prove whether this alteration in the colour of the plumage is a perverted sex characteristic, and that nature hoists the danger signal in the altered coloration of the plumage.—A. H. E. MATTINGLEY, C.M.Z.S., Melbourne.

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Birds Seen on the Sydney-Melbourne Train Route.—Having had the opportunity of travelling this route fairly often, I think that there has been, during the last year or so, a very distinct increase of the birds seen from the train. In one hour's run on the southern side of Goulburn, I noted the following species from one side of the train only, covering about 35 miles of country:—Magpies were particularly numerous, and well distributed right along the line between the two capitals. White-fronted Heron (*Notophox norac-hollandica*) (9); Nankeen Kestrel (*Cerchneis cenchröides*) (5); Rose-breasted Cockatoo (*Cacatua roseicapilla*) (This species was fairly numerous fur-

ther south; they appeared to be feeding on the ground, and small flocks were often disturbed by the train); Rosella (*Platyercus eximius*) (21); Red-backed Parrot (*Psephotus haematonotus*) (55); Laughing Kingfisher (*Dacelo gigas*) (11); Magpie-Lark (*Grallina cyanoleuca*) (8); White-winged Chough (*Corcorax melanorhamphus*) (10; isolated flock, only ones noted on journey); Black-backed Magpie (*Gymnorhina tibicen*) (31).—A. S. LE SOEUF, C.M.Z.S., R.A.O.U., Taronga Park, Sydney.

* * *

Mantis and Young Birds.—The following remarkable story was told me quite recently by a man in whose testimony I can place every reliance.

A pair of (what I take to be by his description) Yellow-rumped Tits (*Acanthiza chrysorrhoa*) had built a nest in a vine growing round the verandah of his house, on the Barwon River.

The distressed state of the birds attracted his attention one morning, and looking into the vine he saw a large mantis with a tiny naked bird securely grasped in its spiked arms and apparently eating at its head. Thinking the occurrence most unusual, and needing a second witness to the act, he jumped on his horse and rode after a friend who had just left. Together they came back and made further investigation. The mantis had gone, but had dropped its prey, which they found lying under the bush with three other tiny birds, each one of which had a tiny round hole in the top of its head and all the brains extracted therefrom.—F. C. MORSE, Moree.

* * *

Mortality amongst Swallows.—During the heavy storm of wind and rain in December last, about 30 Welcome Swallows (*Hirundo neoxena*) that usually frequent the homestead all perished. Dr. Bradby and myself brought six into the house and tried to bring them round by warmth and food, but they would not eat by hand, and all died. They had not a particle of food in the stomach when opened, and evidently died of starvation through there being no insects on the wing owing to the very wet and cold weather with gales of wind. Great numbers of these lovely little birds must perish in heavy, wet and cold weather during the summer months.—J. F. H. GOSLERLEY, R.A.O.U., Ellerslie, Wallis Lake, N.S.W.

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Nesting of Grey Duck. Herewith you will find two photographs of a white pine (*Podocarpus dacrydioides*), in which, evidently, a Grey Duck (*Anas superciliosa*) built its nest at a

height of not less than forty-five feet from the ground. At about 6 a.m. on November 20th, 1921, I noticed a Duck fly from the tree in question, and upon proceeding towards it perceived some object fall from the tree. It was a duckling, but recently hatched. Six more followed; one in falling struck a branch, but reached the ground unhurt. It was really amusing to see them tumble down, one after the other, and then after a few seconds commence a "queek, queek, queek." I caught them and placed them in my hat, and after admiring the pretty creatures, liberated them. They were soon led off safely by the female, which flew around the whole time. I watched this interesting scene in a good-sized patch of bush, not far from the Ruamahunga River, Te Whiti, near Masterton.—R.H.D. STIDOLPH, R.A.O.U., Masterton, N.Z.

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A Strange Nesting-place.—Bird lore is full of stories of strange nesting-places, but perhaps the most singular is that chosen by two sparrows who reside, apparently, somewhere near the Ashburton, N. Z., railway station (says the "Guardian"). They have selected the ventilator of the guard's van used on the Mount Somers train, and there they have built their nest, laid the eggs, and hatched their young. As the van goes with the Mount Somers train to Springburn (a distance of about 30 miles) every evening and returns every morning, it is something in the nature of a puzzle how the fledgelings were hatched. Possibly the mother travelled with the eggs. At the moment, the guard says, the youngsters are very well voiced, and make a chatter on the journey to Ashburton each morning but are quiet at night. Full crops is his explanation of the peace at eventide, and hence he deduces that the parents' permanent place of residence is at Ashburton, N.Z.—R.H.D. STIDOLPH, R.A.O.U., Masterton, N.Z.

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The Red-crowned Pigeon in Tasmania.—On May 15th, 1922, a specimen of the Red-crowned Pigeon (*Ptilinopus regina*) was received at the Tasmanian Museum. As far as we are aware there is no previous record of its occurrence in Tasmania, and it would at first appear as if it was an escapee. It must be remembered, however, that the Purple-crowned Pigeon (*Ptilinopus superba*) appears as an "accidental" on the Tasmanian avifaunal list, and the Top-knot Pigeon (*Lopholaimus antarcticus*) as a "casual." Certain storms may cause these forms to be blown far from their natural geographical habitat, and a percentage of such may reach Tasmania. Unfortunately, the particular specimen which was forwarded to the Museum had been considerably damaged when it was shot and some days elapsed before it was

received in Hobart. It was not possible to make a skin, but, in view of the interest attached to the specimen, it was preserved in spirit. The bird was shot at Bothwell by Mr. H. C. Slater, and it is due to the interest shown by Mr. B. H. Edgell, of "Denmistoun," Bothwell, that the specimen was forwarded to the Museum. Particular attention was paid to the specimen in order to trace any signs of captivity, but none could be observed. It would therefore appear as if the bird was a true "accidental" and worthy of a place as such on the Tasmanian avifaunal list.—CLIVE LORD, F.L.S., R.A.O.U., and J. ARNOLD (The Tasmanian Museum, Hobart).

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Late Swallows.—On Empire Day, when about two miles east of Latrobe, which township is six miles or so inland from Devonport, I noticed with some surprise two pairs of Welcome Swallows (*Hirundo neoxena*), sitting on the overhead wires by the roadside, evidently enjoying the genial sunshine of the late autumn. As all the Swallows had left Devonport seven weeks before for the mainland, it was an unexpected pleasure to find these still making themselves at home in our island, and probably intending to winter with us. The spot where they were seen was close to the Mersey River, and adjacent to large patches of scrub and gum-saplings, so that it was sheltered and warm. Not far away are the old shale-oil works, with sheds and retorts still *in situ*. It is quite probable that the birds roost under some of these, in the same way that a pair or two of the Welcome Swallows roosted in crevices of an old stone-quarry at Launceston for several winters, and probably do so still, coming out on sunny days to catch flies under the shop verandahs. — H. STUART DOWE, F.Z.S., R.A.O.U., W. Devonport, Tasmania. 8.6.1922.

Obituary

Mr. F. R. ZIETZ, R.A.O.U.

Much regret will be felt in the death of Mr. Fritz Robert Zietz, the well-known South Australian ornithologist. This occurred at his residence—Seafeld Avenue, Kingswood, Adelaide—on Monday, April 10th, 1922, after a short and painful illness. Mr. Zietz was the only son of Mr. and Mrs. A. H. C. Zietz. His father, after being connected with the Kiel Museum, Germany, became Assistant-Director and Ornithologist of the Adelaide Museum. He held these positions until his retirement under the Septuagenarian Act a few years ago. Mr. Robert Zietz was born on October 11th, 1874, and was therefore only 48 years of

age, and in the prime of life. He was appointed a student-apprentice at the Adelaide Museum on March 6th, 1891, and promoted to the position of museum assistant on July 1st, 1897. In June, 1919, owing to his studious habits and attention to careful discipline, he had gained such a wide and varied knowledge of our native Australian birds, and those of other parts of the world, that he was appointed to the office of Ornithologist—a position that he held until his death. Under his careful supervision and personal attention, the bird and egg collections advanced wonderfully. Mr. Zietz was also an ardent field worker, and collected for various parts. He was able to assist greatly all those interested in ornithology by giving advice, and by being able to place his hand on any specimen needed for comparison and on names needed in working out the life-histories of the various species. Both in his official and private work nothing was ever too much trouble when assisting the ornithological movement.

Mr. Zietz was a foundation member of the South Australian Ornithological Association, and also a member of the Royal Australasian Ornithologists' Union for a number of years. In these bodies, especially the former, his death will be keenly felt, as he was a hard and continuous worker, and had been for a long time on the editorial committee of the *South Australian Ornithologist*—the official organ of the local association. He was also a member of the Royal Society, and to all of those societies he from time to time contributed valuable papers. During recent years he had taken up the study of the Australian lizards, and had compiled a catalogue of these for the Adelaide Museum. Both in the study of this branch of natural history and that of ornithology and oology, Mr. Zietz showed marked ability, doubtless inherited from his father, who was a wonderfully keen and authentic naturalist.

Mr. Zietz leaves a wife and one son as well as a mother to mourn their loss; his father had only recently passed away.

At a meeting of the South Australian Ornithological Association, held on April 28, feeling reference was made to the death of Mr. F. R. Zietz, and eulogistic remarks were passed upon his ability and life work. The members present stood in silence for a short time as a token of respect in which he was held.

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WILLIAM O'MEARA, R.A.O.U

William O'Meara died suddenly at his office, Park Street, Parkville, on Tuesday, April 10th, 1922. Mr. O'Meara was one of the pioneer builders of Kalgoorlie, and was also a well-known Melbourne contractor. His total deafness from early youth made him quiet and reticent, but to those who knew him he was an exceptionally well-read man. He retired from active busi-

ness many years ago, and had visited the Continent and America several times. He joined the R.A.O.U. a few years ago, and was present at the sessions of the Union held in Queensland and West Australia as well as the camp-outs on the Bunya Mts. (Q.) and at Yallingup (W.A.).

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FREDERICK GEORGE FENTON, J.P.

It is with regret that we have to record the death, on 22nd May, 1922, of Mr. F. G. Fenton, J.P., a well-known and much respected resident of Nathalia, Victoria.

Mr. Fenton was a lover of Nature and was particularly interested in animals and birds, of which he had a fine collection at his home, "The Hut," Nathalia. He was a valued and esteemed member of the Union.

His death was the result of a long and painful illness. Our sympathy is extended to his relatives and wide circle of friends.

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THOMAS TINDALE, R.A.O.U.

Mr. T. Tindale was born at Heaford (Lincolnshire) in 1837, and came to Australia in 1850. He was for thirty-three years manager of Langi Kal Kal Station (Vic.) and later lived on his own property, "Lowlands" Apollo Bay, where he died, after an accident, on May 16th, 1922. He was always keenly interested in natural history and especially in Bird Life and though not an active member of the R.A.O.U., he maintained his interest in it from the date of the first "Emu" to the time of his death.

Reviews

[*"Philippine Birds for Boys and Girls."* By Richard C. McGregor and Elizabeth J. Marshall, with illustrations by Macario Ligaya. Manila Bureau of Printing, 1922. 138 pages, 32 illustrations including six well drawn and well printed coloured plates].

This well-illustrated, brightly written book makes a notable contribution to nature-study literature. All the birds described are Philippine species. Most of them are abundant in the islands, and some are not found outside the islands. Care has been taken to make the descriptions of birds, nests, eggs, and habits true to life. The illustrations so clear and striking were specially prepared for the book.

Several of the birds treated, such as the Grass Owl, the Brown Booby, the Greater Man-of-War (Frigate) Bird, the Pacific Golden Plover, the Island Painted Quail (King Quail), and

Broad-billed Roller (Dollar-Bird), are identical with Australian birds; others are closely related, while many of the most interesting are not found in Australia, some not even outside the Philippine Islands.

The authors are to be congratulated on having produced a work scientifically correct, yet full of interest to all nature students, and especially to the children of the Philippines.

SPOTTY, THE BOWER BIRD.

"Spotty, the Bower Bird" is an original book, in which the author, Mr. E. S. Sorenson, R.A.O.U., gives nature truths in the form of pleasantly-written tales. Three chapters concern birds, three animals. These tales are most informative and interesting, describing really the life histories of familiar bush creatures. Although in the story of "Spotty," the Spotted Bower Bird is dealt with in particular, all other Bower Birds are incidentally mentioned. Likewise with "Jack, the Kookaburra," all his Kingfisher brethren are named, and so with the animals treated.

As has been truly stated, the fascination of the subjects, combined with the author's graphic style and delightful humour, are such as make an irresistible appeal to Nature-lovers, both young and old. Mr. Sorenson is to be congratulated on his original book, which is well illustrated by line drawings by the late Mr. E. E. Barker, R.A.O.U., and by some excellent photographs by various nature photographers.

The publishers are Messrs. Whitcombe and Tombs Ltd., 189-191 Little Collins Street, Melbourne. Price, 4/6; postage, 3d. extra.

[*"Australian Bird-Maps,"* by Robert Hall, C.M.Z.S., Past President R.A.O.U., Honorary Colonial Member B.O.U., Corresponding Fellow A.O.U., and author of many articles and books on Australian birds].

As we go to press this little book (220 pages) most valuable to the student of bird distribution, migration and differentiation, has reached us.

Original in conception, with its 100 maps of Australia and the part of the world north to Siberia showing the range and distribution of Australian birds (residents and visitors) this work will prove of the greatest assistance to those studying Australian birds. Its opportune issue is a piece of good fortune to the members of the committee completing the second edition of the Official Check-List.

Himself, a great traveller along the migration routes of Australian birds, Mr. Hall here presents the results of the study and experience of a lifetime in a striking form readily intelligible to all.

At 4 6 the book is cheap to the bird student and ornithologist. Mr. Hall (Bellerive, Hobart) is acting as his own publisher.

Notes

IMPORTANT ANNOUNCEMENT

Index to *The Emu*, Vols. 1—XX.

Members will be interested to learn that Mr. H. L. White has conferred a signal service on ornithology in general, and the R.A.O.U. in particular, by having prepared an index of volumes 1—XX. of *The Emu*. Needing this work for himself he commissioned Mr. Gregory M. Mathews to arrange for the preparation of the work. This has been done in thorough style by Mr. T. Wells, M.B.O.U., ornithologist of the British Museum.

Mr. White on learning that the printing of a larger number would cost but little more than the cost of printing the dozen he intended, ordered the larger number so that others can benefit by his far-sighted and patriotic action. A gift of 100 copies to the R.A.O.U. will enable a member to become the possessor of this fine index of scientific names. Members requiring same should send 15/- to Mr. Grey, Hon. Gen. Sec. 2 Temple Court, Melbourne.

ANNUAL CONGRESS AND CAMP-OUT.

Captain S. A. White is still absent on his long overland motor trip to Darwin back to the Darling and down to Mt. Gambier. He reports a fine season, and is to advise the Council as to the best place in the interior about Lake Eyre for the annual camp-out. Many enquiries are being made concerning this important excursion and camp-out.

It is expected that there will be a large attendance of delegates at the majority (21st) Congress of the R.A.O.U., in Adelaide, beginning on October 16th.

MONTHLY CONVERSAZOINES.

The following topics have been fixed for the monthly meetings to be held on—

Wednesday, July 5th. "Bronzewing Pigeons and Butcher-birds," introduced by Mr. D. Thomson, assisted by Mr. F. E. Wilson at the R.A.O.U. room.

Wednesday, August 2nd. "Wood Swallows," by Mr. R. T. Littlejohns, at the R.A.O.U. room.

Wednesday, September 6th. "Quails," by Mr. A. J. Campbell, at the National Museum, Melbourne.



(Left) *Fregata gularis*, Vieillot (full plumage) (Right) *Fregata tropica*, Gould
(Upper) *Fregata gularis*, Vieillot (dark phase)

The Emu

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"Birds of a feather."

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[PART 2.]

On the Status of several species belonging to the two genera, *Fregetta* Bp. and *Fregettornis* Mathews

By J. R. KINGHORN, R.A.O.U., Zoologist, Australian Museum, and NEVILLE W. CAYLEY, R.A.O.U., Sydney.

[By permission of the Trustees of the Australian Museum.]

Introduction.

The acquisition by the Australian Museum of several specimens of *Fregettornis* from Lord Howe Is., led us to compare them with others of the genus *Fregetta*, and to investigate the status of several species belonging to both genera. Thorough search permits us to include *Fregetta melanogaster*, *F. tubulata* and *F. leucogaster*, as synonyms of *F. tropica*, Gould, and we have placed *Fregettornis royanus*, *insularis*, *alisteri*, and *immominatus* under *Fregettornis grillarius*, Vieillot. Such a course may at a glance seem rather drastic; but on careful comparison of the various descriptions, and examination of the volumes quoted in the appended bibliography, we found no other course open to us.

Such slight colour-variation as exists between the several species mentioned above is evidently due to some or all of the following causes:—Firstly, according to Loomis¹, no two birds are exactly alike; a feature which is explained by the fact that moulting in any species varies in different individuals, independent of their age, physical state, or time of breeding. Loomis found that in many species the breeding season was protracted over a very large part of the year, not only in tropical, but in temperate regions. Secondly, wear and tear of plumage through fading and abrasion are so great in sea-birds that in the older

ones, the smaller markings on the tips of the feathers are often missing, and Loomis² suggests that descriptions can hardly be called complete unless both worn and fresh plumage is described. Thirdly, sexual and individual variation must be taken into account; variation in size may be sexual or physical, and variation in colour may be ascribed to the same causes. Loomis³ also points out that the most common variation in colour is the intrusion of white in dark areas and of dark colour in white areas. We have found this to be very forcibly brought before us on examining several species of sea-birds, and we agree with Loomis both in this and in his previous observations and statements.

We are grateful to the Trustees of the National Museum, Melbourne, for the loan of several specimens of *Fregatta* which bear Gould's labels; to the Trustees of the Macleay Museum, University of Sydney, for permission to examine specimens in the collection there; and to Mr. A. R. McCulloch, zoologist at the Australian Museum, for valuable assistance in reference to synonymy and literature.

Genus *Freggettornis*, Mathews.

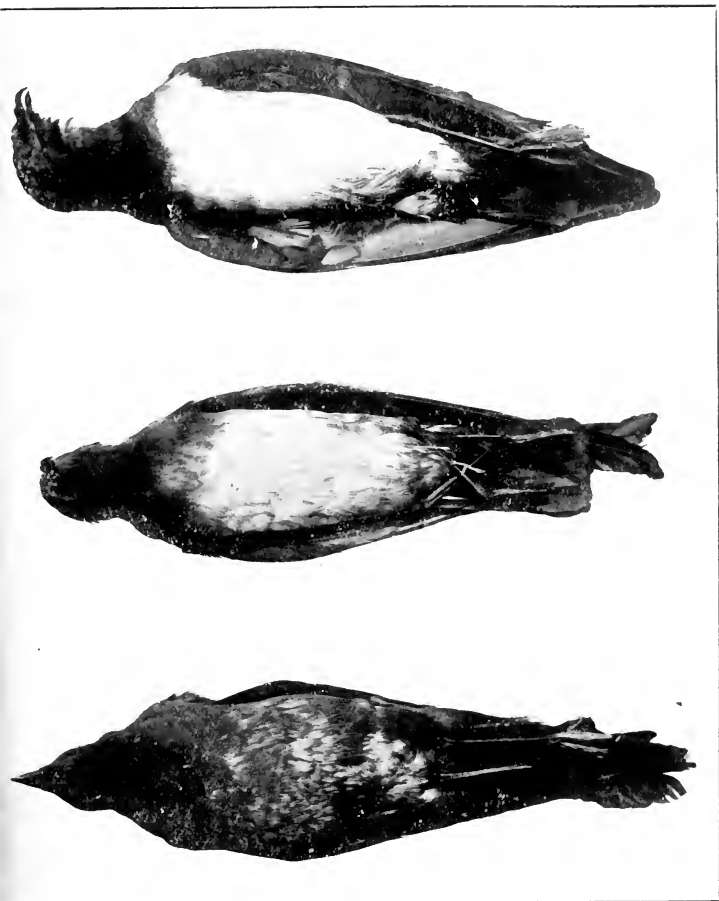
This genus, the type of which is *Procellaria grallaria*, Vieillot,⁴ was separated from *Fregatta*, Bonaparte, because its tarsus is scutulated instead of booted; the two appear to be distinguishable, however, by other and more definite characters.

In the paper in which Bonaparte⁵ created the new genus *Fregatta* he made *Thalassidroma leucogaster*, Gould, the genotype, and mentioned *T. tropica* and *T. melanogaster*. In defining the genus, he stated that the toes did not stretch beyond the tail, notwithstanding the long tarsus. We fail to understand how this statement came to be made; Gould's original description did not mention this character, and Gould's own specimens (which we have before us) certainly show that the outstretched legs do extend beyond the tail. Bonaparte could not have examined the type of *T. leucogaster*, and his observation must have been made from a shrunken skin. Of the several skins in our possession, four are labelled by Gould in his own handwriting; one is called *T. melanogaster*, one *T. tropica*, and two *T. leucogaster*. All these, together with several in the Macleay Museum at the University of Sydney, have the toes stretching well beyond the tail.

In all our specimens of *Freggettornis*, on the other hand, the legs when stretched out do not reach to the end of the tail. This is due to the very short feet; drawings of which are given here for comparison with those of *Fregatta tropica* and its synonym *T. leucogaster*.

Freggettornis is apparently distinguished from *Fregatta* by the following characters:—

Length of the culmen, 13-14 mm.; toes short, the middle toe, including the claw, 20-21 mm. and sub-equal in length to



VIEILLOT STORM PETREL (suggested name).—*Fregettornis gallartius*, Vieillot, showing three stages of plumage. 1. Specimen C of text; 2. Specimen B of text; 3. Specimen A of text. All are from Lord Howe Island, South Pacific Ocean. Photo. by C. Clutton, Australian Museum.

the other toes; tarsus, 35-37 mm.; claws spatulate, very broad and blunt*; legs not reaching the end of the tail. *Freggettornis*. See Figs. 1-3.

Length of the culmen, 15-15.5 mm.; toes long, the middle toe, including the claw, 25-30 mm., being distinctly longer than other toes; tarsus, 38-43 mm.; claws, though spatulate, longer and sharper; legs reaching beyond the tail. *Freggetta*. See Figs. 4-7.

Although the genus *Freggettornis* was established by Mathews in his "Birds of Australia," vol. ii., pt. 1, 1912, p. 31, it was not used by him in the succeeding pages of the same work, and he referred its genotype to the genus *Freggetta* under the trinomial *Freggetta grallaria grallaria*.⁶ Further, he confused *Thalassidroma leucogaster*, Gould, a species of *Freggetta* proper, with *Freggetta grallaria*, placing it in the synonymy of the latter. The error is, however, corrected in Mathews' List of the Birds of Australia,^{6a} where the name *Freggettornis grallarius* is again brought to light. Later,⁷ Mathews and Iredale give a full description of this species.

VIEILLOT'S STORM-PETREL (*FREGGETTORNIS*
GRALLARIUS, VIEILLOT.)

Procellaria grallaria, Vieillot, Nouv. Dict. d'Hist. Naturelle, vol. xxv., 1817, p. 418.

Freggettornis grallarius, Vieillot, Mathews and Iredale, Manual of the Birds of Australia, vol. i., 1921, p. 21; Pls. iv., Fig. 7, and vii., Fig. 6.

Freggettornis royanus, Mathews, Austral Avian Record, vol. ii., 1914, No. 5, p. 86.

Freggettornis insularis, Mathews, loc. cit. vol. ii., 1915, No. 7, p. 124.

Freggettornis alisteri, Mathews, loc. cit.

Freggettornis innominatus, Mathews, loc. cit.

Synonymy.—Examination of several specimens of *Freggettornis* from Lord Howe Island, and a comparison of them with the various descriptions of the above species, leads us to the conclusion that all are referable to a single species, *F. grallarius* Vieillot. Mathews'¹¹ several descriptions are not as perfect as they might be; but apart from small colour differences, his measurements of the various birds are so close to each other,

*Mathews' figure of *F. grallaria grallaria* (8) does not agree with his description, nor with our specimens of *F. grallarius* so far as the claws are concerned. The figure shows them to be long and sharp, not short and blunt; they do not appear to be even spatulate, and it seems that the figure was prepared from a specimen of *T. leucogaster*, Gould, which we regard as synonymous with *Freggetta tropica*. The figure of the tarsus and toes of *Freggettornis grallarius* in Mathews and Iredale's Manual of the Birds of Australia, vol. 1, plate iv., fig. 7, is correct, and typical of the species.

that we consider it impossible to find specific differences between them.

The material before us as we compile this paper, besides a large quantity of literature (nearly thirty volumes having been consulted) consists of three specimens of *Fregettornis* from Lord Howe Is., as follows:—

A.—A very dark specimen with very little white on the abdomen, collected by Messrs. McCulloch and Troughton in the Erskine Valley, February, 1921. This flew into a camp after dark, being attracted by either a light or noise.

B.—A lighter specimen with a more mottled abdomen. This was found, with a broken wing, by Mr. R. Baxter, on a beach towards the end of 1921.

C.—A specimen collected by Professor T. H. Johnston in October, 1910, which is part of the "H. L. White Collection" in the National Museum, Melbourne. This specimen is very important; it is the one which was described, but left "unnamed," by Mathews.^{8a} So far as we can find, Mathews fails to make further reference to this "unnamed" bird in any recent work, so we are fortunate in having it before us as we write.

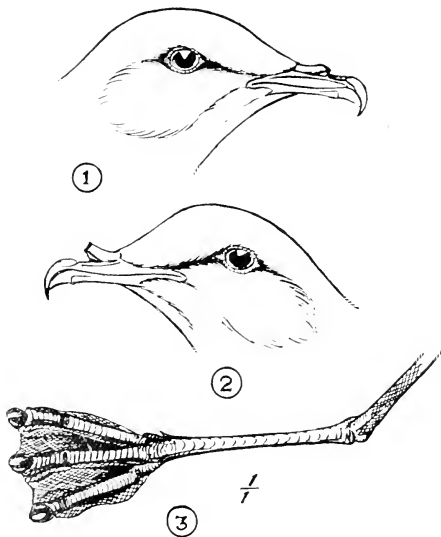
Mathews and Iredale⁹, in a note at the end of the description of *F. grallarius*, say "Examination of Vieillot's type proves that it is not the Lord Howe Island sub-species, but the South American." This must be a mistake, as we have consulted Vieillot's own original description,¹⁰ in which he definitely states that his bird came from New Holland.

Mathews and Iredale⁹ place *F. innominatus* in the synonymy of *F. grallarius*, and it is through this action that we are helped in identifying Mathews' other nominal species. Such slight colour variation as exists between *F. royanus*, *F. alisteri*, *F. insularis*, and *F. innominatus* is evidently due to some or all of the several causes explained by Loomis,¹ and quoted by us in an introductory paragraph.

VARIATION OF *FREGETTORNIS GRALLARIUS*.

The nasal tube.—The bird collected by Professor T. H. Johnston (Specimen C) was described by Mathews,¹² but was left unnamed. He remarked that its greatest peculiarity was the depressed or flattened nasal tube, which he thought might have been soft in life; another feature was the approach of the forehead feathers to the culmen, which gave the bird a vulturine appearance. We noted these peculiarities when we first examined the skin, and also observed that the specimen captured by Messrs. McCulloch and Troughton (specimen A) showed exactly the same characteristics. We decided, however, to moisten the nasal tube of one specimen with spirits and warm water, and found that, so soon as it was thoroughly soaked it assumed an upright position, though it did not become quite so erect or recurved as in a specimen preserved in spirit (B), which was col-

lected by Mr. Baxter. In this latter bird, the nasal tube is what we regard as normal, being in no way damaged, and is upright and recurved almost as much as in *Fregatta tropica*. We also note that the under-portion of the nasal tube is soft, and, if great care be not taken when making the bird up as a skin, is liable to collapse: this spirit specimen having since been made up as a skin, we find that the tube has failed to keep its exact original shape on account of the contraction of the soft parts noted. This experiment has proved that no importance can be attached to the result of a casual examination of nasal tubes which appear to have been soft in life. In support of this we may mention that, prior to our experiment, we shared the opinion of several well-known ornithologists who examined our Australian Museum specimen, that so flattened a nasal tube could never assume the ordinary upright position found in the several well-known species of *Fregatta*.



Fregattornis grallarius, Vieillot.

1. Shows the nasal tube in a collapsed condition.
2. Shows normal nasal tube.
3. The short, sub-equal toes, rounded spatulate claws, scutulated toes and tarsus, all of which are typical of the genus.

The bill.—The variation in the shape of the bill is so slight that we regard it as negligible; but that of specimen (B) which

was collected by Mr. Baxter, appears slightly heavier throughout, though it is of the same length as the bills of our other specimens before us, and also in Mathews' two nominal species, *F. royanus* and *F. innominatus*; in his *F. insularis* and *F. alisteri*, it measures 13 mm.¹¹

Middle toe and claw.—In our Erskine Valley specimen (A) the measurement is 20.5 mm.; in that collected by Mr. Baxter (B) it is 21 mm., while in the "H. L. White Collection" specimen (C) it is 20 mm. It will be noted that the spirit specimen (B) has a longer toe than either of the others; variation which seems to be due to shrinkage in the joints of the dried skins.

Tarsus.—The measurement of the tarsus varies slightly. In the Erskine Valley specimen (A) it is 36 mm. long; in Baxter's specimen (B) it is 35 mm., and in the "H. L. White Collection" specimen (C) it is 37 mm.; in *F. royanus* it is said to be 35 mm., *F. insularis* 38 mm., *F. alisteri* 36 mm., and *F. innominatus* 37 mm. It will be noticed that these measurements overlap, the smallest being 35 mm., and the largest 38 mm.; but the difference of 3 mm. is not a serious item even in such a small bird, as the points from which the measurements are made vary slightly through shrinkage. This statement is borne out by an examination of the tarsi of other species, and also by reference to tabulations of characters given by Dr. Sharpe and other authorities.

Tail.—The tail of the Erskine Valley specimen (A) measures 83 mm., Baxter's specimen (B) about 76 mm., and the "H. L. White Collection" specimen (C) 79 mm.; that of *F. royanus* is said to be 79 mm. long, *F. insularis* 80 mm., *F. alisteri* 75 mm., and *F. innominatus* 80 mm. The difference between that of *F. alisteri* (75 mm.) and the Erskine Valley specimen (83 mm.) being equal to only a third of an inch, we consider it a matter of little importance.

Wing.—That of the Erskine Valley specimen (A) is 150 mm. long, Baxter's example (B) 153 mm., and the "H. L. White Collection" specimen 160 mm.; in *F. royanus* it is 160 mm., *F. insularis* 168 mm., *F. alisteri* 165 mm., and *F. innominatus* 160 mm. Again it will be seen that the measurements are variable, and are in no way comparative to any other measurements.

Total length.—It is difficult to determine what "total length" means in the various works referred to. Some writers have measured from the forehead to the tip of the tail; others seem to have measured from the forehead to the tip of the folded wings, which stretch beyond the tail; again, measurements have been taken from the base of the culmen to either of the other points mentioned. Some authors measure from the tip of the bill to the tip of the tail. These measurements depend on the position of the head, and whether the bill is in line with the body or pointing upwards when the bird is on its back; furthermore, the neck, or in fact the whole skin, may be either stretched

or contracted in a made-up skin, so a considerable allowance must be made in comparing such measurements.

The skins before us, when measured from the forehead to the tip of the tail, vary from 170 mm. to 179 mm., while the measurements given by Mathews¹¹ of his nominal species vary from 200 to 215 mm. If, however, our specimens be measured from the tip of the bill to the tip of the tail, the measurements exceed 200 mm., and almost correspond with those given by Mathews.

Colour.—Having disposed of the measurements, we will proceed to deal in detail with the arrangement of the colours in the three specimens before us, comparing them with those given in Mathews' descriptions. The following is his description of *F. royanus*: "Entire plumage sooty black, darkest on the upper tail coverts. Wings and tail black. A large subterminal band of white is noticeable on the under surface and the upper tail coverts, on examining the feathers. Tail square." The specimen collected by McCulloch and Troughton at Erskine Valley (A) agrees better with this description than with that of any other of the nominal species, but the abdominal and lower breast feathers are, here and there, white almost to their tips, which gives a mottled appearance to these parts. The upper tail coverts also show a little white, and we regard this bird as in a more advanced stage of moult than *F. royanus*, and think that several more moults would leave the abdomen pure white, as in *F. grallarius*. Further evidence in support of this contention is afforded by the characters of specimen (C). The colour description, as published by Mathews,¹² is reprinted here: "It is much darker than *F. g. grallaria*, and has black fringes to the rump feathers, square tail, the bases of the feathers of the throat are dark, but the white lower-breast and abdomen are flecked with grey, especially noticeable on the flanks, and the axillaries are streaked with grey, whereas in every other specimen they are pure white; the under tail-coverts are white with dark tips, whereas in *F. g. grallaria* they would be said to be dark with white bases." We cannot find much difference in these two last statements; examination of the specimen shows that some of the under tail coverts are largely white with dark tips, and others largely dark with white bases. "Another noticeable feature is the lack of white on the inner wing coverts." The specimen (B) presented to the Australian Museum by Mr. Baxter has more white than that collected by Messrs. McCulloch and Troughton (A), but a little less than the example described by Mathews (C). It shows just a little white on the under surface of the wing.

With the exception of Vieillot's type, all the specimens on which the various names are based are from Lord Howe Island. Vieillot's bird was taken in southern seas, on the voyage to Australia, and he states definitely that it came from Australia when he writes "*on le trouve a la Nouvelle Hollande.*"

Conclusions.—With the three specimens, A, B, and C, before us, which we have critically compared with Mathews' descriptions of his *F. royanus*, *F. innominatus*, *F. insularis*, and *F. alisteri*,¹¹ we conclude that they, as well as Mathews' specimens, are all referable to the one species, each being in different stages of moult or age or both. We have pleasure in proposing the vernacular name—Viellot Storm-Petrel—for this species.

NOTES FROM PARIS RELATING TO VIELLOT'S TYPE

Since compiling this paper we have been very fortunate in getting into touch with Monsieur J. Berlioz, of the Paris



Cete et bec

(grandeur naturelle)

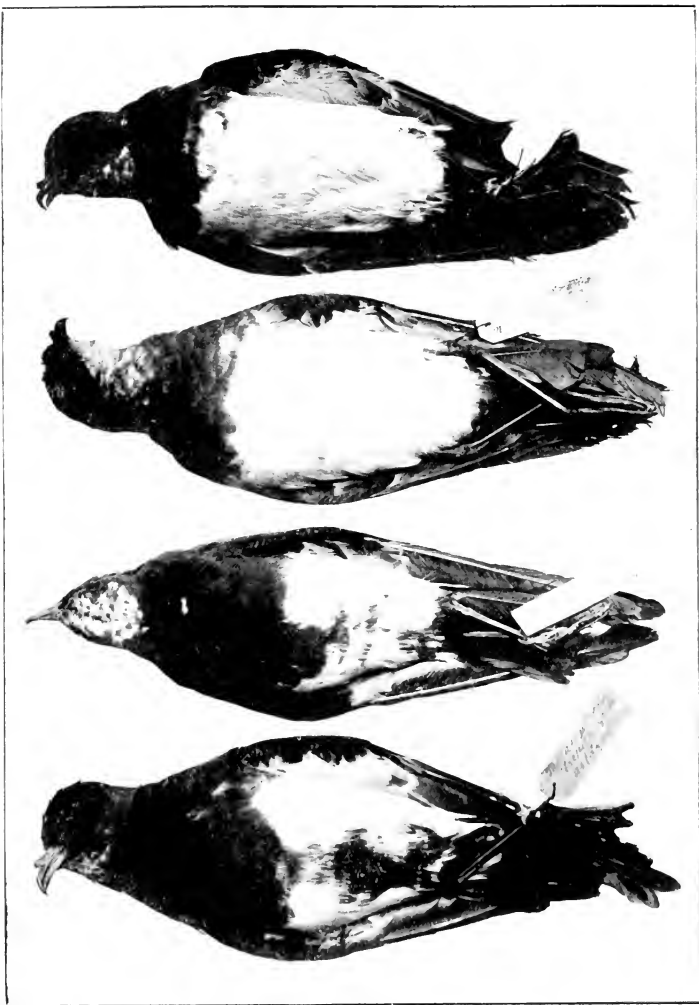


patte gauche

Fregatta grallaria (Vieill.), type

Museum, and we are very grateful to him for the trouble he has gone to in making comparisons for us, and in supplying us with the information which we sought.

Unfortunately he was unable to procure photographs of Viellot's type of *Fregatta grallaria* (*Fregattornis grallarius*), but he drew the accompanying text figures from the type specimen, adding that: "As the specimen was mounted, and rather badly prepared, it was impossible to say whether the extended feet did or did not reach to the end of the tail." The reason for the absence of scutellation on the tarsus of his text figure is, that the legs and feet of the type were so covered in varnish that it was not possible to distinguish the scutes sufficiently, but



GOULD STORM PETREL (suggested name).—*Fregatta tropica*, Gould, showing different stages of plumage. These specimens were labelled and identified by Gould as follows:—1. *Thalassidroma tropica*, Gould—Atlantic Ocean. 2. *Thalassidroma melanogastris*, Gould—Lat. 43° 18', South Long. 140° 52' East. 3. *Thalassidroma leucogastra*, Gould—S. Indian Ocean ♂. 4. *Thalassidroma leucogastris*, Gould—S. Indian Ocean ♀. (Numbered left to right)

the dimensions and general aspect corresponded well to the drawing of the tarsus and foot of one of our Lord Howe Island birds, and not to that of *Fregetta leucogaster*, both of which were enclosed in our letter to him. Mr. Berlioz appended a colour description, the translation of which is as follows:—

"The plumage is a sooty brown, much darker on the remiges and retrices, more pale on the wing coverts; these are the same as the feathers of the back, possessing a whitish border; without doubt a sign of its immaturity. The lower breast and the entire abdomen are white, as well as the rump and upper tail coverts, the under tail coverts are white at the base and brown at the tip. Total length (from base of beak to end of tail), 170 mm.; culmen, 19 mm.; tarsus, 34 mm.; middle toe and claw, 21 mm.; wing, 170 mm.; tail, 79 mm."

We compared these measurements with his enclosed drawings which are natural size, and we find that the culmen must have been measured from the angle of the mouth; this would give the 19 mm., as noted by Mr. Berlioz (see text figure), while the wing was most probably measured from the junction with the body, and not from the bend, by allowing for this difference, the measurement would then be from 165—170. (We checked and compared these carefully with the specimens at our command before coming to any conclusions). By adding the length of the bill to the total length given, we find that the dimensions should then read—

Total length, 184 mm.; culmen, 14 mm.; wing, 165 mm.; tail, 70 mm.; tarsus, 35 mm.; middle toe without claw, 18 mm.; with claw, 21 mm.

These readjustments bring the measurements into line with those already published, and so give a better basis for comparative work. We believe that the above figures are the first ever published of Vieillot's Type.

Mr. Berlioz further stated that the Type did not carry any indication of Bonaparte.

We now feel assured that by the publication of this information, together with the drawings of the type, no doubt should remain as to the validity of Mathews genus *Fregettornis*. Furthermore, it should greatly assist readers in following the arguments set forth in our paper.

GOULD STORM-PETREL.—*FREGETTA TROPICA*,

Gould.

Thalassidroma tropica, Gould, Ann. Mag. Nat. Hist., vol. xiii., 1844, p. 366.

Thalassidroma melanogaster, Gould loc. cit. p. 367.

Thalassidroma leucogaster, Gould loc. cit. p. 367.

Fregetta tubulata (Gould m.s. loc. cit. p. 367), Mathews, "Birds of Australia," vol. 11, pt. 1, 1912, p. 41.

Fregetta grallaria, of Authors (not of Vieillot).

A glance at the above synonymy will show that we include *T. leucogaster* Gould, and *F. tubulata* Mathews, under *F. tropica* Gould. This course was not adopted until a thorough examination was made of the specimens available, comparing them critically with the various descriptions and notes made by the authorities quoted in the bibliography. In discussing this question we refer to our introduction, in which we quote and abide by the various observations and opinions held by Loomis.¹

The specimens before us number ten: Four of these were identified and labelled by Gould, two as *Thalassidroma leucogaster*, one as *T. melanogaster*, and one as *T. tropica*. The remaining six were distributed as follows: Two mounted specimens of *F. tropica* in the Australian Museum, and four of *T. melanogaster* in the Macleay Museum, University of Sydney. We have pleasure in proposing for this species the vernacular name—Gould Storm-Petrel.

F. leucogaster as opposed to *F. grallaria*.

Bonaparte¹¹ wrongly placed *T. leucogaster* Gould as a synonym of *P. grallaria* Vieillot, and this mistake has been continuously accepted since that time. Later, several specimens collected by the *Challenger* Expedition were identified as *F. grallaria*, instead of *F. leucogaster*, an action which has caused most of the trouble since, as authors have evidently followed this lead. We therefore hold that the *F. grallaria* referred to by most authors is really the form usually recognised as *Fregetta leucogaster*, Gould. This latter species is generally placed in the synonymy of *Fregetta grallaria*; but as *F. leucogaster* is certainly not *Fregetta grallaria* Vieillot, which has been placed in the new genus *Fregettornis*, by Mathews,¹⁵ it is probable that the *F. leucogaster* referred to above is synonymous with *Fregetta tropica*.

VARIATION.

Godman¹⁶ refers to *Fregetta grallaria* as being closely allied to *Fregetta melanogaster*; but he states that the former always has a white belly and white margins to the feathers of the back. Dr. Bowdler Sharpe,¹⁷ who uses the generic name *Occanites* in preference to *Fregetta*, says that "the differences between *O. melanogaster* and *O. tropica* are extremely slight, consisting in the white throat and the greater amount of black in the abdomen and centre of the body, in the latter bird. I believe it possible that *O. leucogaster* is also only a stage of plumage of the same species, the four specimens in the Museum being apparently immature, with narrow whitish edgings to the feathers of the upper surface. . . ." Both Salvin and Godman¹⁸ oppose this, and Godman says that *grallaria* never shows any black on the abdomen, while the white banded specimens which he examined in the British Museum appeared to be adult birds. He also states that the white edges to the feathers of the back seem to

be the sign of adult plumage in *grallaria* and juvenile in *melanogaster*. Later, in referring to *Fregatta grallaria*, he says:¹⁹ "A specimen from Ambrose Is. shows only slight traces of white fringes to the dorsal feathers, but the breast and abdomen are pure white, there being no trace of black. This seems to indicate that the white bars disappear more or less in fully adult birds." This statement contradicts his earlier one to the effect that the white edgings to the feathers of the back are a sign of the adult stage. We think that the presence or absence of the white edgings to the feathers should not be taken into account as in any way connected with specific characters, and should be put down to variation caused by wear and tear or due to moult or age.²⁰ The white edgings to the feathers occur both in the white-bellied and black-bellied forms, and Mathews makes a point of this on p. 40 of the work previously quoted.

Loomis²¹ mentions that a specimen of *Fregatta grallaria* (presumed by us to be *F. leucogaster*), which was shot in latitude 4° 20' S., longitude 93° 30' W. (in the vicinity of the Galapagos Islands) was undergoing a complete moult. The worn feathers of the dorsal region were black with vestiges of white tips in some instances, while the new feathers were heavily washed with grey and broadly tipped with white. The throat feathers were more or less white basally. He points out that in some specimens the throat feathers are said to be wholly dark, a phase which may be due to the existence of a dual coloration similar to that which exists in *Puffinus griseus* and *Puffinus chlororhynchus*. We agree with Loomis, and think that wear and tear, dichromatism, geographic and individual variation would account for the uniting of several species, which are at present placed under different names.

Mathews,²² "A specimen labelled *Fregatta* ♀ *melanogaster* Gould. Off the E. Coast of N.S.W., May, 1875." This is the only authentic Australian produced specimen known to me. The skin shows slight whitish tips to back feathers; whitish bases to throat show an as obscure whitish patch; the belly mark distinct but ill defined; lower tail coverts have long black tips with white bases and extend to end of tail; there is a whitish patch on inner wing coverts and a brownish outer wing covert patch. Wing 146, tail 69, tarsus 41, mid. toe 27, culmen 15 mm. Nostrils tending upward. This is my *Fregatta tropica australis*. Gould had not an Australian specimen of this bird or *grallarius*."

One of Gould's specimens of *T. melanogaster* is labelled by him as being from latitude 43° 18' S., longitude 140° 52' E., this locality being about 200 miles west of Cape Grim, Tasmania.

On March 24-25, 1922 a visit to the Macleay Museum revealed the four specimens of *Fregatta melanogaster* mentioned above, comprising two flat skins (females) and two mounted skins (male and female), all four being from "off East Coast of New South Wales, May, 1875." On the flat skins the following notes were made:—Nostrils raised well up from the culmen on

the one specimen but slightly more flattened on the other. The white patches on the throat are conspicuous; the central dark patch on the belly is interrupted with white, and there are whitish specks on the feathers in front of the eyes. The measurements of the two are as follows:—Wing, 149, 157; tail, 67, 71; tarsus, 41, 43; middle toe and claw, 28, 28; culmen, 15, 15.

It will be noted that none of the measurements agree in all respects with those given by Mathews, but the former bird is most probably the specimen examined by him.

The characters of the mounted specimens are as follows:—Female, the nostrils not very erect, the dark belly marking distinct, the under tail coverts not reaching the end of the tail. The light patch on the upper wing coverts is more noticeable than in any other specimen examined, while there is not a light patch in front of the eye. In the male, there is a light patch in front of the eye, and the facial feathers are lighter than in the female, the nostrils are more erect, and there is a very distinct whitish patch under the throat. The black belly marking is indistinct, and is interrupted half-way down by the infusion of white feathers. The measurements are:—Female: wing, 162; tail, 70; tarsus, 39; middle toe and claw, 27; culmen, 15. Male: wing, 156, tip missing; tail, 71; tarsus, 40; middle toe and claw, 27; culmen, 15.

The characters of the other specimens before us, which, as stated before, bear Gould's own labels are as follows:—

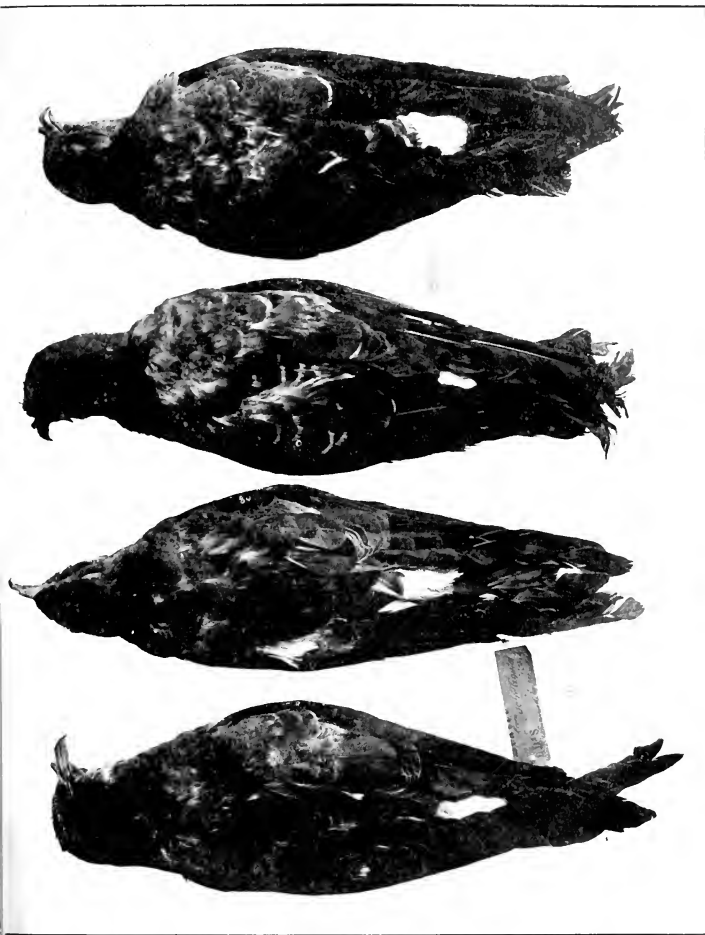
T. leucogaster, Gould.

The feathers of the back show broad whitish tips down to the rump feathers; there is a white patch on the throat; chest and abdomen white, as also are the upper tail coverts and under wing coverts. The under tail coverts are black with white bases; two or three have faint white edges. A white patch is in front of the eyes. Total length, 180 mm.; tail, 79; wing, 156; tarsus, 39; middle toe and claw, 28; culmen, 15 (male); locality, South Indian Ocean.

The female has very few of the back feathers with broad white tips; those on the upper back, being worn or weathered, show but faint white edges. White patch in front of the eye on left side, but not on right side of head. The other characters are as above. Total length, 178 mm.; tail, 77 (tip worn away); wing, 156; tarsus, 41; middle toe and claw, 28.5; culmen, 15; locality, South Indian Ocean.

T. melanogaster Gould.

A few of the feathers of the back show very faint light edges. The white patch on the throat is conspicuous. Central belly-marking very irregular. Under and upper tail coverts as in *leucogaster*. The under wing coverts tend to white; they may be said to be almost mottled; the innermost ones are white on the right wing and dark on the left. White patch in front of eyes present but indistinct. Total length, 176 mm.; tail, 77; wing, 158; tarsus, 39; middle toe and claw, 27; culmen, 15 (male).



GOULD STORM PETREL.—*Fregata tropica*, Gould. Dorsal view of birds shown on previous plate labelled and identified by Gould as follows:—1. *Thalassidroma tropica*, Gould—Atlantic Ocean. 2. *Thalassidroma melanogaster*, Gould—S. Lat. 43° 18', Long. 140° 52' East. 3. *Thalassidroma leucogaster*, Gould—S. Indian Ocean ♀. 4. *Thalassidroma leucogaster*, Gould—S. Indian Ocean ♀. Photo. by C. Clutton, Australian Museum.

Locality, latitude 43° 18' S., longitude 140° 52' E. (about 200 miles west of Cape Grim, Tasmania).

T. tropica Gould.

The feathers of the back have white edges; there is a small whitish patch on the throat; under wing coverts white; the central belly markings blackish but broken near the chest. Under tail coverts black with white bases; two or three have faint white edges; upper tail coverts white; no white in front of eyes. Total length, 183 mm.; tail, 80; wing, 157; tarsus, 41; middle toe and claw, 28; culmen, 15; bill slightly heavier in build than in any other specimen (sex ?). Locality, Atlantic Ocean.

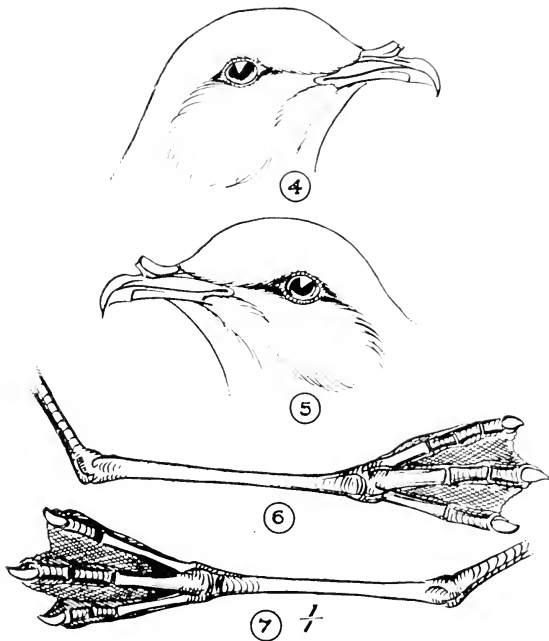
Coues²³ examined a large series of birds, which he placed under the name of *F. grallaria*, but which were not of this species, as most of them were labelled *T. leucogaster* Gould. Among them were Gould's types, which Coues, like other authors of the time, regarded as synonymous with *F. grallaria* Vieillot. He found that this species varied more than is usual among the *Procellaria*; the colour of the upper parts ranged from deep fuliginous brownish black to a much lighter plumbeous, or ashen hue. Some of them, the lighter coloured ones, had all of the dorsal feathers edged with white. He does not mention the remaining specimens, but evidently the white edges were missing in them. He found that the white under surface varied considerably in extent; in some cases it reached far up on to the throat, while in others it descended low on the breast as is the case with *melanogaster*. He found that in the series examined the tarsus measured from 37 mm. to 40.5 mm., and the middle toe and claw from 26 to 28 mm.

Coues, in discussing *Fregetta melanogaster*,²³ of which species he examined Gould's types, found that it was closely allied to the preceding both in form and colour, but stated that it differed consistently as follows:—It was slightly smaller but had longer tarsi and toes, the bill was longer and more slender, the wing nearly an inch (25 mm.) shorter, and the tail about 12 mm. shorter. He found that the central dark line of feathers on the abdomen was never entirely wanting, though it varied considerably, and in some specimens it was represented by only a few disconnected feathers. His great point of difference between the two species is the length of the toes.

Gould^{23a} also noted that *melanogaster* had longer toes than *leucogaster*. However, a glance at the characters and measurements of the series examined by us—in which the details were checked several times, bearing in mind that several of the specimens were named and labelled by Gould—it will be seen that no difference exists on this point between the two birds. Moreover, the bill, which is said to be more slender, and longer in *melanogaster* than in *leucogaster*, varies in individual specimens, while one *melanogaster* in the series before us has a broader and shorter bill than has any of the other birds. The measurements

given by Dr. Sharpe²⁴ will considerably support and strengthen our statements.

With reference to our inclusion of *Fregetta tubulata*^{24a} in the synonymy, we give the following data. When Gould²⁵ described *T. tropica*, *T. melanogaster* and *T. leucogaster* as new species,



Fregetta tropica, Gould.

These drawings have been made from specimens identified and labelled by Gould as follows:—4 and 6, *Thalassidroma leucogaster*; 5 and 7, *T. tropica*.

Long toes, middle one longest, spatulate but sharp claws; tarsus and basal joint of toes booted.

The extraordinary difference between the feet of this bird and those of *Fregettornis* will be seen on comparing them together.

he mentioned, and gave a short description of another bird which was killed near the coast of Australia; to this he did not attempt to attach a name, but said that its "nostril tube is much more lengthened than in any other species, and its apical portion

turned upwards or recurved, instead of being attached to the bill throughout its entire length as in the other members of the genus. In the distribution of its colouring it is very nearly allied to *T. tropica* and *T. leucogaster*, and it may be a mere variety of one or other of those species; but the bill, in addition to the feature pointed out above, is of a more slender and attenuated form than is observable in any other."

Mathews²⁶ examined this bird, to which he attached Gould's m.s. name of *Fregatta tubulata*, and found that the tube was as stated above. The feathers of the throat had light bases, the upper tail-coverts were white without black tips, tail square, the under tail-coverts dark; there were stray dark markings on the belly. The toes longer, and not so much flattened, and the claws longer and more spatulate than in *tropica* or *leucogaster*. Wing, 155; tarsus, 37; middle toe without claw, 21; middle toe and claw would make this measurement 26 or 27 mm.); culmen, 14.

We have before us, as stated previously, specimens of *T. tropica*, *T. melanogaster* and *T. leucogaster*, identified and labelled by Gould; and we are able to say definitely that some error has occurred in Gould's statement in regard to the nostril tube. Evidently in his types the nostril tube was flattened, this being due to want of special care when the skins were being prepared. We pointed out in another part of this paper that the under-surface of the nostril-tube is soft in life, and liable to collapse unless great care be taken in preparing a skin. The nostril-tube of Gould's bird, which was turned upwards, is therefore normal and apparently the same as in other members of the genus (see figs. 4 and 5); furthermore, we fail to see, on the measurements given by Mathews, that the toes of *F. tubulata* are longer and the claws more spatulate. We have Gould's own specimens of *T. leucogaster*, and they have the *longer*, not the *shorter*, toes.

This bird is supposed to be intermediate between *T. tropica* and *T. leucogaster*, which we have decided are synonymous, and we therefore have no hesitation in placing *F. tubulata* in the synonymy of *Fregatta tropica* Gould.

CONCLUSIONS.

As *Procellaria grallaria*¹⁵ Vieillot has been definitely placed in a separate genus from *Fregatta*; and as *T. leucogaster* Gould remains in the genus *Fregatta*, though it was previously confounded with Vieillot's species,¹⁴ it remained for us either to accept *leucogaster* as a distinct species or to place it in the synonymous list.

F. grallaria of authors other than Vieillot is undoubtedly *F. leucogaster* Gould.

T. melanogaster Gould has long been declared synonymous with *Fregatta tropica* Gould.

Fregatta tubulata Mathews²⁶ (Gould m.s.) was declared by Gould²⁵ to be almost intermediate between *tropica* and *leucogaster*, but he left it unnamed. *F. tubulata* is therefore a link between *tropica* and *leucogaster*; and on making comparisons we were led to the conclusion that all the above, except Vieillot's bird, are referable to *Fregatta tropica*.

FOOTNOTE REFERENCES TO NUMBERS TO BE FOUND IN TEXT.

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4. Mathews; Birds of Australia, vol. ii., pt. 1, 1912, p. 31.
5. Bonaparte; Compt. Rend., 1855, vol. xli., p. 1112.
6. Mathews; Birds of Australia, vol. ii., pt. 1, 1912, p. 37.
7. Mathews and Iredale; Manual of the Birds of Australia, vol. 1, 1921, p. 21.
- 7a. Mathews; List of the Birds of Australia, 1913, p. 32.
8. Mathews; Birds of Australia, vol. ii., pt. 1, 1912, p. 37, pl. 72.
- 8a. Mathews; Birds of Australia, vol. ii., pt. 1, 1912, p. 42.
9. Mathews and Iredale; Manual of Birds of Australia, vol. 1, 1921, p. 21.
10. Vieillot; Nouv. Dict. d'Hist. Nat., vol. 25, 1817, p. 418.
11. Mathews; Austral Avian Record, vol. 2, pt. 5, p. 86, and pt. 7, p. 124-125.
12. Mathews; Birds of Australia, vol. ii., pt. 1, 1912, p. 42.
13. Loomis; Proc. Calif. Acad. Sci. Ser. 4, vol. ii., pt. 2, No. 12, April, 1918, p. 182.
14. Mathews; Birds of Australia, vol. ii., pt. 1, 1912, p. 39.
15. Mathews; Birds of Australia, vol. ii., pt. 1, 1912, p. 31.
16. Godman; Monograph of Petrels, 1907, p. 65, pl. 18.
17. Philos. Trans. Roy. Soc. Lond., vol. 168, 1879, p. 130-131.
18. Godman; Monograph of Petrels, Pt. 1, 1907, p. 65.
19. Godman; Monograph of Petrels, pt. 1, 1907, p. 66.
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21. Loomis; Proc. Calif. Acad. Sci. Ser., 4, vol. ii., pt. 2, No. 12, April, 1918, p. 182.
22. Mathews; Austral Avian Record, vol. iii., No. 4, 1917, p. 95.
23. Proc. Acad. Nat. Sci. Philad., No. 2, 1864, p. 85-87.
- 23a. Gould; Handbook to the Birds of Aust., vol. ii., 1865, p. 480.
24. Philos. Trans. Royal Soc. Lond., vol. 168, 1879, p. 131.
- 24a. Mathews and Iredale; Manual of the Birds of Australia, vol. 1, 1921, p. 20.
25. Gould; Ann. Mag. Nat. Hist., vol. xiii., 1844, p. 366-367.
26. Mathews; Birds of Australia, vol. ii., pt. 1, 1912, p. 41.

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In addition of the above, a complete search has been made through the "Journal Fur Ornithologie," "The Avicultural Magazine," "The Auk," "The Ibis," and "The Emu."

New Sub-species of *Acanthiza nana*, Vigors and Horsfield

Acanthiza nana flava, sub-sp. nov.

By H. L. WHITE, R.A.O.U., &c., Belltrees, Scone.

Upper surface bright dark citrine, becoming yellowish on upper tail coverts; crown medal bronze; wings and tail edged yellowish citrine on outer webs; dark subterminal bar on tail; small frontal spot buff; ear coverts fuscous with fine white shaft-streaks; throat clay colour (deep buff), with fine white shaft-streaks; breast olive yellow on sides, tinged buff in centre; abdomen flanks and undertail coverts lemon chrome; bill brown; legs dark brown; eyes brown; length, 89 mm.; bill, 8 mm.; wing, 51 mm.; tail, 38 mm.; tarsus, 16 mm.

Type, male (425) in "H. L. White Collection," Nat. Mus., Melb., taken at Ravenshoe, near Herberton, North Queensland, June, 1922. *Co-type*, female (426), from the same locality, has the buff on the throat more restricted; wing, 45 mm.

This, the most northerly and the brightest race of *A. nana* yet discovered, comes from a region elevated over 3000 feet above sea level, where another interesting member of the genus is found, *viz.*, *A. pusilla katherina*, De Vis.

Description of Eggs* of the Golden-shouldered Parrot (*Psephotus chrysopterygius*)

By H. L. WHITE, C.F.A.O.U., M.B.O.U., "Belltrees," Scone, N.S.W.

A considerable amount of mystery was attached to this beautiful little Parrot, it being confused with the Hooded Parrot *Psephotus dissimilis*, until W. McLennan set all doubts at rest by securing a pair on the Archer River, and sending to G. M. Mathews, who confirmed Gould's identification, made in 1857.

McLennan's observations lead to the conclusion that the habitat of *Psephotus chrysopterygius* is practically confined to a portion of the Cape York Peninsula, and the country adjacent to the south-eastern shores of the Gulf of Carpentaria. The finding of the Parrot's breeding places, holes drilled into Termites' mounds, led to the equally interesting discovery of a new moth, the caterpillar of which lives in the nests, feeds upon the excreta of the nestlings, and pupates in the termitarium. The moth submitted to Dr. A. Jefferis Turner, of Brisbane, is found to be a new genus which he names *Neossiosynocca scatophaga*, and will describe later in an English scientific paper. The habits of the insects are so extraordinary that Dr. Turner wishes attention drawn to them throughout the world.

Mr. McLennan first received a definite report upon the existence of *P. chrysopterygius* in the Coen district, when a friend stated he had seen it in the vicinity of Port Stewart, and had noted old nests in anthills. Nothing further was done in the matter until 22nd April, 1922, when a station hand reported having found a bird supposed to be the Golden-shouldered Parrot breeding some 14 miles north of Coen. Mr. McLennan proceeded to the spot, which is a large flat, thickly dotted with magnetic and spire-shaped termitariums. The nesting site was soon located by the half-caste guide; the female bird flushed when the party was a few yards from the nesting hole, which contained six very heavily incubated eggs. The termitarium was spire-shaped, height six feet, with a top diameter of 6 inches. Entrance to the nest 2 ft. 6 in. from ground, circular in shape, 1 $\frac{3}{4}$ in. x 1 $\frac{1}{2}$ in. Egg chamber 7 in. diameter by 6 in. deep.

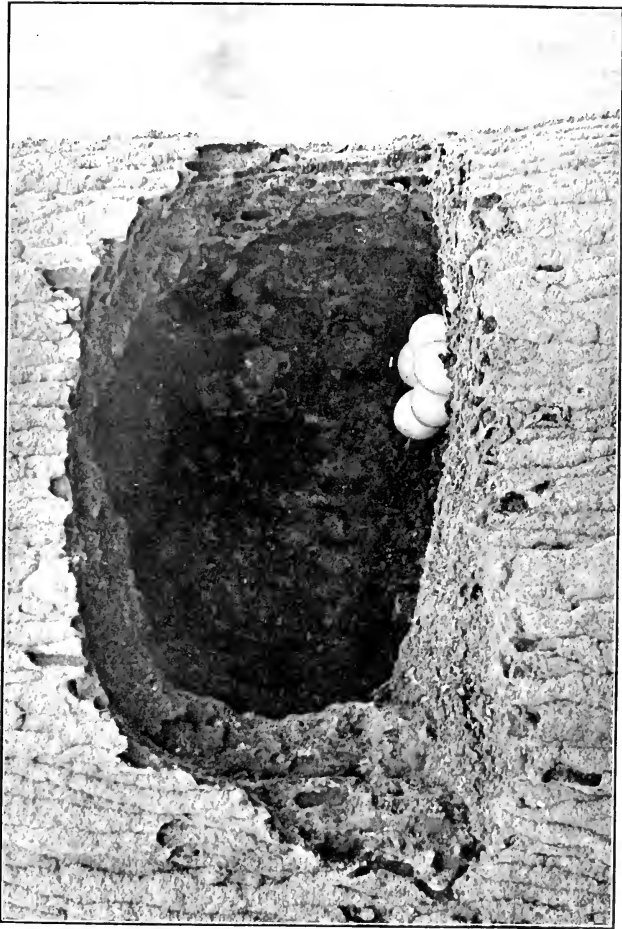
Another nesting hole was found (1/5/22) in a magnetic termitarium; had been taken possession of by a pair of Finches (*Poephila atropygialis*), and their nest partly built; but under it were found 4 eggs of the Parrot. In this case the nesting hole was 3 ft. from the ground; 1 $\frac{3}{4}$ in. diameter; depth from entrance to rear 1 ft. 11 in.; egg chamber 12 $\frac{1}{2}$ in. x 4 in.; eggs

* Eggs supposed to be those of this bird were described in *The Emu*, vol. ii., p. 94, but a mistake was clearly made as the Golden-shouldered Parrot is not found west of the Gulf of Carpentaria.



Entrance to Nest of Golden-shouldered Parrot (*Psophodes chrysops*) in Spire-shaped Anthill.

Photo. by W. McLennan, R.A.O.U.



Nest and Eggs of Golden-shouldered Parrot (*Psaphodius chrysopterygus*.)

Photo. by W. McLennan, R.A.O.U.



Feeding young Golden-shouldered Parrots (*Psittacus chrysopterygus*) by W. McLennan. Onlooker Master Henry M. Hordern, youngest member of the R.A.O.C.

Photo. by H. L. White, R.A.O.C.

placed in middle of chamber. Termitarium 5 ft. 6 in. high, 5 ft. in length, 18 in. thick at base, tapering to a fine edge at top; thickness at nest 7 in.

The nesting sites appear to be rather frequently taken possession of by *P. atropygialis*. Eggs of the Parrot are laid on soft broken up termitarium material, and number from 4 to 6, pure white, almost round, and with little gloss.

Clutch 1, measuring in millimetres:—

A—.83 x .70 B—.83 x .70 C—.81 x .72

Clutch 2 (Type).—A—.83 x .73; B—.84 x .74; C—.84 x .68; D—.82 x .73.

One clutch taken was the produce of birds in immature plumage, which presented such variation from adults that Mr. McLennan at first thought he had a new species. The variation probably accounts for stories circulated as to two species of anthill Parrots being found in the Coen district, but a person of Mr. McLennan's wide experience and ornithological knowledge is not likely to have overlooked a second species during nine months' residence in the locality.

A Collecting Trip to Cape York Peninsula

By H. L. WHITE, C.F.A.O.U., R.A.O.U., "Belltrees," Scone,
New South Wales.

INTRODUCTION

Mr. William McLennan, who, on my behalf, had previously conducted several successful expeditions in Northern Australia, in search of ornithological novelties, agreed to make another trip into the centre of Cape York Peninsula. My original intention being that he should work north from Coen, but as things turned out there was so much of interest in the locality (Coen), that the whole period of engagement (nine months) was spent there.

The Queensland Government has always been extremely liberal to me in the matter of permits, and again my thanks are due for its consent to a further collection of specimens for scientific purposes. I am indebted also to Sergeant McGreehan, in charge of the police, and Mr. D. Anderson, State school teacher at Coen, for assistance and kindness to my collector.

McLennan left Cooktown in the small ketch "Elam" on the 27th August, 1921, arriving at Port Stewart, 175 miles distant, on the evening of the 30th. Coen is not easy of access, but may be reached (1) by boat to Port Stewart, thence per vehicle 45 miles; or (2) by rail from Cooktown to Laura, thence on horseback for 170 miles; the last-named is the mail route (per pack horse, Coen to Laura), the trip being made once per fortnight, except during the wet season, when long delays occur.

Coen, situated on the head waters of a river of the same name, and so called (in honour of Governor Coen, of Batavia) by the early Dutch navigator Jan Carstenzoon during his voyage in the ships *Arnhem* and *Pera* in 1623, and is probably one of the first-named rivers in Australia. Some confusion existed as to the identity of the River Coen, and the matter is explained by R. Logan Jack in his "Northmost Australia," page 49. The same writer gives particulars of gold mining operations carried out later in the Coen district (page 467) where one mine, "Great Northern," is stated to have produced £114,000 worth of gold. The Coen of today has fallen away in importance, a few prospectors only representing the gold mining industry; it is practically surrounded by cattle stations owned chiefly by the State, and is a telegraph station on the line to Thursday Island.

The country in the vicinity is of granite formation, hilly, it being practically on the main range; well timbered with various species of Eucalypts, Melaleucas, and Acacias. It is well grassed, the chief kinds being *Heteropogon*, *Andropogon* and *Themida* (Northern Kangaroo grass), two first named producing most objectionable seeds, which penetrate clothing, and make travelling most unpleasant and difficult during the autumn months.

McLennan reached his collecting locality early in September, and remained there for about nine months, securing many rare specimens of birds, eggs, reptiles and insects; amongst which is a giant venomous snake at present not identified, but which is probably a new and highly interesting species. Owing to the very favourable climate, trees in bloom were always in evidence, providing abundant food for honey-eating birds, which, in consequence, appeared to breed all the year round.

DESCRIPTIONS OF COUNTRY, EXCURSIONS AND EXPERIENCES

The nature of the country and some of the experiences of a collecting trip may be gathered by extracts from the diary, which is voluminous and too full of carefully kept details to be used at length here. The diary is punctuated with many droll expressions.

The river flats, valleys and gullies are mostly well timbered, and birds appear to be fairly numerous. The bed of the river is about 100 yards in width, heavily timbered with tall thin paper barks, river wattles and numerous scrub trees, also a bushy tea-tree (*Melaleuca*), a mass of bottle-brush flowers. Two large leaved varieties in November and again in March were in full flower, one beautiful cerise coloured, the other greenish yellow.

The track coming into Coen runs through level heavily timbered forest country, bloodwood, box, Moreton Bay ash, cabbage gum, river gum, wattle, ironwood, beefwood, wild cotton, and many other trees and shrubs. There appears to be a big break in the coastal scrub belt hereabouts. Bird life numerous. We passed through the track of a cyclone, trees and branches down everywhere, and piles of debris. Standing trees now heavily

refoliated after the pruning. Great bird chorus at the first flush of dawn. The short, sharp whistle of *Eutomyzon cyanotis* (Blue-faced Honey-eater), locally called "morning bird," is the dominant note. *Cracticus mentalis* (Black-backed Butcher-Bird) comes next, with its beautiful bubbling flute-like song. *Dacelo leachi* (Blue-winged Kookaburra); *Scythrops nova-hollandiae* (Channel-Bill) vie with each other in raucous screams. *Microcca flavigaster* (Lemon-breasted Flycatcher), and *Gerygone alboocularis* (White-throated Warbler), both trill sweetly. *Colluricincla brunnea* (Brown Shrike-Thrush) adds other notes of sweetness with its clear and varied calls, so also does *Grallina cyanoleuca* (Magpie-Lark), and *Oriolus sagittatus affinis* (Northern Oriole). The calls of *Geopelia humeralis* (Bar-shouldered Dove), *G. placida* (Peaceful Dove), *Geophaps scripta* (Squatter-Pigeon), and *Chlamydera nuchalis orientalis* (Eastern Bower-Bird) harmonise with the general chorus. *Pomatostomus temporalis* (Grey-crowned Babbler), *Platycercus adscitus amathusiæ* (Northern Blue-cheeked Parrot), *Cacatua roseicapilla* (Galah), *Philemon argenticeps* (Silvery-crowned Friar-Bird), and *P. citreogularis sordidus* (the Little Friar-Bird) are also heard.

While searching for nests he gets covered with small black ants, which give off an "overpowering smell," or he "meets a brown snake coiled at the foot of the tree," or discovers "a hornets' nest—or, rather, the hornets discover me first; had to beat a retreat." "While climbing for a *Strepera* (Crow-Shrike) nest, 50 feet up, I got badly stung about head, hands and back by vicious little yellow hornets, the slightest movement on my part would attract additional hordes of the little brutes. I get some of my own back on those that are anchored to various parts of my anatomy by their stings." "*Gerygone alboocularis* often nests near hornets. I got in first blow with this crowd by tying a bunch of dry Pandanus leaves to a long stick and burning out the hornets' nest before climbing the tree."

McLennan had the sometimes doubtful assistance of black-boys. His diary records:—Friday, 28/10/21: Bob did not turn up with the horse. 3 p.m.: Go to native camp and learn that Bob has gone fishing. He had taken the bridle, and evidently planted the horse, with the intention of getting him on his return, then telling me it had taken him all day to find it." "On going out to make a camp at Rocky Ranges with four pack horses, had to leave without the nigger. The horses seemed to know that I was helpless. They spread out all over the place, and would not stick to the track. One of them got a bit extra by bumping into a nest of hornets, which livened him up."

"Mosquitoes are bad when there is no breeze, and a small grey March fly comes along for its drop of blood. Mistletoes are now in bloom, vivid splashes of scarlet amongst the varied greens. The box trees are flowering, and two kinds of paper barks. Heat becomes intense. The official record, I believe, at 9 a.m.

(10/12/21) was 102 deg. Blackboy complains that his feet 'close up burn.' There was some poorer country about the Rocky Ranges with *Casuarina* and *Banksia*, mostly stunted, big areas of Grass-tree are passed through, and scarcely any bird life seen."

Real tropical scrub (jungle), however, was the objective, and when he finally reached it "there were dense thickets of bamboos and lawyer vines mazed and tangled from the ground upward, forming a barrier through which one has constantly to cut and crawl, in some places completely obscuring a view of the overarching trees."

So much for the dry season. McLennan had a different tale to tell when the rainy season began, with the new year. "Rain nearly every day, and solid showers that would put an inch of water in a pannikin in no time. Streams running like millraces. A trip that could be done in three days comfortably, might now take 30 days on account of the floods and treacherous nature of the country. Horses would sink to the knees and deeper if they left the track. One horse let off steam one day by trying to buck off the pack, but soon got tired of this in the boggy ground."

Prospectors told McLennan: "You can't live in that Rocky scrub now; leeches will suck you dry, and then the beetles will pick your bones." But he persisted, and got something of what he was promised. Leeches sometimes filled the boots with blood from their bites. "Beetles—the air is thick with them; the ground a moving ravening mass, rolling, tumbling inches deep, and devouring every fallen scrap of food. They appear after dark."

"Rain falls in chunks. The ground inside the tent is like a saturated sponge, water flowing down the ridge in all directions. Fortunately there is a big Termites' mound close by, which I hollowed out for a fireplace. Tommy the blackboy got sufficient paperbark to make a rough shelter over it, a dry fireplace is an absolute necessity in these parts."

"Monday, 20/2/22: "The excessive moisture is playing the deuce with everything. Flour and tea have gone mouldy; sugar is melting; salt beef, nearly all putrid, and we haven't been able to get any game to date. Blankets are wet and mouldy, cannot get them dry. It is impossible to do any writing with pen and ink, as the paper is saturated with moisture."

MORE SIDELIGHTS

Taking "Snaps" in Tree-tops.—Bird (Black-backed Butcher) sat on nest till I got within 6 feet. Taking "snaps" was rather a difficult job. I had to stand upright on a swaying limb, one leg lightly braced against a small upright branch, top of camera just under my chin. Was so intent on my work that I nearly took a step sideways, to get better look at the view-finder; just remembered in time that I was 40 feet from the ground.

Another "Snap-shot."—Flush a female Turnix, which flew off behind me. Twist round in saddle and try a shot, but miss. Horse nearly jumped from under me.

Single-handed.—Saddle up and get pack horses loaded (have to make two light packs of my stores, &c.) and start off on my own. The confounded horses seemed to know that I was practically helpless—gun in one hand, collecting rod in other, and *no whip*. The animals spread all over the place, and would not stick to the track; when I went to drive one lot along, others would stop to feed; a couple of times they tried to bolt back along the track. It was a perfect "nightmare" trip.

A Grateful Shade.—The bed of the creek is thickly grown with a variety of trees—large Paper-barks, River Wattles, big Leichhardt "Plums," in full bloom, Wild "Cherries," and numerous other heavily foliated species.

Cause and Effect.—20/12/21: Rainfall 70 points. Night—deafening chorus of frogs.

Wayward Horse.—Would crawl along in front of the pack-horses, prevent them from going ahead. Later he got what was owing to him, and a bit extra, through bumping a nest of inch-long vicious red hornets. These shifted him along at a great pace for a hundred yards or so.

An Evening Plague.—The air is alive with flies, about the size of the house species, which drop a perfect shower of small maggots, as they fly over our food. These, failing to land on a congenial spot, bend themselves into circle, straighten out instantaneously, and then flick about all over the place. Just as well it's a bit dark.

Short Rations.—Everyone in the district has been on short rations for about a fortnight, owing to supply boat not running to time. I had sufficient, but had to share it amongst those who had least.

Snakes!—Saw a beautiful and brilliant green snake with an irregular white stripe down centre of the back and tiny irregular spots of white on sides of body; it was about 5 feet long, and as thick as one's wrist. It was in a tangle of lawyer vines a few feet from the ground, and showed fight.

31/3/22.—When riding through some fairly long grass, I was right over a large snake—a Black-headed Python, I thought, judging by its size. I could not see it plainly so I did not feel anxious, as this snake is sluggish and inoffensive. Passing over it, I saw its head. (Expletive!) "A Brown Snake!" Did not have gun or pistol, so called to Tommy (the black) to cut a strong sapling. As I dismounted the snake started off. I grabbed the sapling—and stopped it. Only about 9 feet long. More anon.

Once Tommy let out an unearthly yell; jammed the spurs into his horse, which made a plunge some feet away. Thought a

brown snake had got Tommy—a snake all right, but of the Carpet species, about 10 feet long. Did not destroy it.

17/4/22.—Saw a brown tree-snake, about 3 feet long, in a mountain ash; while watching it the snake promptly apprehended and swallowed a small wood-adder about 5 inches in length.

30/4/22.—Walked on a five-foot Black Whip-Snake. It struck at me, but missed, as I was "well on the move."

BIRDS AND NOTES

Through Mr. McLennan's perseverance, important bird-observation was carried on, particularly in regard to the little-known *Turnix olivii* (Buff-breasted Quail) and *Psephotus chrysopterygius* (Golden-winged Parrot).

Here follows list of birds observed with extracts from the collector's notes. The names of the species are according to proposed 2nd Edition Official Check-list, R.A.O.U. Sub-specific names in brackets and asterisk indicates skin collected:—

Dromaius novæ-hollandiæ. Emu.—On a river flat near Coen an Emu was noted with six small young. Took some "snaps" of "Dick," a pet bird.

Casuarius casuarius (*C. c. australis*). Cassowary.—Heard a mysterious noise one night like the grunting of a horse in trouble. Think it was a Cassowary.

Alectura lathamii (*A. l. purpuricollis*) Purple-wattled Brush-Turkey.—Tommy brought back a fine Turkey, which will form the leading item on the menu tonight (21/2/22).

***Synoicus australis** (*S. a. cervinus*). Northern Brown Quail.—Flushed from some long grass a covey of Quail at Joe's Lagoon. The call of this bird is a double note whistle; first note short, second much longer; sometimes loud and sharp, but more often rather plaintive. Found an old nest with six shells, and later a nest containing five fresh eggs in a tussock of coarse grass, the blades of which were bent over and lightly woven, and formed the top and side of the nest. Nest merely a shallow depression 4 inches in diameter by 1 inch deep, and lined with a few eucalypt leaves and grass.

***Turnix olivii.** Buff-breasted Quail.—21/11/21.—Heard a deep booming call: "Ooom, ooom, oocm," repeated rapidly for twenty rounds. The first few notes were very low, and appeared to come from a great distance, the succeeding notes gradually higher in tone, louder, shorter, and were more rapidly uttered, until the last notes were about five tones higher than the first. The call takes about 30 seconds of time. As I imitate the call, the bird answers, and in a few minutes I see a bird coming through the grass about 25 yards away. It is a female *Turnix*.

24/11/21.—Flushed a bird which landed 100 yards away and started to call; kept on calling, and appeared to be coming back toward me, which it eventually did.

6/2/22.—Saw a female *Turnix* running through a patch of grass closely followed by a male; one of them was rapidly uttering a soft whistling, chirruping note. Several times a different call was uttered—a deep humming "gug-gug-gug," repeated rapidly for three to five seconds.

9/3/22.—Return to my marked tree, proceed carefully to within 10 yards and imitate the call. In a short time a bird replied from



Nest and Eggs of Northern Brown Quail (*Synoicte australis cervinus*).

Photo. by W. McLennan, R.A.O.U.

near-by; the chirping and gugging call of the male was heard once. Climb 40 feet to the fork of a big messmate, keep imitating the call at intervals, till finally the bird again replies. I see the female walking about in the grass beneath me. Get down and search all around: no luck. The male has another call, "Chirp-chirp-chirp-kwaare-kwaare." The first notes were short and rapidly uttered; the last two were of longer duration, much louder and with a distinct pause between.

12/3/22.—While walking through a patch of short grass, a Turnix flushed from close alongside my right foot. On looking down I saw a dome of dry grass amongst the green, which I thought was a rat's nest. A close examination proved it to be the long-sought nest of *Turnix olivii*, containing four fine eggs. Nest void, entrance in large end, composed of fine, wiry, dry grass-stalks, a few straggling ends of which stick cut over the entrance for 7 inches; lined with short bits of fine grass, and a couple of eucalypt leaves (messmate); placed in a shallow depression in ground amongst fine short grass not interwoven with it; top, sides and back of nest very neat, no straggling ends. Dimensions, outwardly from entrance to rear $6\frac{1}{2}$ inches, depth $5\frac{1}{2}$ inches, width 5 inches; entrance, 4 inches diameter. Inside, from entrance to rear, $5\frac{1}{2}$ inches; depth, $4\frac{1}{2}$ inches; width, 4 inches.

13/3/22.—Heard a male calling differently from any previous call, a deep-toned whistling, "Chu-chu-chu," rapidly uttered. Every time I imitated the call of the female he replied with this call.

17/3/22.—Tommy heard a Turnix calling in a grass pocket. Search well, and find a nest with a broken eggshell in it; two more broken eggs near by, showing teeth marks of some reptile, which Tommy says was a goanna.

22/3/22.—Flushed a bird again, which I feel sure has a nest close by; search thoroughly, and found it about 150 yards from where I first heard the bird calling; take two photos; camouflage the camera with grass and bushes in the hope of snapping the bird. After an hour go to the camera, and the bird flushed from a couple of feet to the side of the nest, being too scared to go into the nest. Nest was placed in a shallow depression between a stool of long grass and a small shrub. Eggs heavily incubated.

24/3/22.—After breakfast Tommy brings horses, and as it will be some considerable time before I finish my job, I send him along to lock round place where we heard Turnix calling yesterday afternoon. About an hour and a half later I heard Tommy returning at a gallop, and wondered what was wrong until I caught sight of his face. There wasn't room for the extra smallest portion of a smile on his black face, and he was that excited he could hardly speak. At last he blurted out: "I findem nest, four hegg this time, quite fresh one." I eventually got a collected account from him. Take camera and extra film cartridge and go along with Tommy. The nest was situated in a thinly grassed patch—thin stools of long grass widely scattered with fine short grass growing between—at the base of a stool of long grass. It contained a lovely set of fresh eggs, one rather strikingly marked in comparison with the others.

27/3/22.—Tommy noticed a track through the grass, and on looking closer found the nest of Turnix containing four eggs some distance away from where we previously flushed the bird. Nest placed at the base of a stool of long grass among short fine grass, and under a small creeping plant, which almost completely hides the nest from view.

The diary contains other instances of nest-finding. Numbers of eggs are apparently destroyed by lizards (goannas).

[For further particulars of this species, see *Emu*, ante, pl. 1 (coloured) and descriptions of nest and eggs, with photo-blocks, pls. ii-iv., and pp. 1-2.]

**Turnix maculosa* (*T. m. melanota*). Red-backed Quail.—Observed a bird, evidently breeding; suitable nesting country hereabouts.

Turnix castanota (?). Chestnut-backed Quail.—Flushed covey of five birds, but am not sure of the species.

Ptilinopus superbis. Purple-crowned Pigeon.—A bird was flushed from its frail nest 10 feet from the ground; the nest contained one fresh egg; another nest was seen 7 feet from the ground with one young bird in a eucalypt sapling; parent very quiet.

Megaloprepia magnifica (*M. m. assimilis*). Allied Purple-breasted Pigeon.—Heard calling in the scrubs.

Myristicivora bicolor. Nutmeg (Torres Strait) Pigeon.—A nest seen 20 feet from ground; climb up and take one egg with 7 ft. rod and scocp; another nest 30 ft. up.

**Macropygia phasianella* (*M. p. robinsoni*). Northern Pheasant-Pigeon.—A nest found 12 feet from the ground in the top of a fan palm; one egg heavily incubated. The nest is a bulky structure of twigs and bunches of Casuarina leaves; it measures 6 inches diameter by 8 inches deep; odd twigs stick out a few inches beyond the bulk; there is a slight depression for the egg. The irides are exceptionally beautiful, there being "an outer circle of deep crimson and an inner circle of blue."

Chalcophaps chrysochlora. Green-winged Pigeon.—Heard calling.

Geopelia humeralis. Bar-shouldered Dove.—Frequently noted. A nest containing two small young was seen in a Pandanus palm. Another nest was on the leaves of a Pandanus 3 feet from the ground; two eggs; still another in a small bush 2 feet from the ground, a coarse structure of twigs lined with fine rootlets; it was 12 inches diameter by 3½ inches deep; egg depression 3 in., ½ inch deep.

Geopelia placida. Peaceful Dove.—Saw a bird building 12 feet from the ground in a swamp paperbark (*Melaleuca*).

**Geopelia scripta* (*G. s. peninsula*). Northern Squatter-Pigeon.—An excellent bird for the pot; often flushed in burnt areas; found a nest containing two fresh eggs in a patch of short, dry grass on bank of creek; also found two young almost fully fledged in a patch of dry grass; they flew off in opposite directions, one landing on burnt country took a long time to find. Took a photo of them in the nest.

2 11, 21.—Numbers of Squatters perched up in ironbarks. Young not long hatched; eyes not open, body covered with dirty white down.

[For description of bird, its nest and eggs (with photo.), see *Emu*, xxi., pp. 163, 167, and pl. 39.]

Rallina tricolor. Red-necked Rail.—Heard calling after dark.

**Amaurornis moluccanus*. Brown Rail.—15/1/22.—Heard calling as they flew over southward at night. The call is a sharp, short, grating "Tchek," uttered at intervals of about a second. By a creek a bird was flushed from its nest in long grass and bushes; four eggs. Stalks and blades of grass were bent over and matted to form base and sides of nest, which was well lined with blades of dry grass. Measurements, 8 in. diameter by 4 in. deep; egg chamber, 4 in. by 2½ in. 8, 1/22.—A native brought in a fine set of five eggs. Later, I found a nest with six eggs, 2 feet from ground. The bird had completely screened the nest by breaking and bending the grass blades above and around. 26/2/22.—Black Moor-hens heard calling near camp; they seem fairly plentiful. Catch a glimpse of one occasionally close by.



Nest and Eggs of Brown Rail (*Amatrornis moluccanus*).

Photo, by W. McLenman, R A O U.

Porphyrio melanotus. Swamp Hen.—Numerous on a great rush-grown swamp; try to explore place; too boggy.

Lobibyx miles. Masked Plover.—Noted several times.

**Charadrius dominicus*. American Golden Plover.—Seen on town flat.

Charadrius ruficapillus. Red-capped Dotterel.—Noted with Greenshanks on a saltpan.

Numenius phaeopus. Whimbrel.—23/10/21.—Noted on town flat.

**Mesocolopax minutus*. Little Whimbrel.—7/10/21.—Shot a bird from a flock of about a dozen on Ccen grass flats. Strange to see these birds inland; no big swamps anywhere near.

Glottis nebularius. Greenshank.—Noted.

Pischia subminuta. Long-toed Stint.—A single specimen seen.

**Gallinago hardwicki* (*G. h. australis*). Australian Snipe.—Flushed in marshy cuntry. Very fat, end of March, and ready for their long flight.

Burhinus magnirostris. Scuthern Ston-Plover.—Was presented with a set of eggs. A bird was seen running, but disappeared from view; it was found stretched cut on the ground among the rocks; it was a young one, nearly full grown.

Eupodetis australis. Australian Bustard (Plain Turkey).—One shot for the pot, or rather, was "cooked in the ashes."

Antigone rubicunda. Brolga (Australian Crane).—One Crane together with a Jabiru, pair of White Ibis, four Pied and one Plumed Egrets and a flock of Masked Plovers noted at a small fresh-water swamp.

Xenorhynchus asiaticus. Jabiru.—2/5/22.—Five seen in company of White-necked and Blue Herons, Egrets, Greenshanks and Red-capped Detterels at a large saltpan. An interesting company.

Threskiornis spinicollis. Straw-necked Ibis.

Egretta garzetta (*E. g. immaculata*) Little Egret.

Egretta intermedia. Plumed Egret.

Notophox novæ-hollandiæ. Blue Heron.

Notophox aurensis.† Pied Egret.

Notophox pacifica. White-necked Heron.—Six foregoing species noted.

Dupctor flavicollis (*D. f. gouldi*). Black Bittern.—Building in a small paperbark (*Melaleuca*) by the bank of the river.

Dendrocygna javanica. Whistling Duck.—Noted; also pair of Green Pigmy-Geese (*Nettaus puchellus*).

Astur novæ-hollandiæ. Grey Goshawk.—Grey phase noted.

Astur fasciatus. Australian Goshawk.—Nest in a tall paperbark, got the rope ladder into position by climbing an adjacent tree to throw the line over a suitable limb. Bird flushed on reaching the nest; three eggs.

**Accipiter cirrhocephalus*. Collared Sparrow-Hawk.—A nest was seen in a tall, thin paperbark about 60 feet up, but impossible to reach it. Another nest in a difficult position I reached with a long rod and scop, the limbs swaying about 8 feet in a strong wind; three eggs. Saw a bird carrying a small goanna in its talons.

Erythrotriorchis radiatus. Red Goshawk.—A fine bird sat in a tree and let me get very close to examine it.

Uroaetus audax. Wedge-tailed Eagle.—Nearing a nest I could see one of the birds sitting on the edge of it, the other bird was just a speck in the blue overhead. Climb up; no eggs; nest lined with fresh branches and leaves of eucalypts, most of which only just picked.

Haliastur leucogaster. White-breasted Sea-Eagle.—Noted.

Haliastur sphenurus. Whistling Eagle.—Several times noted. One bird was being savagely attacked by a Little Falcon.

Milvus migrans (*M. m. affinis*) Allied Kite.—8/11/21.—Single specimen seen flying along river.

Gypocictinia melanosterna. Black-breasted Buzzard.—Noted.

Falco longipennis. Little Falcon.—A pair of birds were seen at a nest in a mountain ash (Eucalypt), when a Brown Hawk flew screeching into the tree and took possession of the nest. The Falcons tried to drive it away, but failed. I think the Hawk was the rightful owner.

Ieracidea berigora. Brown Hawk.—A nest, 50 feet from the ground, in a bloodwood, contained one fully fledged young.

Elanus axillaris. Australian Black-shouldered Kite.—Noted.

***Ninox boobook** (*N. b. macgillirrayi*). Cape Boobook Owl.—Rapping the trees I flush a bird from a hollow 25 feet from the ground; climb and find two eggs. Flushed another bird from its roosting hollow; it was chivvied unmercifully by a crowd of Friar-Birds, Honey-eaters, and Butcher-Birds until the Owl went into another hollow to escape the maddening crowd.

Ninox (? sp.).—Saw a bird flying about after dusk and sometimes heard the call at night.

***Trichoglossus moluccanus** (*T. m. septentrionalis*). Northern Rainbow-Lorikeet.—A pair flushed from a hollow in a cabbage gum, could not get at the nest. Two other nesting hollows were seen; secure two eggs.

Psitteuteles versicolor. Varied Lorikeet.—Numerous with other species of birds in the flowering gums.

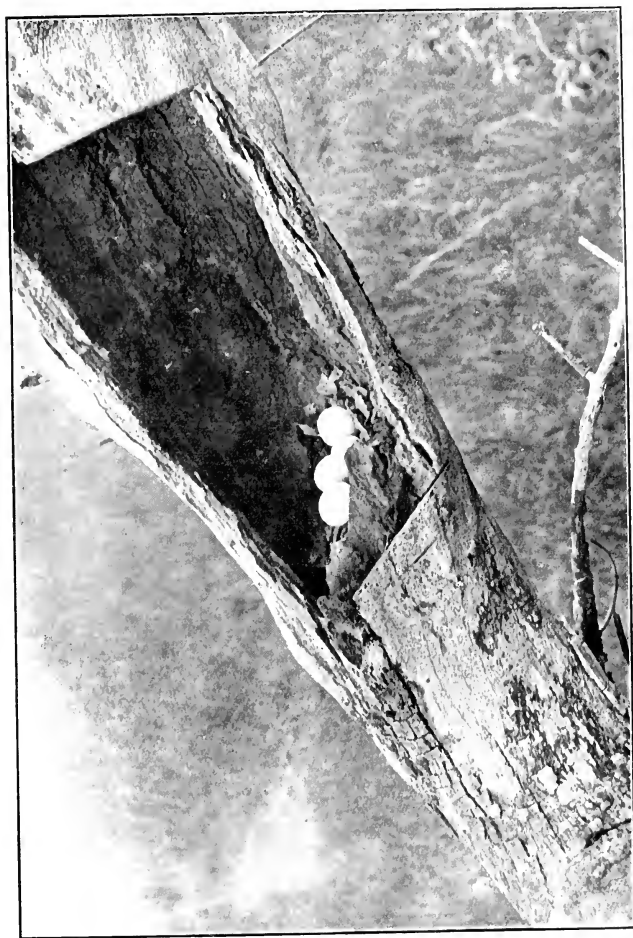
29/1/22.—These birds are now all paired off; see eight pairs inspecting hollow spouts. One lot had enlarged the hollow by biting out the rotten wood.

2/4/22.—Find a nesting hollow 20 feet from the ground. The bird would not come out so I enlarged the hole and put in my hand. The bird bit a piece out of the ball of my thumb. Four eggs lying on a bed of finely chipped rotten wood and dead gum leaves with a few feathers. The dead leaves might have been part of an old nest of a small Phalanger (Marsupial).

16/4/22.—Nest with four eggs in horizontal spout at depth of 12 inches. Three double handfuls of chipped, rotten wood resting on lip of spout, which had been scratched out by the birds. Another nest I could not get at, so made fast a rope; saw off spout, and lower to ground. Entrance, 2½ in.; depth of hole, 2 ft. 9 in. Eggs, four, resting on rotten wood with a few feathers of the bird, a green gum leaf and a couple of cases of bag-moth. At another nest the male was flushed, but the female climbed into a cavity above the entrance hole and would not come out; three eggs.

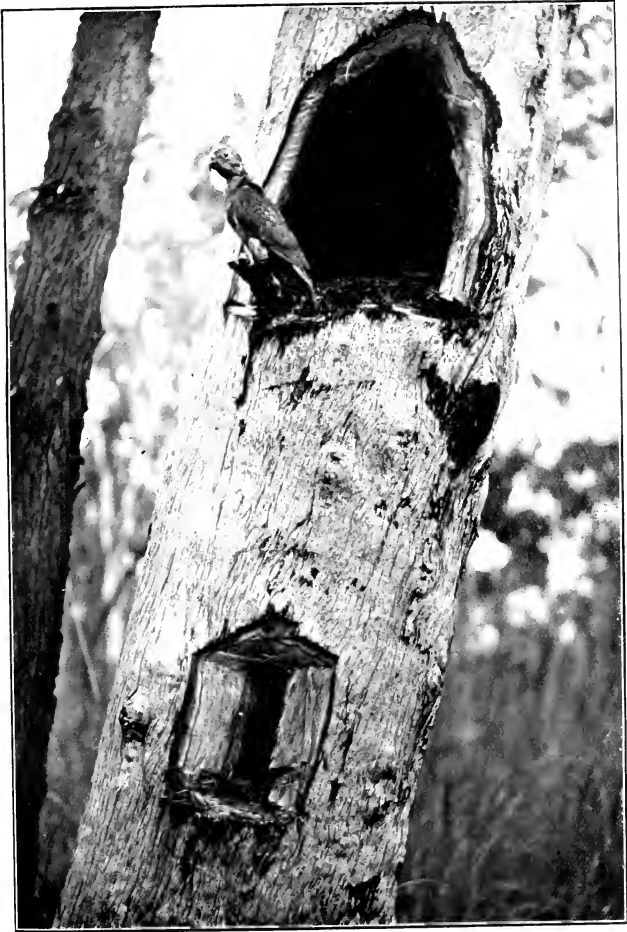
On two occasions eggs were observed in nesting sites previously occupied by the Black Tree-Creeper (*C. melanota*).

In one nesting hollow of a Lorikeet the eggs were resting on a bed of green eucalypt leaves nipped into small pieces, which the birds



Nest and Eggs of Varied Lorikeet (*Psittaculirostris versicolor*).

Photo. by W. McLennan, R.A.O.U.



Nest and Young of Red-winged Parrot (*Aprosmictus erythropterus*).



Nest and Eggs of Northern Pale-headed Rosella (*Platyserretus adscitus amathusica*).

Photo. by W. McLennan, R.A.O.C.

had evidently brought. There was no decayed wood-dust in the bottom of the hollow.

[Dimensions in inches of clutch of four eggs:—(A) .87 x .73, (B) .87 x .72, (C) .88 x .74, (D) .88 x .73.—H.L.W.]

Probosciger aterrimus. Palm Cockatoo.—Noted.

Cacatua galerita (*C. g. queenslandica*). Little White Cockatoo.—Often noted nesting.

Cacatua roseicapilla. Galah.—Often noted. A nesting hollow 40 feet from the ground contained four eggs resting on a bed of green gum leaves. The only place up north where this bird occurs on the eastern watershed.

**Lorius pectoralis*. (*L. p. macgillirrayi*)†. Red-sided Parrot.—Heard calling in the same scrub with Geoffroyus, but they often cease calling as soon as I enter the scrub. Eventually locate a flock of about eight birds. Being the rainy season, most of them are in a very ragged state of plumage; big gaps in the wing feathers and only one or two feathers in the tail. They fly off with discordant alarm calls, "Krrraark-krrraark."

**Geoffroyus geoffroyi*. Red-checked Parrot.—A single specimen first noticed winging its way across a gorge on the Macilwraith Range. In the scrub a bird flew away screeching, but came back. These birds have a habit of daily visiting and feeding in the same tree. Tommy made a squeaker out of a small bamboo, with which he could imitate the call; the birds replied.

Aprosmictus erythropterus. Red-winged Parrot.—Flushed a bird from a hollow 35 feet up. Tree appeared to be hollow to the ground, so cut a hole at 3 feet and find a fully fledged young one.

**Platycercus adscitus* (*P. a. amathusia*). Northern Pale-headed Rosella.—Nesting hollow found 25 feet from ground in mountain ash; five eggs. Another nest also had five eggs, resting on a bed of chipped, rotten wood.

**Psephotus chrysopterygius*. Golden-winged Parrot.—23/4/22.—A bushman first told me of the "Anthill Parrot," and said he knew of a nest. Go out with him eastward into lightly timbered country in places a bit boggy, and come to a flat, thickly dotted with magnetic and tall, thin, spire-shaped termitariums (White-ant mounds). Locate the nest in one of the anthills, and the bird flushes while I am within a few yards. Can feel eggs with a light twig. Take several photos, then secure the eggs, which prove to be heavily incubated. Termitarium 18 in. diameter at base, 6 ft. in height; entrance to nest, 2 ft. 6 in. from ground, and 1¾ in. diameter; tunnel, 3¼ in. long, then enlarged chamber 7 in. by 6 in. deep, bottom being 2½ in. below level of entrance. Hearing strange Parrot calls, a pair of birds presently appeared, the male flying to the top of the anthill and the female to the entrance of the nest. I really expected to see *P. pulcherrimus* the Paradise Parrot, but they proved to be the very rare Golden-winged Parrot.

Several old nests were noted in similar situations; then we found one where the birds were preparing, as the mound of dirt at base of anthill was quite fresh. By fastening a lighted match to the end of a twig the interior was illuminated. No eggs yet.

1/5/22.—Found a nest in which I could hear young squeaking. Another had five eggs, and one young bird just hatched. Take photo

† According to Rothschild, the name of the dominant species should be *Lorius roratus*, Mull., *vide* Ann. & Mag. ix., p. 411.

and patch up the hole again. Four miles further on found that a Black-tailed Finch (*Poephila atropygalis*) had built in a chamber hollowed out by a Golden-winged Parrot; on looking in found the Parrot had laid four eggs in the Finch's nest; found still another Psephotus Parrot's nest, which contained four fresh eggs. Numerous old nesting holes were noticed, all in termitariums.

Later in the month several nests were examined, which contained young in various stages of development. In the floor of the nesting chamber in every instance there was a remarkable colony of scavenger grubs, the larvae of some moth, the species of which has not yet been determined.

[See further this issue, description of eggs, etc., p. 98].

Podargus papuensis. Papuan Frogmouth.—Found a nest in a big paperbark with the bird sitting; on attempting to climb, the bird flushed, knocking its egg off the flimsy nest to be broken on the ground beneath.

**Podargus strigoides* (*P. s. calycensis*). Cape Frogmouth.—After dark this bird is heard uttering a call of two syllables of even tone, "Kee-koek" ("oo" as in fool), the second slightly louder than the first, repeated up to eighteen times in ten seconds. The first few notes of the call are very faint, appearing to come from some considerable distance away, gradually getting louder and clearer; toward the end there is quite a ventriloquial effect. Once the bird uttered a different call, a single "Gug" repeated rapidly for a few seconds. Saw a fresh nest. [For photo. of nest in situ, see *Emu* xxi., pl. 39.]

**Egotheles cristata* (*A. c. leucogaster*). Owllet Nightjar.—Found a set of four white eggs in a hollow. On looking into the hollow from horseback the bird flew out, brushing my face.

**Eurystemus orientalis* (*E. o. pacificus*). Bread-billed Roller.—Flushed from a hollow 20 ft. up in a mountain ash; three fresh eggs.

Aleyone azurea (*A. a. pulchra*). Purple Kingfisher.—Seen along the river.

Syna torotoro (*S. t. flavirostris*). Yellow-billed Kingfisher.—Noted.

**Dacelo leachi*. Blue-winged Kookaburra.—Found a nest in the hollow trunk of a gnarled old bloodwood (Eucalypt) containing a remarkable set of five eggs; subsequently took another set of four from same site. Another nesting hole contained one egg, together with one egg of Northern Rainbow Lorikeet. A few days afterwards there were two eggs of each species. Climbed to a hollow, and found three small young; one trying to swallow a young goanna about 9 in. long; about 6 in. of the reptile hanging out of the youngster's mouth. Sent Jack back for special lens. By the time he returns 1½ in. more of the goanna has disappeared. The young are quite naked and eyes not yet open.

**Dacelo gigas* (*D. g. minor*). Little Kookaburra.—Saw two nests, both in termites' nests 20 feet up in trees; one contained four eggs.

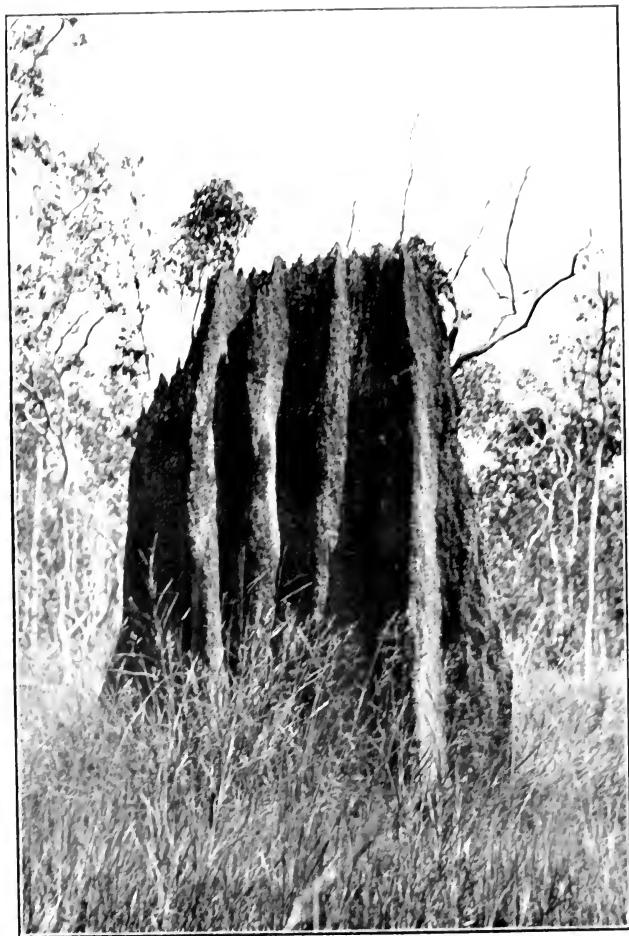
**Halcyon macleayi* (*H. m. barnardi*). Northern Forest Kingfisher.—Found a bird drilling a hole in a termites' nest 20 feet from the ground. Later on I took five eggs, which were very dirty, the result of the termites trying to build over them.

**Halcyon pyrrhopygius*. Red-backed Kingfisher.—Secured one specimen.

Halcyon sanctus. Sacred Kingfisher.—Noted several times.

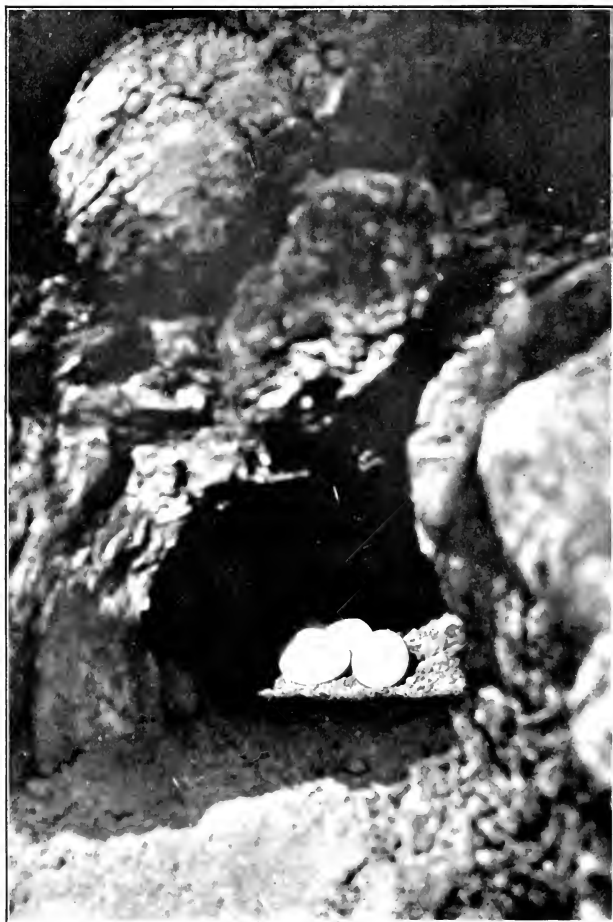
Tanysiptera sylvia. White-tailed Kingfisher.—Noted in the scrubs.

Merops ornatus. Rainbow-Bird.—Saw Tommy digging out a hole, and asked if he had got a goanna. "No more goanna," said he.



Nesting site of Golden-Shouldered Parrot (*Psephotus chrysopterygus*) in Meridian Anthill.

Photo. by W. McLennan, R.A.O.U.



Nest and Eggs of Blue-winged Kookaburra (*Dacelo leachi*).

Photo. by W. McLennan, R.A.O.U.

"Nest belongs pretty feller bird." The nest had five white eggs, 22/2/22.—Flock of Bee-eaters seen flying northwards.

Cellocalia franca. Grey Swiftlet.—Noted hawking overhead.

Micropus pacificus. White-rumped Swift.—Noted in company with previous species.

Cuculus pallidus, Pallid Cuckoo; *Cacomantis flabelliformis* (*C. f. athertoni*), Northern Fan-tailed Cuckoo; *Cacomantis castaneiventris*, Chestnut-breasted Cuckoo.—Noted.

Cacomantis pyrrhophanus. Square-tailed Cuckoo.—Egg taken in nest of the Brown-backed Honey-eater (*Glyciphila modesta*).

Lamprolaima (sp.). Bronze Cuckoo.—Noted.

Eudynamis orientalis (*E. o. cyanocephalus*). Koel.—Often seen and heard. A crowd of large Honey-eaters frequently give a female Koel a bad time, fly at it, bear it to the ground, pecking and buffeting it severely. Once a pair of Grallinas (Magpie-Larks) joined in a chase, and, landing on the ground, pecked and buffeted the Koel severely. The Koel makes feeble resistance, and tries to escape to the bushes.

Seeing a crowd of Friar-Birds darting at something on the ground, I rode up and found a female Koel, which made off, followed by its tormentors, their numbers being augmented on the way. I could hear the scolding cries for some time after they were lost to view. I have never seen a male Koel being chased by other birds nor heard an alarm sounded when one breaks cover.

Found a nest of *Philemon citreogularis sordidus* (Little Friar-Bird) containing an egg of the Koel, and on the ground beneath was a broken egg of the Friar-Bird.

Scythrops novæ-hollandiæ. Channel-bill Cuckoo.—Often heard calling after daybreak, but no eggs found, though I frequently examined the nest of Bell Magpies (*Strepera*) in the hope of obtaining a Channel-bill's egg.

Centropus phasianinus. Pheasant-Coucal.—Tommy found a nest with eggs heavily incubated.

Pitta versicolor (*P. v. simillima*). Lesser Pitta.—Heard calling in the scrubs.

Pitta mackloti. Rainbow Pitta.—Its mournful call could be heard in the scrubs. A nest containing three eggs was found in some low scrub grass.

Microeca fascinans (*M. f. pallida*). Pale Flycatcher.—Noted.

**Microeca flavigaster*. Lemon-breasted Flycatcher.—Found a nest which made a good subject for a photo. Another nest contained one small young, which one of the parents was covering, to protect it from the sun.

**Smicrorhis flavescens*. Yellow Tree-Tit.—Found a nest 15 feet from the ground in drooping branches; the bird sat till I put my hand on it; two eggs.

**Gerygone albogularis*. White-throated Warbler.—Common and nesting. The male does not appear to take any part in building, though he generally inspects the work of the female, and constantly trills his sweet little song in and about the nesting tree.

**Gerygone magnirostris*. Large-billed Warbler.—Found nesting. One pair was building in a paperbark 4 feet over water.

Gerygone palpebrosa (*G. p. personata*). Masked Warbler.—Nesting.

Poecilodryas superciliosa. White-browed Shrike-Robin.—Seen several times, notably on the creeks.

Pachycephala rufiventris (*P. r. pallida*).—Pale-breasted Whistler.—Noted several times.

**Rhipidura leucophrys*. Black-and-White Fantail.—A homely bird; nesting.

Rhipidura flabellifera (*R. f. phasiana*), Pheasant Fantail; *Rhipidura rufifrons* (*R. r. kempia*), Cape Rufous Fantail; *Rhipidura setosa*, Northern Fantail.—All noted.

**Myiagra rubecula* (*M. r. concinna*). Blue Flycatcher.—A nest was seen on a dry limb 20 feet from the ground.

Myiagra ruficollis (*M. r. latirostris*), Broad-billed Flycatcher; *Piezorhynchus alecto* (*P. a. nitidus*), Shining Flycatcher.—Both noted.

Monarcha trivirgata (*M. t. albiventris*), White-bellied Flycatcher.—Heard calling and often seen in the scrubs.

**Graucalus novæ-hollandiæ*. Cuckoo-Shrike.—Several nests seen, and two eggs taken.

**Graucalus hypoleucus*. White-breasted Cuckoo-Shrike.—Nest seen on a horizontal fork 25 feet from the ground; two eggs. The bird kept flying at me snapping its bill while I was at the nest.

Edoliisma tenuirostris. Great Caterpillar-eater.—Both male and female seen; a shy species. 21/11/21.—A bird flushed uttering a short, sharp whistle; "tcheep," at about two-second intervals. Have not heard that call before.

Campephaga tricolor. Caterpillar-eater.—A nest found in a cabbage gum.

Drymodes superciliaris. Northern Scrub-Robin.—Noted. Fond of land-shells. Broken *Helix* shells seen scattered through the scrubs.

Pomatostomus temporalis. Grey-crowned Babbler.—Noticed a bird gather a large billful of messmate bark strips. Found a nest in the dead branches of a fallen tree; observed three eggs in another nest.

Cisticola exilis. Fantail-Warbler.—Seen.

**Sericornis magnirostris* (*S. m. viridior*). Large-billed Scrub-Wren.—Noted. Appear like a new variety.

Malurus amabilis. Lovely Wren.—Noted.

**Malurus melanocephalus* (*M. m. dorsalis*). Red-backed Wren.—Nests seen with three and four eggs respectively. A nest was found attached to a small shrub among swamp grass, composed of fine strips of various soft barks and fine grass, lightly bound with cobweb and lined with fine grass. Measurements, 5 in. by 2½ in. over-all; entrance, 1½ in.

**Artamus hypoleucus*. Grey-breasted Wood-Swallow.—Several pairs were seen nesting. One nest containing four eggs was placed in an old nest of the Babbler.

Artamus minor. Little Wood-Swallow.—Once noted.

Colluricincla megarrhyncha (*C. m. gouldi*). Allied Rufous Shrike-Thrush.—Noted in the scrubs.

**Colluricincla brunnea*. Brown Shrike-Thrush.—One nest found in a *Pandanus*; another in the hollow top of a dead stump; eggs three.

Grallina cyanoleuca. Magpie-Lark.—Frequents forest country.

**Neositta striata*. Striated Tree-runner.—Several times seen in small parties in the forest.

**Climacteris melanota*. Black Tree-Creeper.—This was one of the particular searches of the trip, and much time was spent in observation of nesting habits. Eggs were observed during September, October and November. First nest found by watching the bird, which in a few minutes flew to a hollow 24 feet from the ground. Result: Two lovely eggs, which I could just reach; nest composed of short

grass, cattle hair and pieces of bark; a few pieces of charcoal were with the eggs.

While watching another bird saw a shadow on the ground as its mate flew toward it from a hollow at my back. One bird came back carrying a piece of charcoal and entered the hollow; nest there right enough; two eggs.

Take up a position and watch another pair of birds. For half an hour they fly from tree to tree and on to the ground in an aimless manner. It is an eye-strain watching these protectively coloured birds; any movement of falling leaf or shadow of passing bird attracts attention, and as you flash a glance at it that is the moment for your quarry to disappear to another tree, silently and quickly, as if watching its opportunity. Eventually both birds flew to a hollow 15 feet up, and visited this hollow four times, once with something in their bills. I climb to this hollow, but can see no nest, but am not satisfied. After a while I see one of the birds carrying a large piece of grass. It flew to a tree, and clung motionless, merging into the dark spots and shadows on the bark. Slowly it hopped up to the topmost branches, and then, fluttering like a wind-blown leaf, it planed to the base of another tree, and repeated the performance. It sat still for what seemed an interminable period, and then flew straight to a hollow in a dry tree, where it was joined by its mate. The bird came out minus the bill-load and flew out of sight. Examine the hollow and find nest with one egg.

Cut out a hollow to note construction of the nest. Hollow filled for 7 inches with coarse tufts of grass, on top of this a layer of horse dung (some of the balls of which were unbroken), and dingo dung for 5 inches. On top of this the nest proper consisting of short fine grass, fine shredded bark, cattle hair, wallaby fur and snake scales, with quite a lot of small pieces of charcoal.

While observing another nest the bird came back carrying a piece of charcoal in its bill. Still another nest had a large handful of charcoal under it besides the usual base of coarse grass and dung. Termites sometimes start to eat the grass and dung. The greatest quantity of material noted in a hollow consisted of 10 inches of coarse grass and strips of paperbark up to 8 inches long, then 5 inches of dung packed on top. Snake scales are found in some nests, sometimes not. [For description of eggs, with photo. of nesting site see *Emu*, xxi., pp. 166, 310, and pl. 64.]

**Zosterops lateralis* (*Z. l. ramsayi*). Yellow-vented White-eye.—A small party seen.

Pardalotus rubricatus (*P. r. yorki*). Cape Red-browed Pardalote.—A nest found in bank of river at end of 9-inch tunnel; three eggs. These birds appear to me to differ from the same species in Western New South Wales; yet their calls, four or five short, clear, whistling notes, are exactly alike.

**Pardalotus melanocephalus* (*P. m. barroni*). Northern Black-headed Pardalote.—I found a bird drilling its nesting burrow in the bank of a small creek.

**Myzomela pectoralis*. Banded Honey-eater.—This charming little Honey-eater was numerous, and several of their small nests were found hanging in paperbarks suspended by rim; eggs, usually two. The male will not allow any other birds near the tree where the mate is sitting, even attacking and driving off large Friar-Birds. One nest was two feet from the ground in a small sucker. Once a sitting bird allowed itself to be stroked by one's finger.

After rigging shearlegs to another nest 17 feet high, I sat on top with the camera and waited patiently. After a while the bird returned and snuggled down on the eggs. I had to touch her with my finger to make her move off so that I could get a picture of her returning. Nest, a frail cup-shaped structure composed of fine strips of bark and grass lightly bound with web and cocoon-silk, and lined with very fine seed-tops of dry grass; measurements, 2 in. by 2 in.; inside, 1½ in. by 1¾ in. deep.

Myzomela obscura. Dusky Honey-eater.—Noted.

Conopophila albogularis. Rufous-breasted Honey-eater.—Numerous.

Meliphaga analoga. Yellow-spotted Honey-eater.—Heard calling in the scrubs.

**Meliphaga versicolor*. Mangrove Honey-eater.—Noted.

Glychichaera claudi. Green Honey-eater.—This little and rare bird was noted.

Meliphaga gracilis. Lesser Yellow-spotted Honey-eater.—Noted.

**Meliphaga flava*. Yellow Honey-eater.—I saw a bird building in a mango tree and another in a paperbark.

Xanthotis flaviventris (*M. f. filigera*) Streak-naped Honey-eater.—Noted in the scrubs.

**Trichodere cockerelli*. White-streaked Honey-eater.—Tommy found a nest containing two eggs situated 2 ft. 6 in. from the ground in a seedling paperbark. Nest, a frail, deep, cup-shaped structure suspended by the rim; composed of very fine rootlets lightly bound with web; lined with very fine grass. Measurements: outside, 2¾ in. by 3 in. deep; inside, 1½ in. by 2 in. deep.

Glyciphila fasciata. White-breasted Honey-eater.—Noted.

**Glyciphila modesta*. Brown-backed Honey-eater.—A nest was found suspended from small twigs, and composed of small pieces and strips of paperbark bound with web and cocoons, lined with soft pieces of paperbark. Measurements: overall, 7 in. by 3 in. diameter; entrance almost concealed by overhanging hood, 1¼ in. diameter; inside, 1¾ in. by 2 in. deep; eggs, two.

Stigmatops indistincta (*S. i. ocularis*). Least Honey-eater.—Noted.

**Entomyzon cyanotis* (*E. c. harterti*). Northern Blue-faced Honey-eater.—Plentiful. Nests frequently noted in varying situations, in Pandanus palms, paperbarks; sometimes in old Babbler's nests, and once in a strange situation, viz., on wallplate under the eaves of the court house. Flushing a bird from a Babbler's nest, I found two eggs of the Honey-eater and one of the Babbler, the former having taken possession without building a nest of its own inside, which it usually does. In another such domicile I noted seven eggs. The Honey-eater used strips of paperbark for lining, which were mixed in with the messmate bark used by the Babbler.

Passing a Pandanus, where I had noted a Blue-faced Honey-eater's nest with three young just hatched, two eggs chipping and one addled egg, the bird flushed from the same nest, which contained three fresh eggs.

25/10/21.—*E. cyanotis* flushed from Babbler's nest 30 feet from ground in ironbark. Nest contained four eggs of two distinct types.

8/5/22.—Nest of *E. cyanotis*, 25 feet from ground, in nest of Magpie-Lark; four young just hatched.

**Philemon argenticeps*. Silvery-crowned Friar-Bird.—Many nests noted; 2 to 3 eggs in each. One set was broken; eggs very pale salmon pink, with a few faint bluish spots about the larger end.



Taking Nest of Northern Blue-Faced Honey-Eater (*Entomyzon cyanotis harterti*).
Many species of eggs were secured by this method of rod and spoon.

Photo. by W. McLennan, R.A.O.U.



Playground of Queensland Bower-Bird (*Chlamydera nitchidis orientalis*).

Photo. by W. McLennan, R.A.O.U.

Philemon yorki. Helmeted Friar-Bird.—Noted.

***Philemon citreogularis** (*P. c. sordidus*). Sordid Friar-Bird.—Several nests found. A typical nest, composed of fine creeping plants and grass, bound with web and cocoon-silk, and lined with fine grass. Over all 5 in. by 3¾ in. in depth; egg chamber 3 in. across by 3½ in. depth; eggs, two; sometimes seen from below through the nest. A nest in a bloodwood about 10 ft. from the ground contained an egg of the Koel Cuckoo. On the ground underneath was a broken egg of a Friar-Bird (7/1/22).

Steganopleura bichenovii. Banded Finch.—Found a nest 4 feet from the ground in a small bush.

Dnaccla pectoralis. White-breasted Finch.—A small flock noted in long grass.

Aegintha temporalis (*A. t. minor*). Lesser Red-browed Finch.—Noted.

***Pcephila atropygialis.** Black-tailed Finch.—Three nests found in Pandanus palms. Tommy found one and gave me a hail, saying, "Got four hegg, deer round norther side." I pulled it from its resting place, and found it contained nine. Tommy remarked, "What's the matter that feller; he only small feller." After that he always called the Finch the "nine-hegg bird."

Pcephila personata. Masked Finch.—Several nests found in large stools of grass, three with six eggs in each. Nest outwardly composed of coarse wiry grass and lined with hair-like seed tops of swamp grass and a few feathers; a few pieces of charcoal were in with the eggs. Measurements: outside, 5 in. by 5 in., with spout 3 in. long; entrance, 1½ in. diameter; egg chamber, 3 in. across. Both birds waited near by while I examined the nest, each with a piece of charcoal in the bill; saw one nest built upon an old Bower-Bird's nest. One of these Finches collected feathers about the camp to line its nest.

Nest, a bulky mass of fine grass twigs and leaves of small plants, lined with hair-like seed, tops of grass; measurements, 8½ in. by 7 in. outside; entrance, 2½ in. by 1½ in.; egg chamber, 3½ in. by 2 in. deep. Later, when we got out into the anthill flats in search of Anthill Parrots, we often found this species of Finch with its nest built right out of sight in the old nesting chamber hollowed out by a Parrot. The termites did not appear to repair the damage done to the termitarium. On one occasion in a magnetic termitarium a Finch had taken possession of the Parrot's nest, and commenced to build. On removing the Finch's nest four Parrot's eggs were revealed. The Black-tailed Finch also builds its nest in a hollow spout of a tree.

Pcephila gouldiae. Gouldian Finch.—Several birds noted.

***Oriolus sagittatus** (*O. s. affinis*) Northern Oriole.—Found a nest in a nondah plum tree.

Oriolus flavocinctus. Yellow Oriole.—Noted.

Sphecotheres flaviventris. Yellow Fig-Bird.—Some seen near Coen. On another occasion saw a nest 40 feet from the ground.

Chibia bracteata. Spangled Drongo.—Found a nest containing two eggs situated 40 feet from the ground.

Ailuroedus melanotus (*A. m. maculosus*). Spotted Cat-Bird.—Noted in the scrubs.

***Chlamydera nuchalis** (*C. n. orientalis*) Queensland Bower-Bird.—Numerous. These birds feed largely on the seeds of the river wattle; bowers were noted; found a nest on a long horizontal limb of iron-wood; could see the single egg through the structure. Secured the egg with a rod and scoop. Another nest contained one young one.

not long hatched, eyes open, head and body covered with long mouse-grey down. Saw another nest placed in a clump of mistletoe, and two in Pandanus palms—situations I would not have thought of looking in. These all had single eggs. I found a bird trying to build in the slippery three-pronged fork of Pandanus; a few twigs were in position, but enough material to make two nests had fallen to the ground. In another instance, a nest was prettily situated in a Coral tree. During November several two-egg sets were observed, notably in box sapling, Pandanus, ironbark, paperbark, and quinine trees. In the Pandanus tree there were no less than three old nests apparently of the same bird and two old nests in another tree 50 yards away.

Ptiloris magnifica. Magnificent Rifle-Bird; *Phonygammus kerandrenii*, Manucode.—Both noted in the scrubs.

**Corvus ceciliae*. Australian Crow.—Saw a nest in a tall mountain ash; birds frequently investigated the camp for what they could thieve. Blackboy, when watering the horses, saw a Crow chasing a small animal about a tree, and rescued it; proved to be a young ring-tailed opossum. These birds go out to feed in the mangroves.

**Strepera graculina*. Pied Bell-Magpie.—Numerous. Noticed a bird chase a Friar-Bird away from a big wattle (*Acacia*), which contained a large nest. Though it stayed in the vicinity, it did not visit the nest. This is the first easy nest of this bird I have seen; most of them are at the top of tall paperbarks 60 feet or more from the ground. They usually provide a good exercise climb. I observed sets of two, three and four eggs.

[Description of nest taken at Coen.—Large open structure, composed of dead sticks and twigs of the Tea-tree (*Melaleuca*), lined with long thin plant stems and rootlets. Dimensions in inches:—Across overall, 14; depth overall, 5; egg cavity across, 6½; egg cavity deep, 2.—H.L.W.]

Cracticus quoyi. Black Butcher-Bird.—Noted in the scrubs.

**Cracticus nigrogularis* (*C. n. picatus*). Pied Butcher-Bird.—Several nests found with three and four eggs. At one the birds savagely attacked me, repeatedly striking me on the head. [For photo. of nest and bird, see Emu, xxi., pl. 40.]

**Cracticus mentalis*. Black-backed Butcher-Bird. — Numerous. Watched a bird breaking twigs off a paperbark for building; it tried about fifteen before it got one to its liking, which it carried to the nest. A pair near the camp made very slow progress with their nest. I picked up 34 twigs, which had dropped in course of construction to the ground beneath. Found a nest in a cabbage gum containing four eggs. One of the birds attacked me. Another nest provided a good subject for the camera. The bird did not leave till I got within a couple of feet, but soon returned and settled on the eggs. Snap it. It then sat facing me on a twig a few inches over the nest. Secure another snap and the eggs, three. These birds feed largely on river wattle seeds as well as small birds. Saw a bird with a female *Malurus* in its bill.

**Gymnorhina tibicen* (*G. t. terra-regina*) Little Black-backed Magpie.—These birds are every bit as wild as those on Groote Eylandt. Have spent two hours following a party to try and get a specimen, but could not get within a hundred yards of them. Saw two nests about 40 feet from the ground, in one of which I observed three eggs.

[Description of nest taken at Coen.—The usual large open structure, composed of sticks, and neatly lined with grass, roots, and a few thin vines. This northern species does not use fur or hair in the lining of the nest. Dimensions in inches:—Across overall, 14; depth overall, 5½; egg cavity across, 5¼; egg cavity deep, 3½.—H.L.W.]



Nest and young (two) of Queensland Bower-Bird (*Chlamydera nuchalis orientalis*).

Photo. by W. McLennan, R.A.O.U.



Black-backed Butcher-Bird (*Cracticus mentalis*) at Nest.

Photo. by W. McLennan, R.A.O.U.

A Trip to the Northern River-Scrubs of N.S.W.

By E. A. D'OMBRAIN, M.B., Member of Council, R.A.O.U.

When camped out in 1919 with the R.A.O.U. members at the Bunya Mts., Queensland, it was decided by a few of us that, all being well, we should pay a visit to the big scrubs of the Dorrigo district in the following spring. The party was to consist of Messrs. F. Morse, R. Hays, A. S. Le Souef, N. Cayley and the writer. Unfortunately, Messrs. Le Souef and Cayley were unable to attend, but others were induced to make the trip in their place. These were Messrs. A. Mawhinney, J. Bradley and W. Purkiss.

The plan was that the writer was to go to "Coocalla," Garah, the home of Mr. F. Morse, at the end of September, and after a fortnight's enjoyment of the hospitality of his host and hostess and the great pleasure and excitement of investigating the bird-life of the plains and swamps, including a camp-out by four of us at the Gwydir River, "Watercourse" (a list of the birds found here was recorded in *The Emu*, vol. xxi., part 1), a start was to be made east towards the coast and the Dorrigo Scrubs.

At the end of the second week in October, Messrs. Morse, Hays and myself, in the former's car, said good-bye to Coocalla, and, laden with camp gear of nearly every description, made a start for "The Prairie," the home of Mr. Mawhinney, where we were to pick him up, and also our cook, Jim, the latter a very necessary addition, as all who have put in a hard day in the big scrubs will admit. To arrive "home" tired out and have to set to and prepare and eat (the least troublesome), and wash up a meal means a tedious ending.

Before leaving Coocalla there was much map-reading o' nights, and as there had just been recorded 5 inches of rain at Dorrigo great disappointment was in our hearts. Anyone who knows the Dorrigo roads, with their steep descents and equally stiff climbs, and the "hairpin" turns and bends, will realise that the risk to life is very great if rain in any quantity has fallen. Five inches! We were indeed depressed. In addition, rain on the black soil plains of North Western N.S.W. means an absolute certainty of being bogged up to the axles, and staying where it happened, until the sun hardened things up, for no horses could pull us out if any were to be obtained readily. However, the rain did not reach very far west of the great tableland which divides the waters of the coastal rivers from those of the Western plains, and so we were enabled, going *via* Garah, to reach "The Prairie" without mishap.

A hearty welcome from Mr. and Mrs. Mawhinney awaited us, and over tea such wonderful stories were related of the bird-life of "The Prairie" and some neighbouring belts of belah and other

timber, that we decided to put in a day there and see for ourselves the mysterious "Cracking Thrush," as it was locally called. Here the Painted Honeyeater was to be obtained; here too, was a Whistler that needed inspecting, as he was very far north; here the Crimson-Wing Parrot was nesting, and Bell-Birds tolled their limpид notes.

Accordingly, a very enjoyable time was spent at "The Prairie," but as the object of this article is an account of the scrub birds, it must suffice to say that the Cracking Thrush is still *sub judice*, and that it seems to be a connecting link between *Colluricincla harmonica* and *C. brunnea*. It must be noted that we were close to the Queensland border.

More is intended to be recorded about this bird at another time, and one must leave the birds of this region to Mr. Mawhinney to record for readers of *The Emu* later. The various belts of timber and stunted scrubs were, however, very distinctive, each carrying its peculiar bird-life.

Mr. Mawhinney's car was called into requisition, and laden with tents, tucker, the cook's gear, and the cook, who was rescued from the arms of Bacchus and kept at "The Prairie" during "convalescence"! Away the two cars started on their long trail over the tableland, and steep descent to the lower levels on the other side. An interesting journey followed from "The Prairie," by way of roads and tracks across huge paddocks, and then on *via* Delungra (which we only just managed to reach ere the rain had made the roads too boggy), to Inverell, where we stayed for the night.

Much amusement was caused to the party at the former place, where we pulled up for benzine for the engines, when the writer was mistaken for a shearer just "cut out" from his last shed. On to Armidale next day, where we added Messrs. Purkiss and Bradley, in another car, to our party. Here the writer was mistaken by Mr. Bradley for a clergyman. After the shearer episode, the writer did not know whether to feel flattered or otherwise.

An early start was made from Armidale, and in view of the very disconcerting weather reports, after much consultation it was decided, on the advice of Mr. Purkiss, who was born in the Dorrigo district, to make for the Five Day Creek, Comara. Breakfast was eaten about twenty-five miles out from Armidale, at the Four Mile Creek, a most picturesque spot.

A ramble enabled us to list 31 species of birds here, many of them with nests or with young flying. A few feet from our fire was a nest of the Wattle-Bird about three feet from the ground. It contained two eggs, and the bird had used pieces of rag and twine for nesting material. The birds seen were the commoner varieties found in Victoria and New South Wales, and need not be enumerated.

From here we journeyed on, up hill and down, till we reached the banks of the Macleay River, and followed its winding course

amongst the hills, along roads very well made and maintained, but with thrilling, narrow, hairpin bends cut out of the mountain side, with the beautiful gleaming and swiftly flowing Macleay down at the foot. With a constant dropping to the lower levels, we came at last to the river, passing on our right a reservation for aborigines on a flat bordering the river. On past Blackbird school, an ideal place for Satin Bower-Birds, which fact leads one to assume that the name doubtless was taken because these birds were evidently pientiful in the locality, "black" in this case meaning dark blue.

Towards the end of the afternoon we reached Comara Store and P.O., and soon our guide, Mr. Purkiss, had decided where we should camp on the Five Day Creek, a swiftly flowing, large-sized creek, a tributary of the Macleay. On our left rose steep hills, in the general tree-top colour of which could be seen darker and denser areas denoting big scrubs—*i.e.*, those in which figs and vines and all the sub-tropical growths occur, places beloved of Pigeons of several species, Pittas, Log-runners, and perhaps even the shy Scrub-Birds (*Atrichornis*), and who knew what bird treasures!

Soon ridge, and other tent poles were cut, and the tents erected on a shady, grassy flat, close to a small feeder of the Five Day Creek, from the opposite side of which towered a steep, scrub-covered mountain, which we hoped to investigate in due course. For the moment we could hear the calls of many birds, one of the first we noted being that of the little Crimson ("Blood") Honeyeater. As we ate our evening meal, the queer, monotonous notes of the Wonga-Wonga and the Brown Pigeon could be heard, and an inquisitive Coachwhip-Bird was making himself heard in a tangle of wild raspberries and scrub close by.

Up early next day, the party split up and tackled the surrounding hills from various gully ends, and soon all found that we had happened on one of the most tiring and dangerous rocky ascents in tangled scrub—a queer combination—we could possibly have selected. It was as though there had been a giant mine-shaft at the summit and all the huge slaty rubbish had been dumped down the hillsides into the gullies at the bottom. Of birds there was such a scarcity that it almost suggested bird extinction, except that hundreds of feet up in the leaves of the fig trees a pigeon or some other fruit-eater would at intervals drop a purple fruit as it fed.

Those ahead of one would slip on the shifting stones, which would come crashing down, a danger to those on the lower levels, and one was constantly slipping and falling and hurting one's ankles, etc. Also the heat was stifling, and there was not a breeze to cool one or drive away the sand-flies and mosquitoes. Tired, cross, and disappointed, all by degrees returned to camp, thoroughly disgusted with our non-success, and somewhat doubtful of our guide's knowledge of this bit of scrub at least. However, we were determined to give the place a good "try-out,"

and hoped for better luck around the river flats, where the paper-bark (*Melaleuca*) was in bloom. Here we found the Blood Honeyeater, together with the White-eared Honeyeater, the Yellow-faced Honeyeater, and the Yellow-eared Honeyeater. One Flinders Cuckoo was seen, and what at first caused a lot of speculation as to species, the Black Bittern.

Plenty of White-eyes (*Zosterops*), an occasional pair of Crested Shrike-tits, Blue Mountain Lorikeets, Australian Orioles. The quaint "four-line" call of the shy Black-faced Fly-catcher, produced almost like four short questions, was heard, and the birds seen. Rosellas, King Parrots, and Crimson Parrots were about, looking for a handy place to drink, thus confuting the theory popular amongst some, that Parrots do not require water. In some scrub at the camp the fluty notes of the Collared Butcher-Bird rang out, whilst Ravens were heard and seen overhead. Tree-Creepers, both the Brown and White-throated, were seen. Only one species of the Hawk was noted, the Brown Hawk. Satin Bower-Birds were fairly numerous, and although keen search was made, and many a sapling climbed, no recent nests were found. Indeed from an oologist's point of view the whole place was disappointing, and considering the long way we had come from North Western N.S.W. almost to the coast, we felt it more than we otherwise should.

When evening fell we went off to the river, after tea, to try for perch and eels to be had there, but not being properly equipped the result was not any better than our luck with the birds. There were plenty of fish to be had, and next day on again trying with natural flies we caught some beautiful silvery herrings, which on cooking revealed more bones than we thought a fish capable of possessing.

We decided to pull out of Comara, and going back on our tracks again, turning at an angle, on the Armidale-Grafton road, we made for what is known as Billy's Creek, a part of the big scrub once visited by Mr. Syd Jackson many years ago. It was a long trek, and the latter end of the journey was finished in the dark. The last hundred yards nearly provided an accident. Our cars had to ford a creek and run up a stump-studded bank opposite. One of the cars, in trying not to collide with the one in front, began to run backwards down to the creek, and only a bit of luck and much hanging on by four of us prevented a disaster. However, no damage was done, and soon the cars were parked. "Jim" had a cheerful blaze a-going, tents were soon erected, and after a good hot meal, a tired party of "bird maniacs," as we were called, soon turned in to sleep soundly.

Next morning saw us early astir, and we set off after breakfast to explore the big scrub beside which our camp was pitched, in a clearing at the foot of which ran a splendid stream of mountain water. This water is said to be the purest water possible. Giant trees of many kinds with a majority of coachwood— not very good fuel wood our cook complained—and a fairly dense

undergrowth was encountered, and in one of the gullies, all of which ran to the main creek (Billy's Creek), we found Lyre-Birds' nests, and lying at the foot of one a fine male bird, dead, and close by a young one. The cause of their deaths seemed mysterious, and we wondered if poison laid for rabbits by the settlers had been the cause.

Our ears were ever on the *qui vive* for the Scrub Bird (*Atrichornis*), and although in all our quests we were not fortunate enough to find a specimen, yet later on, thinking over things and comparing notes, we came to the conclusion, in view of what we learned, that we had heard the call, but failed to associate it with the bird. It must be remembered that it was in this locality, years before, Mr. Syd. Jackson had located the birds.

Soon we had found a Log-runner's nest, empty, and everywhere the quaint call of the Small Southern Warbler (*Gerygone fusca*) was heard, and numerous examples of the pretty hanging nests were found. High up among the top branches of giant trees we found the Crested Hawk, a good specimen of which was secured before it was identified. The days spent there were full of interest, but always the chief object of our outings—the *Atrichornis*—was not recorded.

However, we were introduced for the first time to the Large-headed Shrike-Robin, and much excitement was evinced about it until we had finally "placed" the species, the writer spending many hours in closely observing the habits of this dweller of the quietest glades, and in securing photos of the bird on the nest, but about this it is intended to write later in detail.

Night brought its Boobooks and another Owl with a weird call, which species it was we were unable to determine. Cat-Birds "meowed" and Bell-Magpies (*Strepera*) called unceasingly from the tree-tops; Lyre-Birds gave us imitations, and Dollar-Birds chattered in the dead timber around our camp in the twilight; altogether over 70 species of birds were listed.

Our last day at this camp was occupied by an excursion in the cars to a splendid creek known as Cloud's Creek, where we were to "park" the cars near the site of an old saw mill, and from which we were to follow a certain track into the hills into another "big scrub."

The drive down to this creek was very fine, as very frequently the road was simply an avenue with huge vine-covered trees hundreds of feet high on either side. However, after leaving the cars in a beautiful, clear space covered with very green grass, we somehow missed the right track, and after a long and hot walk had to return to camp. The clear space referred to was an ideal place for a camp, and we found that at different places in the big scrub these spaces existed and caused a lot of surprise to the party owing to the fact that they had not been cleared by artificial means, but were natural open spaces.

There were the usual species of birds to be seen and heard, and we were much interested in Tree-runners (sp.?) in the top-

most branches of the tall trees. The call note was unfamiliar, and we consequently tried to secure a specimen, but the best shots of the party failed to secure one owing to the great height. Here we saw the Red-tailed Black Cockatoo, mostly in threes, two adults and a young one. We thought this would be a good spot for the 1921 R.A.O.U. camp, but we decided it would be difficult of access.

We returned to Billy's Creek, and next day left there, returning on our tracks along the head waters of the Nymboidea River (where we sighted a Koel and a Black-breasted Buzzard) for Dorrigo, a very long journey, necessitating some terrific hill-climbing, from the tops of which we had magnificent views of miles of forest stretching away to the Pacific Ocean. Passing through North Dorrigo, we came to Dorrigo township, and were now in the middle of the "cow country," thousands of acres of which a few years back were covered with dense vine scrub.

Having laid in a fresh stock of provisions, we went on a few miles and made camp on some private property close to the long descent of winding road which leads down to the coast on the Bellingen River, which could be seen in the cleared river flats miles away, winding among the farms to the Bellingen Heads. Soon we saw and heard the beautiful Rifle-Birds of Paradise. Again we heard the call of the Wonga-Wonga, and the red Pigeon, and here too the familiar Cat-Bird call and the Satin Bower-Birds. Flock Pigeons were sighted, but in small numbers only. Swainson's Purple-crowned Pigeons were numerous, as also were the Green-winged Pigeons.

Almost immediately we were at work reconnoitring our new surroundings with the eagerness of schoolboys, and some of us crossing the road, which was hewn out of the hill-side, essayed a descent to the deep gully below. This proved a most hazardous, if not dangerous, feat owing to the tangled growth and loose stones and precipitous slope, and the thick tree tops hundreds of feet above our heads almost shutting out the light.

A scramble up through dense wild raspberry vines and Lantana brought us hot, tired, and dusty on to the road again, and all we had learnt was that in these dense, dark gullies bird life is scarce, whereas the birds we expected to find were away up in the sunlit treetops, with the exception of some few ground dwellers, such as the Scrub Turkey, Log-runners, and the Spotted Ground-Bird.

For days we worked the dense scrubs and gullies and climbed trees without number after Cat-Birds and Satin Bower-Birds, but mostly we looked out for Scrub-Birds and Rifle-Birds. We were constantly finding nests of Cat-Birds and Bower-Birds, which were neither old nor new--that is, they presented the appearance of being recently inhabited. The same with the Log-runners, and one of our party, though not an ornithologist, soon became so specialised in finding the nests of these birds that it became almost uncanny. All or nearly all the birds seemed to us to have nested and hatched out their broods, and yet this was

only early in October. The writer is of the opinion that following the break-up of the long drought, the birds at once started breeding, and threw the nesting season out of step. In no other way could we account for the finding of so many recently-used nests.

From an oological point of view our excursion was a partial failure, but when we considered all the birds we had seen and heard, and whose habits we had observed, we felt the outing was not in vain. For instance, one could never forget seeing the Log-runners a few feet away from us rooting up the ground like a domestic fowl scratching on a manure heap, all the while emitting most musical notes. One can see the fighting and chasing of enemy species and hear the exultant notes of the victors; cheeky Honey-eaters and rival bush whistlers bursting into defiant song before the eyes of a demure female; the piercing calls of the Tree-Creepers, and the early morning call of the Wonga-Wongas, and at night the eerie screech of the unknown Owl.

Rain, the best gift to the man on the land, was responsible for a change in our plans, and for some interference with our outings, but the lack of this same gift has been also the means of somewhat spoiling the result of the R.A.O.U. Camp in Queensland the previous year, and we consoled ourselves with the fact that the rain was better for the preservation of our birds than lack of it.

All the same, quite reluctantly we struck camp, and made our long run to Armidale, which we reached in a perfect torrent of rain, and here our party broke up, with expressions of regret and a decision to meet again, if spared, for another outing in the future.

The following birds were listed during the expedition:—

Brush-Turkey (*Alcatura lathamii*); Purple-crowned Pigeon (*Ptilinopus superbus*); Topknot-Pigeon (*Lopholaimus antarcticus*); Pheasant-Pigeon (*Macropygia phasianella*); Peaceful Dove (*Geopelia placida*); Green Winged Pigeon (*Chalcophaps chrysochlora*); Wonga (*Leucosarcia melanoleuca*); Mangrove Bittern (*Butorides stagnatilis*); Grey Goshawk (*Astur nova-hollandiae*); Australian Goshawk (*Astur fasciatus*); Black-breasted Buzzard (*Gypoictinia melanosterna*); Crested Hawk (*Baza subcristata*); Brown Hawk (*Ieracidea berigora*); Nankeen Kestrel (*Cerchneis cenchroides*); Boobook Owl (*Ninox boobook*); Owl (Sp.); Powerful Owl (*Ninox strenua*); Blue Mountain Lorikeet (*Trichoglossus moluccannus*); Red-tailed Black Cockatoo (*Calyptorhynchus banksii*); King Parrot (*Aprosmictus scapularis*); Crimson Rosella (*Platycercus elegans*); Rosella (*P. eximius*); Tawny Frogmouth (*Podargus strigoides*); Australian Roller (*Eurystomus orientalis*); Azure Kingfisher (*Alcyon azurea*); Kookaburra (*Dacelo gigas*); Fantailed Cuckoo (*Cacomantis flabelliformis*); Square-tailed Cuckoo (*C. pyrrhophanus*); Narrow-billed Bronze-Cuckoo (*Chalcites basalis*); Broad-billed Bronze-Cuckoo (*Lamprocyx lucidus*); Koel (*Eudynamis orientalis*); Lyre-Bird (*Menura nova-hollandiae*); Noisy Pitta (*Pitta versicolor*); Welcome Swallow (*Hirundo neoxena*); Fairy Martin (*Hyolochlidon ariel*); Jacky Winter (*Microeca fascians*); Flame-breasted Robin (*Petroica phanica*); Rose-breasted Robin (*Erythrodryas rosea*); Hooded Robin (*Melanodryas cucullata*); Southern Bush-Warbler (*Gerygone fusca*); Large-headed Shrike-Robin (*Pocillodryas capito*); Yellow-breasted Shrike-Robin (*Eopsaltria australis*); Shrike-Tit (*Falcrunculus frontatus*); Rufous-breasted Whistler (*Pachycephala rufiventris*); Golden-breasted Whistler (*P. pectoralis*); Fantail (*Rhipidura flabellifera*);

Rufous Fantail (*R. rufifrons*); Spine-tailed Log-runner (*Orthonyx temminckii*); Black-faced Flycatcher (*Monarcha melanopsis*); Leaden Flycatcher (*Myiagra rubecula*); Great Caterpillar-eater (*Edollisoma tenuirostris*); Cuckoo Shrike (*Graucalus novt-hollandia*); Australian Ground-Thrush (*Oreocincla lunulata*); Whip-Bird (*Psophodes olivaceus*); Thornbill (*Acanthiza pusilla*); Yellow-tailed Thornbill (*Geobasilus chrysorrhoa*); Spotted Ground-Bird (*Cinclosoma punctatum*); Yellow-throated Scrub-Wren (*Scricornis lathamii*); Scrub-Wren (*S. frontalis*); Large-billed Scrub-Wren (*S. magnirostris*); Blue-Wren Warbler (*Malurus cyaneus*); Variegated Wren-Warbler (*M. lamberti*); Wood-Swallow (*Artamus cyanopterus*); Shrike-Thrush (*Colluricincla harmonica*); Magpie-Lark (*Grallina cyanoleuca*); Orange-winged Tree-Runner (*Neositta chrysoptera*); Brown Tree-Creeper (*Climacteris picumna*); White-throated Tree-Creeper (*C. leucophaea*); White-eye (*Zosterops lateralis*); Mistletoe-Bird (*Dicaeum hirundinaceum*); Pardalote (*Pardalotus striatus*); Spotted Pardalote (*P. punctatus*); Crimson Honey-eater (*Myzomela sanguinolenta*); Spinebill (*Acanthorhynchus tenuirostris*); Striped Honey-eater (*Plectorhyncha lanceolata*); White-eared Honey-eater (*Meliphaga leucotis*); Yellow-faced Honey-eater (*M. chrysops*); Yellow-eared Honey-eater (*M. lewinii*); Wattle-Bird (*Acanthochaera carunculata*); Australian Pipit (*Anthus australis*); Friar-Bird (*Philemon corniculatus*); Red-browed Finch (*Aegintha temporalis*); Australian Oriole (*Oriolus sagittatus*); Cat-Bird (*Ailuradus crassirostris*); Satin-Bower Bird (*Ptilonorhynchus violaceus*); Rifle-Bird (*Ptiloris paradisea*); Australian Raven (*Corvus Coronoides*); Currawong (*Strepera graculina*); Grey Butcher-Bird (*Craicticus torquatus*); Black-backed Magpie (*Gymnorhina tibicen*).

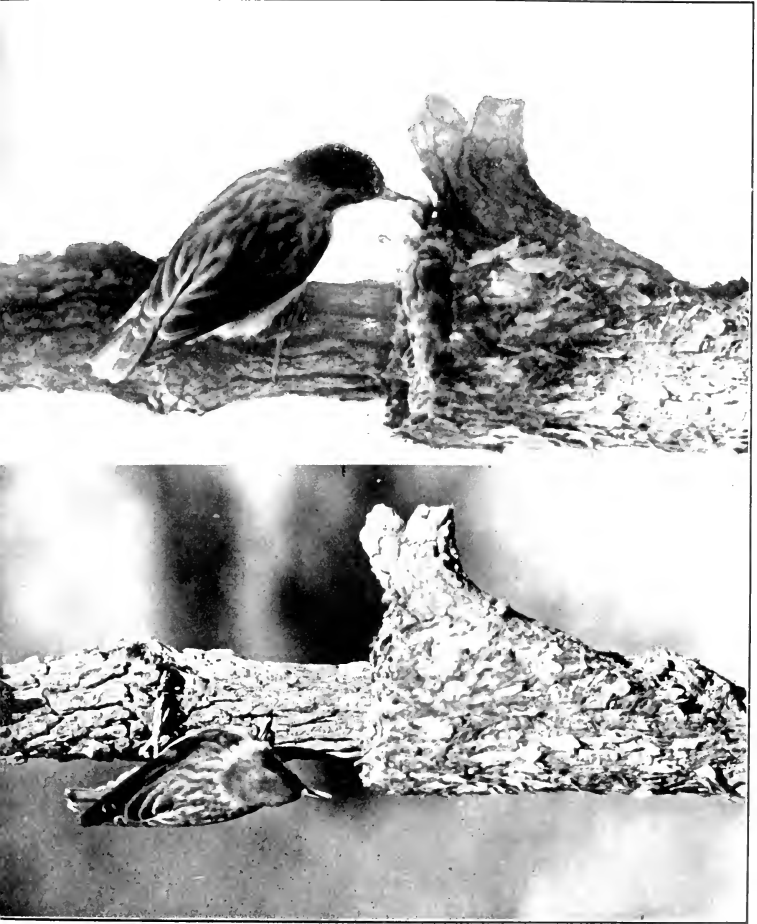
The Orange-Winged Tree-Runner (*Neositta chrysoptera*)

By P. A. GILBERT, R.A.O.U., Lakemba, N.S.W.

For several years, in a certain locality, two pairs of Orange-winged Tree-runners have been under observation, bringing forth their successive broods. This place, which was once a secluded nook clothed with typical Australian brush, scrub, and trees, and frequented by numerous forms of bird life, is however, now shorn of its verdant beauty, to make way for the habitations of man, whose advance into Nature's solitudes is characterised by a cold disregard for all life, animal or vegetable, unless, perhaps, it adds to his wants and desires.

Notwithstanding this rather saddening concomitant of man's urban progress, an ineffaceable mental picture was obtained of a bird whose life history is made up of the inconceivably minute detail of Nature, the adequate portrayal of which baffles the art either of poet or painter. Recourse must be had, therefore, to a more pedestrian muse, in describing this bird and its habits, in such a way as to render intelligible the accompanying photographs.

The length of this bird is between four and five inches. The crown of the head is dark brown; while the rest of the dorsal feathering is more or less a duller brown, with darker streaks. The wings are dark brown with a rufous patch of a rich tone about the centre of the outspread wing, which shows up to ad-



Right—Removing excreta.

The Orange-winged Tinamou.

Left—Feeding Young.
Photo. by R. A. Gilbert, R.A.O.U.



The Orange-winged Tree-Runner (*Acositta chrysoptera*) catching small black ants at Nest.

Photo. by R. A. Gilbert, R.A.O.F.

vantage when the bird is flying. The tail feathers are blackish-brown, some of which are tipped with white. The under surface generally is a dull white streaked with light brown; the under tail coverts are barred with blackish brown; and the head of the female is slightly darker than that of the male.

The nest is a neat structure closely resembling the branch on which it is built, enabling it to escape the notice of all but those acquainted with the nesting habits of this bird. It is composed of flakes and scale-like pieces of tea-tree bark, or shreds of stringy lark and turpentine bark. An abundance of spiders' web is used to hold the materials together, such is the skill of this avian architect; while fragments of lichen loosely laid in the bottom of the receptacle, or worked in with spiders' web, make the only lining. A rare specimen has ornamentations of lichen around the rim, and on the outside, giving it a handsome appearance. August to December is the usual breeding period.

Two or, more often, three eggs are laid for a sitting. The ground colour is bluish-white, over which spots, speckles and blotches of glossy black and amber are spread. Many faint underlying markings of grey appear beneath the prominent surface markings. The coloration is thickest at the larger end, where it gathers together to form a conspicuous zone. The eggs take twelve or thirteen days to incubate. Cold weather hinders incubation, while warm weather hastens it. The young remain in the nest for thirteen or fourteen days. Oak (*Casuarina*), Tea or Paper-bark (*Melaleuca*), Ironbark (*Eucalyptus*,) and Apple (*Angophora*) trees are most frequently selected to build in.

As the young grow from day to day, the parent birds are enabled to leave them for considerable lengths of time. Nature, in her many experiments, has taught the young the necessity of relaxing and exercising their wings before undertaking the risky move of leaving their nest. Many imitations of the flying movements of the wings are fulfilled by the young, which toughen and tighten their sinews, and develop their wing and body muscles. From all appearances, it is a time of great anxiety for the parent birds in keeping their young together once they quit the nest. Long after they have left the nest, they are waited on by the parents, who are tireless in their efforts to meet the appeals for food expressed by gapes and vibrating wings of their ravenous young. All kinds of insects in various stages of development are devoured by this species.

One day while leisurely rambling through the bush, two Orange-winged Tree-runners were met with, busily tearing and tugging at some loose Tea-tree bark. As soon as they had torn a piece of the requisite size, they hurriedly flew to another Tea-tree near by. It was ascertained that a nest was in the course of construction. They were so absorbed in preparing a home for their potential offspring, that one was able to approach quite closely and watch their movements without disturbing them. The energy with which they uttered their call was ample evidence that they had warmed to their work. While one placed the

material in position, the other stood close by pouring out its sweet notes, "tzir, zit-zit, tzir-zit-zit, tzir,-zit-zat-zat." For the time being, further observations were informally interrupted. Several keen-witted bush boys appeared on the scene, who know this bird by the name of "Bark-tit" or "Bark-pecker." They were not long in finding out the cause of the observer's interest. A compact was entered into, that they should leave the nest intact, and neither disturb nor interfere with the birds or eggs. They did not touch the nest, but the smoothness of the trunk bore evidence as to the frequency with which it was reached. The birds deserted the nest when almost completed, owing, no doubt, to continual hindrance by the youthful observers. Later, this pair was found high up in a Stringy-bark tree building a nest. This time they were operating well out of the way of boy marauders, and eventually they brought forth a family of two. This bird will build in the same tree, spring after spring, until molested, when it abandons that tree, and selects one of a different species.

At East Hills, N.S.W., on the 9/9/1917, Mr. H. Kean, R.A.O.U., and the writer saw seven of these birds engaged in building a nest in a swamp-oak tree. Two of the seven had a nest seventy-five yards away, which, later on, was occupied by three young. While photographing these birds, four have been observed bringing in food for the young. As each bird fed a young one, it flew to a tree in the vicinity, where all four gathered, and then flew off to collect food for the young in a second nest one hundred yards away. Often two birds have been detected feeding one sitting on a nest. This procedure is misleading, for, on climbing to inspect the nest, one expects to see young, but in their place there are fresh eggs.

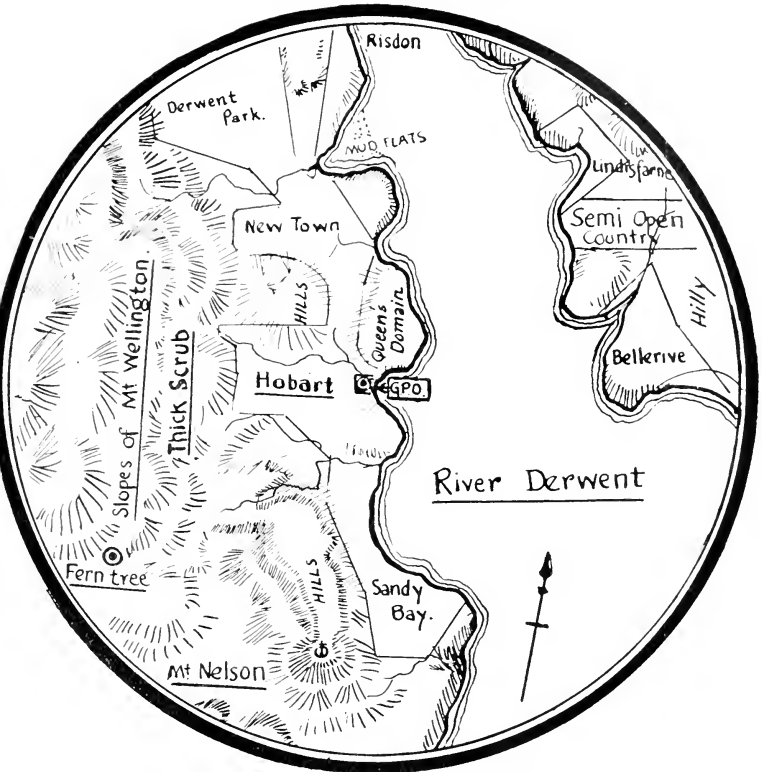
If we follow up the various stages of development in the Orange-winged Tree-runner's life, we shall see that each stage suits its immediate environment—first, the adult bird upon the branch or trunk of the tree, on which it toils for the means of its existence; then the nest, which resembles the butt of a broken dead branch; the eggs, that harmonise with the velvety lichen whereon they lie; the young birds when fledged that agree with the nest wherein they crouch. All this wonderful unconscious mimicry suggests that the Orange-winged Tree-runner was evolved in an age when birds of prey and tree-climbing predaceous were abundant, in consequence of which, every variation that occurred in the direction of protective coloration, or adaptation, conducive to greater security, was preserved.

Lastly, the peculiar methods this bird adopts when searching for insects may be referred to. As it hops down the branch, it throws itself from one side to the other, so that its downward inspection of the chinks in the bark, on both sides of the branch, is achieved in one descent. As soon as one branch has been examined, it either continues its search in the larger crevices of the trunk, or flies to the top of another branch, in its endeavours to make its arboreal host yield up its stores of lurking insects.

Birds of Hobart

By M. S. R. SHARLAND and S. W. CRANE, M's.R.A.O.C.

Of the six Australian capital cities none is perhaps better than Hobart from an ornithologist's point of view. Situated on the banks of the River Derwent, backed by the diabase



Country within a five-mile radius of Hobart General Post Office.

massif of Mount Wellington (4166 ft.) and flanked by well-wooded hills, the city is visited by a large number of birds, its surroundings offering nearly every class of country suitable for them. Many species frequent the more open country on the

eastern side of the river, and at times many sea-birds are noticed on the river itself. Comparatively speaking, Tasmania is rather short of birds, both of varieties and individuals of varieties, but, as will be seen from our list, the locality of Hobart cannot lay claim to the scarcity. In the compilation of our list we fixed on a five-mile radius from the General Post Office in the centre of the town, and recorded both the resident birds and casual visitors within that area (see map). No fewer than 88 species have been noticed. Those species breeding within the five-mile radius are signified by an asterisk.

The following is our list:—

Coturnix pectoralis. Stubble Quail.—This species is fairly common on the eastern side of the River Derwent at certain seasons of the year. The birds do not, however, stay in one place for long.

Syncoicus ypsilophorus. Swamp Quail.*—Odd flocks move about the outskirts of the city and on the Queen's Domain, where cover is usually plentiful. This bird has also been observed in scrubby patches on the slopes of Mt. Wellington.

Phaps chalcoptera. Bronzewing.*—A fairly common species on the semi-open slopes of Mt. Nelson, and round about Bellerive on the opposite side of the river.

Phaps elegans. Brush Bronzewing.*—Like *P. chalcoptera*, this species is common, but frequents denser country like that of Mt. Wellington, where they breed freely. We sometimes find their nests in gorse bushes two or three feet from the ground. A comparatively tame species so far as our experience goes.

Fulica atra. Coot.—Occasionally the Coot may be seen in the River Derwent near Hobart, but is very shy.

Eudyptula minor. Little Penguin.—Common in the River Derwent and at Sandy Bay. We have found odd birds hiding amongst rocks on shore in the process of moulting. Fairly large rookeries exist on Bruny Island, a few miles south of Hobart.

Oceanites oceanicus. Yellow-webbed Storm-Petrel.—This dainty and tiny little Petrel has been observed in the river just within the five-mile radius. It is, however, a rare visitor; but is common outside the entrance to the Derwent.

Puffinus tenuirostris. Short-tailed Petrel.—The "Mutton Bird," which provides a living for the islanders of Bass Strait, is a fairly common bird in the River Derwent in summer and autumn, when it may be seen in large flocks, all wheeling and dipping at the water simultaneously. They are fast flyers, and are always zig-zagging about the river. They often come close to the steamers, thus allowing one a good view of them.

Sterna caspia. Caspian Tern.—Generally to be observed slowly flying up or down the river on the lookout for food. We have seen them as far as 25 miles from the sea hunting over shallow lagoons. It is one of the most handsome terns.

Sterna striata. White-fronted Tern.—Probably the commonest Tern about Hobart. May be seen practically any day in small flocks, and in company with the Silver Gull.

Larus novaehollandiae. Silver Gull.—Of the various species of sea-birds frequenting the River Derwent, the Silver Gull is the most familiar. It congregates in immense flocks, especially at low tide, along the beach or on reefs or mud banks. A fairly large rookery exists on Cape Frederick Henry, Bruny Island, a few miles south of Hobart.

Gabianus pacificus. Pacific Gull.—Like the preceding species, the Pacific Gull is very common about the harbour, often perching on the top of vessel's masts. Frequently seen in flocks of from 15 to 20 birds.

Catharacta skua. Southern Skua.—A somewhat rare visitor to Hobart, but specimens have been seen in the vicinity of Bellerive.

Lobibyx novæ-hollandiæ. Spur-winged Plover.—Common about Hobart and suburbs. May often be seen feeding in company with Silver and Pacific Gulls on mud banks at low tide. Frequently flies over the city at night.

Zonifer tricolor. Black-breasted Plover.*—Common on the Bellerive side of the Derwent, where it breeds. Last year we found three nests in a small paddock. We have noticed this species to be much more pugnacious than the Spur-winged Plover.

Limosa lapponica. Barred-tailed Godwit.—During the summer these birds come down to Tasmania from Siberia, and in 1919 one visited a small lagoon on the outskirts of Bellerive. They have not since been observed so close.

Notophox novæ-hollandiæ. Blue (White-fronted) Heron.—Occasionally odd birds may be seen at Bellerive; but they are not common. Two years ago a pair nested along the river just outside the five-mile radius, but some local "sportsmen" found the nest, and being unable to climb the tree, shot the young birds from the ground.

Chenopsis atrata. Black Swan.—A rather irregular visitor. Usually to be seen passing down the river Derwent in flocks of about half a dozen birds at the beginning of the shooting season, when they have been disturbed from their usual feeding grounds.

Anas superciliosa. Grey (Black) Duck.—Frequents the upper reaches of the Derwent, and occasionally may be seen within the five-mile radius, more especially during the evenings.

Phalacrocorax carbo. Black Cormorant.—Fairly common birds about the river, frequenting the bays, where they take their toll of fish. Have also observed them half way up Mt. Wellington "fishing" at creeks, and have seen them perching on factory chimneys on the outskirts of the city.

Phalacrocorax fuscescens. White-breasted Cormorant.—Does not frequent the harbour waters to the same extent as *P. carbo*.

Microcarbo melanoleucus. Little Cormorant.—Fairly plentiful in the vicinity of the harbour, where they may be seen diving for their food.

Sula serrator. Australian Gannet.—May occasionally be seen slowly flying up the river past Hobart, and sometimes reach about 30 miles from the sea. Breed on lonely Mewstone Rock, south of Tasmania.

Uroaetus audax. Wedge-tailed Eagle.—We have observed this splendid bird on the outskirts of Bellerive, and have heard of its appearance on Mt. Nelson.

Haliaetus leucogaster. White-bellied Sea-Eagle.—This fine bird may occasionally be seen up the River Derwent, often winding up in great spirals till it resembles a small Sparrow against the clouds.

Falco peregrinus. Peregrine Falcon.—A common bird about Hobart, and perhaps the greatest enemy of owners of homing Pigeons. These birds have been taken off the protected list, and rewards are paid for their heads.

Eracidea berigora. Brown Hawk.*—By no means a rare bird in the five-mile radius. A few years ago they bred on Mt. Nelson. They are common all through the Bellerive district.

Ninox nova-zeelandiae maculata.—Spotted Owl.*—Common about the city at night. In the day time it retires to the adjoining ranges, where it may often be seen resting amongst the dense vegetation along creeks.

Glossopsitta concinna. Musk Lorikeet.—These pretty birds periodically sweep across Hobart, and enter every garden, park and reserve where the eucalypts are flowering, remaining here just as long as the honey is available. Their last stay was a particularly long one, appearing in March, 1920, they did not leave until April, 1921. They have not appeared since. At the approach of evening they congregate in big flocks in the trees, and pairing off, make love by "kissing" each other with their beaks, chattering incessantly during the process. Intruding birds are often given a rough time.

Calyptorhynchus funereus. Black Cockatoo.—The Black Cockatoo is not a resident within the five-mile radius, but may commonly be seen over Hobart and on the slopes of Mt. Wellington, especially during very wintry periods.

Platycercus caledonicus. Green Rosella. This Parrot is confined to Tasmania and adjacent islands. Very common about Hobart and Bellerive, where it sometimes raids orchards.

Platycercus eximius. Rosella.*—Probably the most numerous of the *Psittacidae* about Hobart and suburbs. It breeds on the Queen's Domain close to the city.

Pedargus strigoides. Frogmouth.*—We have seen this bird on the slopes of Mt. Nelson, where it nests, and at Bellerive. It is fairly common, but is only animated during the night, when it sets forth on its quest for insects.

Chaetura caudacuta. Spine-tailed Swift.—A regular annual visitor, appearing here usually about the middle of February, and leaving again about the end of March or first week in April. Immense flocks are sometimes seen near Bellerive.

Cuculus pallidus. Pallid Cuckoo.*—A very common species about Hobart and Bellerive. Arrives about beginning of September, and leaves again end of March. Last year we added the Tasmanian Pipit (*Anthus australis bistriatus*) to the list of the Pallid Cuckoo's foster parents.

Cacomantis flabelliformis. Fan-tailed Cuckoo.*—The commonest Cuckoo about Hobart. Mt. Wellington is their favourite spot, while the open country on the eastern side of the Derwent is also frequented. These birds often call at night.

Chalococcyx basalis. Narrow-billed Bronze Cuckoo.*—In common with other species, this bird arrives from the mainland in September and departs about March.

Chalcites plagosus. Bronze Cuckoo.*—Like *C. basalis* this Cuckoo is a regular and very common visitor to the south of Tasmania. The Yellow-tailed Thornbill (*Geobasilus chrysorrhoea*) appears to act as foster-parent more than any other bird.

Hirundo neoxena. Welcome Swallow.*—A common visitor, arriving somewhere about August or September, and departing again some time late in April. A few birds remain here all the year round.

Hylochelidon nigricans. Tree-Martin.*—In company with Swallows, the Tree Martin comes right into the city, and appears to remain here longer than the former. Nests are often found in hollow trees.

Petroica multicolor. Scarlet-breasted Robin.*—A very common resident, nesting on Mt. Wellington principally.

Petroica phoenicea. Flame-breasted Robin.*—At the approach of winter this bird moves to the lowlands from the mountains, returning again in the spring. They are very common.

Erythrodryas rhodinogaster. Pink-breasted Robin.*—A resident of Mt. Wellington, where it may often be seen in the gullies.

Amaurodryas vittata. Dusky Robin.*—A Tasmanian bird, very common about Hobart and Bellerive, where they breed. Open timber country is most frequented.

Pachycephala pectoralis Golden-breasted Whistler.*—Very common on Mt. Wellington, where they breed.

Pachycephala olivacea. Olive Whistler.*—Together with *P. pectoralis*, this Whistler breeds on the slopes of Mt. Wellington, the nests often being made from long strips of the "stringy" bark (*Eucalyptu obliqua*).

Rhipidura flabellifera. Dusky Fantail.*—Common birds about Hobart, and very tame. They nest on Mt. Wellington, Mt. Nelson, and on the eastern side of the River.

Myiagra cyanoleuca. Satin Flycatcher.*—Arrives from the mainland towards the end of October, and departs again in March. The lower slopes of Mt. Wellington, where it breeds, are much frequented by this species.

Graucalus novaehollandiae. Small-billed Cuckoo-Shrike.*—Arrives at Hobart during the summer, and breeds within the five mile radius. Known in Tasmania as the "Summer-Bird."

Cinclosoma punctatum. Spotted Ground-Bird.*—Bellerive appears to be the favourite spot of this bird, where it breeds annually. They are very local, and a pair will occupy a certain spot for months.

Calamanthus fuliginosus. Striated Field-Wren.*—This pretty little *Calamanthus* frequents the country near Bellerive, though it is not common. In the breeding season it has a very sweet song.

Oreocincla lunulata. Ground (Mountain) Thrush.*—A common resident of the gullies of Mt. Wellington. Breeds here during July and August. Speaking from our experience, this bird is very tame, for on one occasion we had almost to lift the bird off her nest in order to photograph the young beneath her.

Epthianura albifrons. White-fronted Chat.—An irregular visitor to Hobart, but fairly common on the outskirts of Bellerive. They sometimes move round in large flocks.

Acanthiza pusilla diemenensis. Tasmanian Thornbill.*—A very common bird on both sides of the River Derwent; frequently the foster parents of the Bronze and Fantail Cuckoos.

Acanthiza ewingi. Ewing Thornbill.*—A fairly common bird on Mt. Wellington, where it breeds.

Gebasileus chrysocephalus. Yellow-tailed Thornbill.*—A very plentiful bird about Hobart and Bellerive.

Sericornis humilis. Brown Scrub-Wren.*—Very common in the undergrowth on Mt. Wellington.

Acanthornis magna. Scrub-Tit.*—A very shy bird, and not so common as *S. humilis*.

Malurus cyaneus. Blue Wren.*—Very plentiful about Hobart and on the eastern side of the River Derwent.

Artamus cyanopterus. Wood-Swallow.*—This species is fairly plentiful on the outskirts of Bellerive and Lindisfarne, where it breeds. "The date of arrival varies considerably, much depending on the climatic conditions. Some years it arrives early in August, and others not until mid-September" (Littler, "Birds of Tas."). Departs for the mainland from March to April.

Colluricincla harmonica. Grey Shrike-Thrush.*—Fairly plentiful on both sides of the river. Locally known as "Whistling Dick," and is a great favourite.

Zosterops lateralis. White-eye.*—Large flocks of the White-eye fly about Hobart. The bird breeds freely on the slopes of Mt. Wellington, and in suburban gardens.

Pardalotus punctatum. Spotted Pardalote.*—A very common species on both sides of the river, breeding in holes which the birds drill into the sides of a suitable bank.

Pardalotus striatus affinis. Yellow-tipped Pardalote.*—Common about the lower slopes of Mt. Wellington, and on the opposite side of the river.

Pardalotus quadragintus. *Many-spotted Pardalote.*—Not so common as the two preceding birds, but may often be seen in gardens at the foot of Mt. Wellington. A Tasmanian species.

Melithreptus validirostris. Strong-billed Honey-eater.*—Plentiful on Mt. Wellington, frequenting the tops of the highest gums, and scarcely ever seen on the eastern side of the Derwent.

Melithreptus affinis. Black-headed Honey-eater.*—One of the foster-parents of the Pallid Cuckoo. Common on both sides of the river.

Acanthorhynchus tenuirostris. Spinebill.*—Very plentiful on Mt. Wellington and round about Bellerive. Also frequents suburban gardens a lot.

Meliphaga flavicollis. Yellow-throated Honey-eater.*—One of the commonest Honey-eaters within the five-mile radius, breeding on both sides of the Derwent. This bird is confined to Tasmania and adjacent islands.

Meliornis pyrrhoptera. Crescent Honey-eater.*—Frequents both the heavily timbered and open country in great numbers.

Meliornis novae-hollandiae. White-bearded Honey-eater.*—Appears to prefer thickly wooded tracts, such as the slopes of Mt. Nelson and Mt. Wellington, where it breeds.

Myzantha garrula. Noisy Miner.*—The Miner is common on the Queen's Domain near the city as well as on the eastern side of the river. A very noisy bird.

Anthochaera paradoxus. Yellow Wattle-Bird.—The Wattle-Bird occasionally comes within the five mile radius, and may sometimes be seen honey-hunting amongst the native fuchsia (*Correa speciosa*) near the ground.

Anthochaera chrysoptera. Brush Wattle-Bird.—In the winter months the Brush Wattle Bird comes into suburban gardens in search of food, but is at no time plentiful.

Anthus australis bistriatus. Tasmanian Pipit.*—Another foster parent of the Pallid Cuckoo. Breeds on the Queen's Domain and other places close to the city. Very plentiful on the Bellerive side of the river.

Zonaeginthus bellus. Beautiful Fire-tail.*—The only Finch indigenous to Tasmania, and not very common in the five-mile radius. Birds are trapped a lot, and get shy. Seen on both sides of the river.

Corvus australis. Australian Raven.—May frequently be seen about Hobart, but have not yet found it breeding here.

Strepera fuliginosa. Black Bell-Magpie.—A common bird on Mt. Wellington. Often steals fruit from orchards, and is usually shot at on sight, especially as its flesh is very palatable.

Strepera versicolor arguta. Hill Bell-Magpie.—The "Black Magpie," as this bird is called, is by no means a common visitor to the city, being almost entirely confined to the upper mountain regions. How-

ever, during very cold periods odd birds find their way to the lower ranges, and in the winter of 1921 we saw a pair on the eastern side of the river near Lindisfarne.

Gymnorhina hypoleuca. White-backed Magpie.*—A common bird in the open country on the eastern side of the River Derwent.

Cracticus torquatus. Grey Butcher-Bird.*—The "Jackass" as this bird is locally named, is fairly plentiful in the vicinity of Hobart and the suburbs of Bellerive and Lindisfarne. As a home-defender this bird is very pugnacious.

We are informed on good authority that the following species have also been observed within the five mile radius:—*Turnix varia* (Painted Quail), *Circus approximans* (Swamp Hawk), *Stipiturus malacurus* (Emu Wren).

INTRODUCED BIRDS.

Turtur ferrago. Indian Turtle Dove.*—Very common. These birds were introduced to Tasmania by the late Mrs. H. L. Roberts of "Beaumaris."

Carduelis carduelis. Goldfinch.*—Very plentiful about Hobart and suburbs. Breeds freely.

Passer domesticus. House Sparrow.*—Very common.

Sturnus vulgaris. Starling.*—The birds, at certain seasons of the year, gather in immense flocks and spend the nights in the oak trees in the city gardens.

Spinetailed Swifts in Tas.—The "tale of the Swifts" (*Chaetura caudacuta*) for the summer of 1922 is very soon told. They did not appear on our North-West coast until 8th March, when at 3.30 p.m. some passed swiftly towards the west, flying rather low. Afterwards, a large number came from the direction of the beach (north), and, passing to south and south-west, stayed there for some time, many of them at a great height, and circling in their mazy dance. At 6.30 (about sunset) some more passed rapidly, singly or in pairs, to the westward. The day had been sultry, foreboding change, with great numbers of flying ants and other insects in the air; wind, first easterly, afterwards S.W., light; sky mostly covered with alto-stratus cloud. The following day was very hot with north wind, and the second day there was a squally north-wester, with clouds of dust and a rough sea. On 28th March there was a solar halo at 9 a.m., and a solitary Swift appeared at a great height, flying within the circumference of the ring, and making somewhat in a north-easterly direction. In the early afternoon the sun was exceedingly warm; later the sky became overcast, a strong N.W. wind sprang up with heavy showers until early next morning. Thus were the forecasts of those two prognosticators of cyclonic disturbance, the halo and the Spine-tailed Swift, again fulfilled. This was the last of the birds seen on our coast, although Mr. H. C. Thompson recorded them as late as 15th April in Launceston, which, being in a basin surrounded by hills, forms a more sheltered feeding-ground in late autumn than does the open coast.—H. STUART DOVE, F.Z.S., W. Devonport, Tasmania.

List of Birds found Breeding in and around the Swamps near Moora, W.A., during 1921

By P. T. SANDLAND, R.A.O.U., and O. L. E. ORTON,
R.A.O.U.

Porzana pusilla. Little Crake.—One nest found among bulrushes and tea-tree containing three eggs, but when examined a week later the eggs had disappeared.

Porphyrio bellus. Blue Bald-Coot.—Four nests found containing 3, 4, 4, and 5 eggs. Nests always built on a fallen bough among bulrushes and tea-tree. Rare.

Fulica atra. Coot.—Very common. Nests principally in the swamps that are free of bulrushes. Number of eggs varies from five to fifteen, the latter number no doubt being a combination clutch. The breeding season lasts from August to January.

Carphibis spinicollis. Straw-necked Ibis.—First occasion. Large flocks often to be seen during winter and early summer. A number of birds commenced building on tea-tree in Marrida Swamp. Several nests contained one and two eggs, but next time we examined them the eggs were broken and the birds had forsaken, although still living on the swamp.

Platalea flavipes. Yellow-billed Spoonbill.—First occasion. Eight birds lived on the swamps all the winter. Two nests were found in Street's Swamp, built in paper-bark trees, containing three eggs. Another in Blue Gum Swamp, with two eggs, and when this nest was examined a week later the eggs were hatched. This, I think, is the furthest south these birds have been recorded breeding in W.A.

Notophox novaehollandiae. White-fronted Heron.—Very common. After the Coots and Cormorants, it is the most plentiful bird found breeding round the swamps. These birds are often found breeding fully half a mile from water. Usual number of eggs four or five, in about equal proportion. Have found nests at all heights from 5 to 50 feet from ground or water.

Ixobrychus minutus. Little Bittern.—Rare. Two pairs of birds bred in the Bulrush Swamp, on opposite sides. They are late breeders. On November 13th we observed two nests containing two eggs heavily incubated and four eggs not quite so far advanced. Something must have happened the first pair, as three weeks later we found a set of four eggs within 35 yards of the previous nest containing two eggs. The second pair was not found again. The nests are small, neat platforms, about 6 to 7 inches in diameter, and about 2½ inches deep, placed in each instance on a leaning limb among tea-tree and bulrushes. Nests were made on a foundation of bulrushes, bent down on to a leaning limb, and then short pieces of rushes were placed across and across, and lined with shorter, finer pieces. Height above water, 15 inches to 2 feet. In 1918 we found two nests containing three and four eggs, and one nest was fully five feet above water. The birds were first seen on the swamp in September, when they flushed easily; but, when they were nesting, they preferred to sneak away through the rushes.

Botaurus poeciloptilus. Australian Bittern.—Rare. Two nests were found on October 15th and 16th at Karo and the Three-Mile Swamp, some 45 miles west of Moora. The first nest was built in a patch of dense spearwood, and contained three young and two eggs just chipping. The second contained four incubated eggs. A pair was heard

calling in a dense thicket in one of the swamps near Moora, but we could not locate the nest. The nests are roughly made platforms of sticks, placed on a fallen stick, just above water level.

Chenopsis atrata. Black Swan.—Five nests were found. The eggs in four had hatched out, and the fifth contained five heavily incubated eggs. One nest built of sticks, and lined with tea-tree, was in a tea-tree thicket, the others were merely platforms of bulrushes. The birds breed early in this district, as all these nests were found early in September.

Stictonetta nævosa. Freckled Duck.—Rare. Two nests were found, the first contained seven eggs on the point of hatching, and the second contained two eggs when found, and five noted a week later. Both nests undoubtedly belonged to the same pair of birds. On December 24th a flapper was shot by a third-rate sportsman on the same swamp. This Duck builds a nest of fairly fine sticks on a leaning limb in a thick, bushy tea-tree, just above water level. The nest is lined with finer twigs and tea-tree twigs and, of course, down. In 1918 a nest was noted with seven moderately incubated eggs.

Nyroca australis. White-eyed Duck.—Fairly common, nests rare. Two nests were found, each with seven eggs, but one also contained a single egg of the Musk-Duck. The nest is always placed in a thick, bushy, isolated tea-tree growing among bulrushes. It is composed of trodden-down rushes for a foundation, and then a deep structure is made of bulrushes and lined with down. This bird builds a much deeper and neater nest than either the Blue-billed, or Musk-Duck, both of which build in similar positions. In 1918 several nests were noted with seven and eight eggs usually, and in one instance ten.

Oxyura australis. Blue-billed Duck.—Rare. Two nests were observed with five and six eggs respectively. Nests are as a rule merely trodden-down bulrushes, in a thick, bushy tea-tree. In two instances eggs were taken from stick nests. The nesting bush always has a thick, bushy top. When among bulrushes and tea-tree, the nest always has a dome of rushes. In 1918, which was a wonderful year for Ducks, seven nests were noted. One nest contained eight eggs; four, six each; one, five; and one, three eggs. The three-egg clutch was the first found and was considered in mistake a Musk Duck's nest. Evidently five or six is the usual complement of eggs laid. Have given numbers of all nests yet noted by us, as both North and Campbell give smaller numbers.

Biziura lobata. Musk-Duck.—Common. Although nothing like so common as the Gray (Black) Duck and Teal, more nests are found of this species than all the other Ducks together. Their tastes for nesting sites are much more cosmopolitan than those of the two preceding species. The favourite site is a bushy tea-tree growing among bulrushes. In the more open swamps any thick bush will do, and they are adepts at "jumping the claims" of other birds. Number of eggs, two and three, principally three, and in four cases, out of some 50-60 nests examined, we have found four eggs.

Anas superciliosa. Gray (Black) Duck. *Nettion gibberifrons*. Grey Teal.—Although so extremely plentiful, no nests were noted on the swamps last season.

Phalacrocorax ater (Little Black Cormorant) and *Microcarbo melanoleucus* (Little Pied Cormorant).—There is a large colony of these birds in Street's Swamp, and a small one in Marrida. Nests are all built of sticks, and placed in paper-bark thickets in the deeper parts of swamps. The Little Black Cormorant usually prefers to nest near the top of the trees, and generally lines its nest with strips of paper-bark. The Little Pied Cormorant nests anywhere, and uses green fronds of paper-bark tree to line its nest with. The number of eggs laid is either four or five. In the first week of September.

1918, some nests contained large young ones, and others were in all stages from that down to building. Odd birds were still laying in January. Usually eggs can be seen from the end of August to the middle of November.

Anhinga nove-hollandiæ. Australian Darter.—A few pairs usually about. Found breeding for the first time last season, when five nests were found, all containing four eggs. Nests were built of green tea-tree twigs about a foot long, and were placed on leaning forks. One nest was found in the Cormorant rookery, the other four were in larger trees on the outskirts.

Astur fasciatus. Australian Goshawk.—Rare. Two nests were found; one at Karo Swamp, containing two eggs, and another with three eggs in a large red gum in a watercourse leading to Walyerin Swamp, several miles nearer Moora. Several nests have been taken at odd times, and the eggs are usually smaller than eggs from the Eastern States. However, the pair seen at Karo are the largest I have yet seen. In 1908 I examined 12 sets of eggs of *Astur fascians* in S.A., and retained two, the largest set, and the best-marked set. The above pair are larger than either of these sets.

Hieraetus pennatus. Little Eagle.—Rare. One pair of birds nested near the Bulrush Swamp, and when robbed moved away about a quarter of a mile and nested again. In each instance only a single egg was laid. Have seen four other nests at different times, and twice a pair of eggs was laid. In each instance one egg was distinctly smaller than the other, although the eggs belonged to different pairs of birds. Have never known them to build their own nest. They patch up an old Crow's nest and line it with green gum leaves.

Haliastur spheerurus. Whistling Eagle.—Rare. One pair nested in a large dead white gum, near the swamps. This is the first record of these birds in the district to our knowledge. Eggs were taken twice from the same nest. Among the nesting material was the backbone of a lamb, dried-up skeleton of a rabbit, and wing of a Musk-Duck. They laid two eggs the first time, and three the second. The second climb was made lively by a swarm of bees, which had taken possession of a hollow about 15 feet below the nest, and being a hot day, they were extra spiteful.

Cerchneis cenchroides. Nankeen Kestrel.—Common. A pair nested in a hollow in same tree as the Whistling Eagle's nest, but only about 20 feet from the ground. Have never known this bird to nest in an old Crow's nest in this district, but always in a hollow. Three or four eggs form a clutch here, usually four.

Ninox boobook ocellata. Marbled Owl.—Rare. While I was climbing to nest of the Whistling Eagle, Mr. Orton went round tapping trees with the tomahawk, and flushed a bird within 150 yards. The nest contained three eggs, and ended a quest of years, as I had previously only a single egg in my collection. These birds moved away about a quarter of a mile, and we found the nest later with newly-hatched young in it. Eggs are merely laid on wood-dust at bottom of hollow.

Barnardius zonarius. Yellow-Banded Parrot.—Common. Nests hard to find as birds seldom flush, and don't gnaw round the hollow as most Parrots do. Found one nest containing five eggs, and two with young, judging by the chorus set up at the first stroke of the tomahawk. Five and six are the usual number of eggs laid, very rarely seven, and in one instance eight.

Psephetus varius. Many-coloured Parrot.—Rare. One nest found contained young birds. This is the first known instance of their breeding so close to Moora.

Halcyon sanctus. Sacred Kingfisher.—Common. Numbers of these birds breed every year in any suitable trees. Five eggs is the usual number, with an odd example of six.

Merops ornatus. Rainbow Bee-eater.—Common. Nesting tunnels may be found at odd intervals all round the swamps.

Lamprocoecyx plagosus. Bronze-Cuckoo.—Common. The principal foster-parent for this Cuckoo is the Yellow-tailed Tit-Warbler (*Geobasiliscus chrysorrhous*).

Cuculus pallidus. Pallid Cuckoo.—Common during spring. Foster parents usually selected are Wattle-Birds (*Anthochaera carunculata*), Dusky Miner (*Myzantha obscura*), Tawny-crowned Honey-eater (*Glyciphila fulvifrons*), White-naped Honey-eater (*Melithreptus lunulatus*), and the Black and White Fantail (*Rhipidura leucophrys*).

Hyolchelidon nigricans. Tree-Martin.—Common. Nests may be found in any old hollow trees during the nesting season, but usually quite safe on account of the rotten nature of the limbs.

Rhipidura leucophrys. Black and White Fantail.—Common. Nests are found as often in paper-bark trees growing in the swamps as among timber on land.

Seisura inquieta. Restless Flycatcher.—Not so common as the above species. Always nests in trees growing in the swamps.

Aerocephalus australis. Australian Reed-Warbler.—Rare until the wet years of 1917 and 1918; since then fairly plentiful. Nests among tea-tree and spearwood thickets in swamps. Nests are placed at all heights from one to eight feet above water. Lays three and four eggs in about equal proportion.

Megalurus gramineus. Little Grass-Bird.—A few pairs breed in bulrush swamp. The nests are always placed in a thick, bushy tea-tree growing among thick bulrushes. Average height of nest above water about one foot. Three or four eggs form a clutch.

Geobasiliscus chrysorrhous. Yellow-tailed Tit-Warbler.—Very common. Nests in any and every suitable position, and rears at least two, and often three, broods in a season. Eggs may be found from July to December. Lays three or four eggs usually, five being extremely rare.

Zosterops gouldi. Green-backed White-eye.—Birds common, nests rather hard to find, on account of the thickets they nest in. Number of eggs three usually, two occasionally, especially in the early part of the season.

Stigmatops indistincta. Brown Honey-eater.—One or two nests are usually found each season. Two eggs are invariably laid.

Anthochaera carunculata. Wattle-Bird.—Very common. Numbers of nests are to be found, but are not taken unless containing an egg of the Pallid Cuckoo.

Corvus cecilæ. Australian Crow.—Common. Build in the tall paper-barks in the swamps. Four eggs is the usual number laid, five only found occasionally. They destroy quite a number of Ducks' eggs every year.

Craicticus torquatus leucopterus. White-winged Butcher-Bird.—Common. Three eggs are laid almost as often as four.

In the Haunt of the Grey Butcher Bird (*Cracticus torquatus*)

By DONALD F. F. THOMSON, R.A.O.U., Canterbury, Vic.

During the spring, amongst the army of birds that followed the plough or perched nearby on a point of vantage, to pounce upon the cockchafer grubs turned over by the mouldboard, was a pair of Grey Butcher Birds (*Cracticus torquatus*).

For some time I watched them carefully without obtaining any clue as to the whereabouts of the nest I felt sure was close by. On October 7th, however, I was rewarded by seeing one bird fly off into the timber with a mouthful of grubs. I watched until it vanished in the trees, but hearing its loud echoing calls, I knew it had not gone far. After a short search I found the nest, about 20 feet high in a messmate or stringy bark sapling so slender and straight that I was afraid photography would be difficult.

A second nest was discovered on the same day. It contained two newly hatched nestings, and one egg, already cracking, from which the bird was about to emerge. This nest was also about 20 feet high, but photography was practically impossible. The male, though calling in the locality, displayed not the slightest signs of alarm or annoyance as I climbed the dense Casuarina tree to the nest. The female, brooding, sat tight until I was within a few feet of her, when she quietly slipped off the nest. After examining the nest, I descended the tree; the female went to a branch beside the nest, where she sat as if in great sorrow or dejection, and was still there when I left. It was remarkable, and intensely interesting.

I noticed somewhat similar behaviour on the part of this species at a later date. The extraordinarily quiet and detached air of this pair of birds gave me an altogether false impression of the nature of the species.

I spent the afternoon in building a strong staging upon which to work the camera at the first nest. It proved a long job, and the lifting of the green saplings into position was heavy work.

The birds, during the early part of my operations, were singularly silent and indifferent, remaining away from the locality for long intervals. Often, however, as I toiled at my staging, in the silence of the bush, one of the birds would swoop, like a bolt from the blue, with a swirl of wings and a horrible grating cry just over my head. More than once I received a scare, for, though these visitations were repeated at intervals, I was generally caught unawares. I was somewhat taken aback, to say the



Upper—Male with a lizard. Lower—Female.
Grey Butcher Birds (*Cracticus torquatus*), nest and young.

least, after my experience with the second pair at their nest, though the wicked, beady, black eye and hooked bill might have given me a suggestion of the true nature of the bird.

It was not until I became intimately acquainted with this particular pair of Butcher Birds, that I realised, and began to appreciate, the wonder of some of the notes of this bird. Admittedly, many of its notes are unmusical, nay, even harsh, but it has some of the fullest and richest notes, and the most glorious piping song I have heard from any bird. I now believe the song of the Butcher Bird at its best to be the finest song of any Australian bird which I know. To be fully appreciated, it must be heard in the deepest silence of the bush, and be uttered by both birds in unison.

Like many birds, I believe that the Butcher Bird sings its purest and best in moments of intense emotion, not only of happiness, but also of pain or sorrow. Certainly I have never been more moved by the song of any creature than when both birds burst into song in chorus, their heads held high, their bodies, down to the tips of their wings and tails, quiver with the intensity of the song. Would that others could have heard it too; there would be more true bird-lovers amongst us!

On October 8th I visited the nest again, and the birds became a little less shy. Next morning I went early to the nest and placed the camera in position, lashing it to the staging. Owing to the tall, thin nature of the saplings to which the staging was lashed, the whole structure swayed when the wind blew, in regular motion, like the roll of a ship. I used a long ladder to reach the staging from the ground.

The birds daily became more confident, and no longer refused to visit the nest. As usual, I operated the camera without the use of any distance release, and so became the centre of a very lively situation. So much so in fact that I was obliged to put my head under the focussing cloth for protection. Through the trees they would come, with their direct flight, like winged arrows, shooting past my head and snapping their bills viciously. I was always thankful that my eyes were not in their tracks.

At first, the female alone fed the nestlings; the male merely flying around, uttering his harsh alarm notes and attacking me from time to time. Later, however, he too assisted in the feeding operations. Though both birds fed the young, apparently the female alone brooded. On one occasion, whilst the female was brooding, the male arrived with a dainty morsel. The female, however, did not offer to move, but opened her own beak, whereupon the dutiful male fed her. Unfortunately, the light was too poor for photography. During the day heavy rain and hail fell. As the female returned to the nest to shelter the young, I was able to obtain a photograph of her, after a shower.

brooding. The rain drops may be seen glistening on the twigs below the nest.

After feeding the young, both birds would sit on the edge of the nest and look intently at the nestlings, sometimes gazing for several seconds at a time. So bugnacious did the male become during the day, that often, after feeding the young, he would pause on the side of the nest, suddenly launching himself at the camera, shooting quickly past. Once, during the day, he struck my head and also my finger, even drawing a speck of blood. This was the first occasion upon which I had known a wild bird actually to touch me in defence of its young.

Though the day was dull, and I could do practically no photography, yet during several hours spent a few feet from the nest, I learnt much of the intimate life and habits of the bird. In spite of heavy rain, I was obliged to leave the camera out, covered only by an oilskin coat, for many days and nights. On Wednesday, October 12th, I had a splendid day with the Butcher Birds. The day was cloudy at times, and exceedingly muggy and warm, but the birds were unaffected by it, being extremely bold and fierce. All idea of feeding the young seemed to have left them when I first arrived upon the scene, but after a long wait, my patience was rewarded by several good pictures.

At first the birds had fed the nestlings with insects, including many moths. To-day one dragon fly was brought, and small lizards were fed very freely. It was an interesting and ridiculous sight to see the waggling head of a nestling with the tail of a lizard hanging from its mouth, the protruding tail still writhing. The youngsters appeared to thrive on their reptilian diet, and were always ready for more. I obtained a photograph of the male at the nest with a lizard in his beak. As the day went on, the male became still more savage. He would suddenly flash into view, and, perching sidelong on a sapling as if to muster his strength and measure his distance, launch himself with a harsh note, or perhaps, with an ominous silence, broken only by the swishing of wings, striking as he shot past. His mate also joined him at intervals. I must confess that I breathed a little more freely when they had passed. Nevertheless, to have to shield my eyes all day, and continually dodge the birds, was rather a novelty.

It appeared that the birds did not feed the youngsters continuously all day, but full-fed them at intervals. That this was the case was further suggested by the absence of the birds at intervals, for more or less long periods, whilst at other times they would join in an attack upon me instead of attending to their domestic duties.

It was a unique pleasure and privilege to spend so many days in the home of this glorious songster and to study and photograph his intimate home life.

Notes from Wahroonga, Sydney, N.S.W.

By H. WOLSTENHOLME, R.A.O.U.

These notes are from observations of birds at Wahroonga, a North-Shore-line suburb, 12 miles from Sydney. They were made in the garden (or within 100 yards round it), largely from the verandah, which has trees and shrubs close by and a small bathing pool, hollowed out of a flat piece of sandstone, a few steps away in the shade of an apple tree. On three sides is almost virgin bush, with small areas here and there of tall eucalyptus, left by the timber-getters of last century and still happily untouched by the ruthless hand of civilisation. All the country north of the North Shore railway suburbs consists of the Hawkesbury sandstone formation, usually hard and rocky, sterile in appearance, and supporting its characteristic flora of Banksias, Boronias, Heath (*Epacris*), Apple-tree (*Angophora*), etc., etc., that Honeyeaters love, and where the shy Ground-Wren (*Hylacola pyrrhopygia*) may sometimes be seen. The land falls away into gullies which are studded and flanked with irregular masses of weathered and waterworn sandstone, and grow deeper and wider as their streams wind away to the salt waters of Cowan Creek or Middle Harbour—plenty of cracks and caves for the Rock Warbler (*Origma rubricata*), and thick scrub and undergrowth in places for the Whip-Bird (*Psophodes olivaceus*) and the Lyre-Bird (*Menura nova-hollandia*).

There would be 100 or more bush birds about these suburbs on their northern side, beginning at Roseville, six miles from Sydney, and it is a matter of surprise and regret that, with this amount of interesting bird-life close to a city, there seem to be so few individuals that go out among the birds and hear and see them in their native haunts.

Eurystomus orientalis. Dollar Bird or Australian Roller.—Very common in summer, small parties taking up a position in high trees, preferably on dead branches and doing short flying stunts to and fro as though practising or “showing off,” perhaps catching insects at the same time, to an accompaniment of rough, hoarse notes from both performers and spectators. Good glasses are needed to appreciate their varied hues. They rarely come down low.

Eurostopodus mystacalis. White-throated Nightjar.—At nightfall every fine evening in April one was to be seen in continuous strong and graceful flight of sweeping curves about the tops of the tall eucalyptus. Once only (April 16th) were two birds seen at the same time, when it was too dark to identify the species.

Eudynamys orientalis. Koel.—Unmistakable “cooees” were heard on two summer evenings, and a few nights later (January 14th) a bird came into the tall trees in the back paddock and “cooeed” several times. The birds have not been actually seen here, but have frequently been seen nearer the coast at Pittwater, about 8 miles away as the Crow flies.

Microeca fascians. Australian Brown Fly-catcher.—Jacky Winters are very common indeed and great favourites. They have no

bright plumage to please the eye, but are so lively, friendly, and useful, and such sweet songsters in the warmer months; frequent companions to the gardener (but often in high timber, where their song is usually given), alighting familiarly round about on twig or post, and flicking the white-edged tail to this side and that side. Quiet and trustful, alert and wistful, gentle, yet they are marvellously quick. If a morsel is dropped it will be caught in the beak before falling 6 inches. On good terms with all other birds with the exception of Cuckoos. Rather silent through the cool months, but they give prolonged "Peter Peters" in a variety of sweet tones and modulations in spring. Their chorus at dawn on a fine spring morning is glorious—a daily joy to the early riser in these parts. We feed some every day by tossing up little bits of cheese to be caught in mid-air—a natural way for fly-catchers to obtain food—and they take them most wonderfully with the greatest ease. A few posts close to the verandah are for their special use. In the garden they will alight just at hand or hover above one's head, asking for a morsel to be thrown to them. Their shallow little nests, though so small and hard to see, may be found easily by watching the birds. Their were four last season within 70 yards along the road by the gate. Usually they are in a big eucalyptus and frequently are quite low.

Gerygone albogularis. Bush-Warbler.—Plentiful. This little migrant fly-eater is here from spring to autumn. It is sometimes called the "Native Canary," having its breast a light canary colour, and possessing a beautiful song—a cascade of light liquid notes ending with a staccato note not always heard. It lives chiefly aloft in the big gums. The nest is of the Tit-Warbler (*Acanthiza*) type, very elongated, with a hooded entrance and a long tail.

Eopsaltria australis. Shrike-Robin.—Very common indeed, and, like the Jacky Winter, most attractive, but very different. It is heavier, slower, more deliberate, often eyeing a piece of food for quite a little time before hopping down to it. Does not hover, and moves about silently in thick, scrubby and shaded parts (perhaps its large eye is to assist the sight in these places). Here one is almost sure to be seen in its well-known position, clinging diagonally to the vertical stem of a small tree, and never far from the ground. Some are usually in the garden. First to wake and last to sleep, their gentle and regular one-note whistle is (along with the boisterous laugh of the Kookaburra) the earliest of bird-notes at day-break, and the latest at nightfall, but throughout the day it is not so much heard. The strong "Tehoo Tehoo" is given in the nesting season only.

Some of the birds are tame—friends of all the household—and take cheese perching on our hands. Two were given names—"Cheeky" and "Stumpy," he was minus his outer tail feathers for a while. Trustful, unassuming and peaceful by general repute, and rightly so, yet, at times, quite otherwise. If food is being distributed, they are very jealous of the Jackies and try to keep them away, and occasionally they fight amongst themselves. At the bathing pool Robin is selfish and exclusive. A Sparrow is usually there. If Robin wants to go in, he just jumps at the Sparrow. Sparrow as a rule goes; if not, Robin jumps on him, and, applying his beak effectively, has the bath to himself. He objects to strangers, and rudely drives off Redheads (*Aegintha temporalis*) or other small birds. The nests about here are a uniform height, about 8 feet from the ground.

Falcunculus frontatus. Shrike-Tit.—Very numerous. Their queer chuckle or slow whistle is constantly heard in the eucalyptus trees. Young birds were often fed in the orange trees. In the quiet of the bush the presence of these fine birds is sometimes discovered by the crackling noise made in breaking and pulling away bits of dead

bark with their powerful mandibles, as they search for their insect food. At the bath one will flop down suddenly, causing a scare and a scurrying away of the bathers as though he were a Butcher-Bird. He will splash about energetically, looking very alert and more handsome than usual with crest and tail spread—formidable, no doubt, to the smaller birds that do not venture near while he is in possession. A pair nested at the extreme top—70 feet high—of a lanky blackbutt near the fence.

Pachycephala rufiventris. Rufous-breasted Whistler.—These great songsters may be heard in all directions in spring and summer, except during a kind of midday siesta on hot days. Most of them go north in the autumn. They have many melodious notes. The chief one is heard at its best in the mating season, when the males are in competition with one another, and in their excitement at this time they have a curious habit of bowing or bobbing their bodies up and down. This note is a rapid and confused blending of rich and resonant melody impossible to imitate. It is heard, too, when the nest is being made. The female bird attends to this, but whether she goes some distance away collecting material or whether she is at the nest arranging it, the male bird is never very far from her, making the bush resound with his approving outbursts and joyous song. That is his only assistance. But it must be recorded that later on he takes a turn sitting on the eggs, which many male birds do not.

Other pleasing notes are the leisurely "Echews" and the short whip-like notes. Then there is the loud single piping note oft repeated—so many times frequently that one wonders when it will cease. When this is given it follows at the end of the commonest call. Any sudden noise such as the report of a gun, a clap of thunder, blast at a quarry, always startles these birds into song. The female is not seen as often as the male, and has not his bright colours or fine notes.

Pachycephala gutturalis. Yellow-breasted Whistler.—These are plentiful, but not so common as the Rufous-breasted. They prefer the scrubs and brushes of the gullies. A more handsome bird to look at, but an inferior songster, though he has some fine calls—one that is reminiscent of the well-known note of the Grey-Shrike Thrush (*Colluricincla harmonica*) and one with a whip-like swish at the end. The Whistlers are particularly fond of caterpillars, and may frequently be seen in the trees pulling out quite large ones from under the bark. One female bird used to come about the verandah and take bits of cheese that were thrown down. Its plumage is darker than that of the female *rufiventris*, and has a green tinge. The nest of the yellow bird is more solid than that of the rufous bird, and, speaking generally, is nearer the ground.

Rhipidura flabellifera. White-shafted Fantail.—Very numerous. Fearless and inquisitive (yet in a shy kind of way), fussy and restless as a Honeyeater, the peculiar little whistle may be heard all through the day in the nesting season, as they hop and flit about in the scrub and trees. Very quick and active in pursuit of flying insects, they dart or dive suddenly in any direction, making the flight sometimes appear jerky. Nests about here are very low—some only 2 feet from the ground.

Rhipidura rufifrons. Rufous-fronted Fantail.—Not nearly so numerous; but they frequently come up from the gullies to the gardens and are sometimes seen hopping about in company with the White-shafted. They are similar in habit to the white-shafted species, but more beautiful in appearance—a study in rufous shades.

Seisura inquieta. Restless Fly-catcher.—The Scissor-grinder is plentiful—a fine and interesting bird to observe with its lustrous

dark-blue (not black) head, on which the feathers can be erected into a little crest, and its under parts pure white except for a slight wash of rufous on the chest of the female. It calls so sweetly (though, perhaps, holding the while a large moth in its beak), "Tu whee, tu whee" high in the gums or on a telephone post, and gives the grating, grinding notes lower down among the fruit trees and vegetables. Close to the ground it flies along very slowly, and at times hovers as it searches the ground for insects and spiders, suddenly, maybe, dropping down on to them like a Kookaburra on to a mouse. In hovering it gets its body and tail into a more vertical position than Jacky Winter, and its head seems more pointed to the ground. The scissor-grinding sound ends with notes at a higher pitch than those at the beginning. This effect is produced by opening the mandibles wide. It does not nest low and near houses like its relative, the Willie Wagtail Fantail (*Rhipidura leucophrys*), but usually high in a eucalyptus.

Myiagra rubecula. Leaden Fly-catcher.—Not plentiful; but birds are to be heard and seen now and then in the high timber, never about the garden. The tail is not held up like that of the Fantails, but sometimes shows a slight quivering or trembling movement when the bird is at rest. The female differs from the male in having throat and breast rufous, which in the male are of a greeny-blackish colour.

Monarcha carinata. Black-faced Fly-catcher.—Not common. "Why-you, which-you," heard two or three times, revealed the presence of two birds in a thick Pittosporum (*P. undulatum*) on February 17th. They are singular looking birds as though wearing a black mask, the face and throat being in such contrast to the grey upper and rufous under parts. Odd ones also were seen on a few other occasions—one with face and throat grey looked commonplace in comparison with the black-faced birds. This was a female or immature male. They keep in thick brush country as a rule.

Psophodes olivaceus. Whip-Bird.—Fairly common a little way off, where there is thick undergrowth in the gullies. They come up to the shrubberies in the warmer months, and may then be frequently seen and heard near the ground among thick umbrageous shrubs in the gardens that border on the bush. They are very shy.

Acanthizae. Tit-Warblers.—These lively and most useful little birds are very numerous in small flocks. About the ground, often among the vegetables and flowering plants, may be seen parties of *A. chrysorrhoa* (Yellow-tailed), and less often *A. reguloides* (Buff-tailed), active and busy feeding on aphids and other insect pests, and showing their yellow or buff upper tail coverts as they flit from place to place.

Going through tree after tree (particularly Acacias) in little companies, the Little (*A. nana*) and Striated (*A. lineata*) may be distinguished, hard at work decuring insects. *A. pusilla* (Brown), darker, and with spotted chest, is not so common; keeps more to the bush.

Malurus cyaneus. Blue Wren-Warbler.—The bright warblings of these lovely little birds are to be heard in every garden as they hop and flit about among the small plants and creepers. Some will come to the verandah, and take cheese thrown to them. It is surprising how many birds like cheese. It must be more nourishing than the outer parts of many insects. They nested twice in honeysuckle on a bush-house.

The Variegated-Warbler (*M. lamberti*) of the same genus is fairly numerous, but stays in the wild undergrowth away from houses.

Colluricincla harmonica. Harmonious Shrike-Thrush.—These are very plentiful and are great favourites about the homes. They are

to be seen on the ground or among the trees and plants of every orchard and garden, rarely high even in bush timber. They live on grubs and all kind's of insects, spiders, beetles, small lizards, and have been seen swallowing with some difficulty large centipedes. One bird comes hopping along every day with cheerful confidence on to anyone's hand for cheese, and has been a family pet for a long time. It will hop about us as we lie reading, and sometimes wakes us up early by coming on to our pillows (two of the family sleep outside). This is quite an old bird—a male with chest a clear blue-grey, not streaked like that of the female. Its nest was placed in the young growth from a *Casuarina* stump about 3 feet from the ground. One young bird only was reared which came to us like the old bird for a while, then disappeared. It had a rufous eyebrow and a generally lighter colour. The rich, harmonious note for which these birds are famous is heard in the nesting season only.

Neesitta chrysoptera. Orange-winged Tree-Runner.—These are plentiful. They go about in little flocks, which give mournful notes as they fly over. They feed, too, in small companies, running along the branches and the tree trunks, usually head downwards, probing with their sharp beaks every little crack and hollow in the bark or wood in their search for insects, and uttering a little "Chip, chip" all the time. One has to observe a little party at work in thick scrub such as *Casuarina* to see their pretty marking and coloration and their yellow legs and feet. One can get quite close: they are so hungry and so busy, and always seem in such a hurry—going like a flash from one tree to another and displaying as they go the band of colour on the wings, which is bright rufous rather than orange. A pair nested in October and in January (perhaps same pair) high in two eucalypts 20 yards apart in the back paddock. The nest is built on a perpendicular branch usually dead, at a junction, and is difficult to find unless the bird can be followed to it with the eye.

Climacteris leucophaea. White-throated Tree-creeper.—Very numerous, especially in autumn. They live on the same kind of insect food as the *Sittella* and obtain it in a similar way, creeping up (never down) the tree trunk spirally or winding round the main limbs and suddenly darting away to the base of a neighbouring tree to begin another ascent, often giving loud and shrill piping calls and a pretty, soft, rattling note. Seen closely, they are beautifully marked (female having a clear orange spot near the ear); like the *Sittella* they show the rufous band on wing when they fly. Being rarely on the ground, they are awkward in an unaccustomed place such as the flat side of the bathing pool; on going in, the bird splashes and ducks and gives a loud cry between the splashes, which no other bird does.

Dicaeum hirundinaceum. Mistletoe-Bird.—Though common, this exquisite little bird (the male) is not very frequently seen notwithstanding its bright red breast, being very small and keeping aloft. Its shrill little chirp is often heard from the tree-tops or lower down from the clumps of the parasitic mistletoe (*Loranthus*), whose berries are greedily eaten and look as though they might choke the bird in its efforts to swallow them. It comes down at times into the garden trees in search of small insects—its principal food. A male bird was observed one day for quite a little while hanging by its feet from a clothes line head downwards like an acrobat. The male only has the gorgeous colours, female being inconspicuous and not much seen. The nest is made of light-coloured woolly-looking material obtained from various plants, and is sometimes decorated with small globules of red gum like rubies—a wonderful structure.

Egitha temporalis. Red-browed Firetail.—Very plentiful during April. Commoner than Sparrows. They were all round in flocks and about the garden, where their sibilant whistling was heard all day, and little flocks were flushed where the grass and weeds were long.

Many birds were not mature, being without any red on brow or bill; rump feathers just showing the red. They swarm round the bathing-pool. A party enjoying themselves there on a bright day is a pretty sight. Nests all round; they were still nesting in April.

Honeyeaters (Family *Meliphagidae*) are very numerous. Near the verandah is a Coral-tree (*Erythrina*), from which, when in flower, the varied notes of different birds from the Friar-Bird or the Leatherhead (*Philemon corniculatus*) to the Blood-bird or Crimson Honeyeater (*Myzomela sanguinolenta*) are heard, as they gather honey and insects, and flit hither and thither from blossom to blossom. It is remarkable that, among all the Honeyeaters in the coastal districts of New South Wales there are not many that have pleasing notes. There is no Honeyeater that, as a songster, can be compared with the Rufous Whistler or the Thrush (*C. harmonica*), the Australian Reed-Warbler (*Acrocephalus australis*) or the Jacky Winter. Many have notes that are harsh or discordant—the ejaculations of the Gill Bird or Wattle-Bird (*Icanthochaera carunculata*), the queer talk of the Leatherhead. The bright, insistent whistle of the Spinebill (*Icanthorhynchus tenuirostris*), and the lovely "Tink Tank" notes, now close, now distant, of Bell-Miners (*Manorhina melanophrys*), immortalised by Henry Kendall as being—

"Softer than slumber and sweeter than singing,"

give great pleasure to the ear; but these are the exception.

Melithreptus lunulatus. White-naped Honeyeater.—These are very common, and are here all the year round. Their well-known notes, one plaintive and another with a sort of sucking or lispng sound, are continually heard from the tall gums, where they chiefly live and nest. They come in small parties to the bathing pool, where they are shy and timid, but are not much seen in the flower garden. They obtain their honey from the native trees. Smallish birds, clean-looking and with bright colour contrasts—the black head, the white chest, the bright yellow green upper parts, and the little ring of vermilion about the eye. They are not fruit eaters.

Melithreptus brevirostris. Brown-headed Honey-eater.—This bird is not so common as the White-naped, but is plentiful. It might be said to resemble a White-naped, whose plumage has become very faded and shabby—a little blue about the eye. They are often in small companies in the bush trees and in the garden, where they are very fond of the large blossoms of cannas and *Bignonia grandiflora*. Their commonest note is rather jerky and unmusical. The Black-chinned Honey-eater (*M. gularis*), of same genus, is like an extra big *lunulatus*, with blue instead of vermilion about the eye. It is not common.

Myzomela sanguinolenta. Crimson Honey-eater.—This beautiful little fellow—about the smallest and the brightest in colour of the family—is plentiful roughly from October to February, according to the season—in some years more numerous than in others. Though their diminutive song may often be heard aloft in the eucalypts, the birds themselves are hard to see until they come down to the flowering shrubs in the gardens, where they may nearly always be found on the flowers of the Coral-Tree (*Erythrina*) or Native Bottlebrush (*Callistemon laucolatus*), both largely grown in gardens.

and both producing big blossoms of a scarlet colour—a good example of protective coloration. Immature birds are sometimes seen with very little scarlet on the back. The female, as in the case of the Mistletoe-Bird, has dull plumage and no song, but a chirp, and is rarely seen unless near her nest. About here they often choose a Turpentine tree (*Syncarpia laurifolia*) or a Sweet Pittosporum (*P. undulatum*) for their nests, which are frequently built very low.

Acanthorhynchus tenuirostris. Spinebill.—This lovely bird is the best-known Honey-eater in the flower gardens. He likes the bright blooms of summer time, and looks very pretty as he flits from plant to plant and gracefully balances or hangs on a flower spike or hovers beside it, while he culls the honey and little insects from the blossom-depths with his long tongue. A pair, perhaps, is on the same stem (the female is the one with duller plumage), and it bends over, maybe to the ground, with their weight. Active and restless and fussy, swift in flight, making a “Frip frup” sound with his rapidly-moving wings as he speeds along, always in a hurry, even his calls—especially the clear whistle, a single note repeated, given “tempo accelerato”—suggest impatience. Not a fruit eater, he is a genuine honey-eater and flower-lover. He often nests in small She-oaks (*Casuarina*).

Meliphaga chrysops. Yellow-faced Honey-eater.—This bird, one of the least attractive of the family to look at, is the most plentiful in these parts, and can always be seen in the native trees or about orchards and gardens. Inveterate orchard-robbers, they place a high value on their services as insect destroyers, when helping themselves to their wages in the form of fruit. In company with the Lewin or Yellow-eared Honey-eaters (*M. lewini*) and Silver-eyes (*Zosterops lateralis*) they do great damage to summer fruits and to apples and pears. These are all so greedy, when busy feeding on the fruit, that one can approach and stand within one or two feet (literally) of them without being noticed.

The Yellow-faced is the most tameable or least wild of the family—the Soldier-Bird or Noisy Miner (*Myzantha garrula*) excepted. Some come for cheese, almost taking it from our hands. A pair fed a young Pallid Cuckoo (*Cuculus pallidus*) four times their size, that took up a position in the nearest peach tree for two days on a liberal diet of cheese crumbs supplied by the household. They are almost as omnivorous as Sparrows, often feeding with them at the scrap-bucket on all kinds of refuse. One had a habit of coming into the kitchen, and was often found on the floor picking up morsels. Here, as elsewhere, they often nest in a bush or creeper quite close to a building. Their note is rather pleasant, but short.

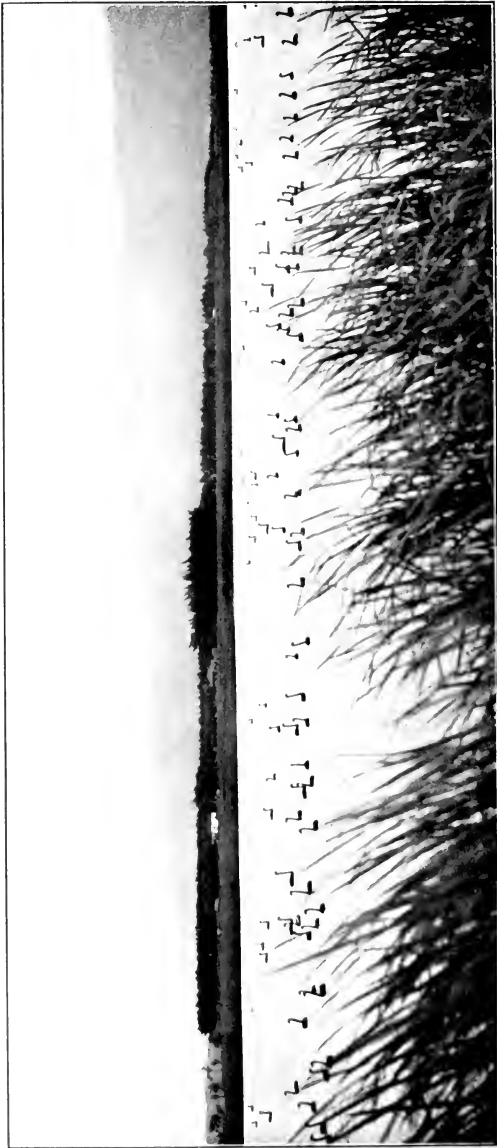
Meliphaga lewini. Yellow-eared or Lewin Honey-eater.—This Honey-eater is common especially in autumn—a finer bird in every way than *M. chrysops*; of a dull darkish green colour and with a large yellow spot by the ear. It is a robber of the orchards when the fruit is ripe, and, like the Oriole (*Oriolus sagittatus*) is very fond of figs. It also feeds on large insects and spiders, for which it will dart in under the verandah. These birds like thick leafy shrubs or trees such as Lillypilly (*Eugenia smithii*) or Sweet Pittosporum (*P. undulatum*) for their nests, which are placed not high in the tree and are fairly large and solid and beautifully lined bottom and sides—often with soft, downy material obtained from the seed cases of various plants. The old birds are very brave and pugnacious when the young ones are in the nest. Their chief call is a prolonged quavering note, rather musical and pretty.

Meliphaga melanops. Yellow-tufted Honey-eater.—These are not very plentiful, but companies are frequently seen—handsome birds with projecting ear-tufts of a rich golden-yellow and dull yellow crown which sometimes appears to be ruffled. Their hoarse notes are

heard aloft in the eucalypts, where they jump and flit about as though playing some game, and are hard to observe. They come down to the garden sometimes and to the bathing pool. They have not been seen to take fruit. Like the Crimson Honey-eater, they are fond of the Bottle-Bush (*Callistemon*) blossoms, among which, one bright summer's day, eight or ten were to be seen enjoying themselves—a sight to be remembered. They form little settlements, confining themselves to a small area for nesting. A previous season near here, in an area of about three acres, some fifteen nests (all 3 or 4 feet from the ground) were found in the young growth sprouting from the stumps of felled eucalyptus trees. Many of the nests had a little bit of paper fixed in their outer parts—a scrap of newspaper or torn-up letter.

Meliornis nova-hollandiae and *M. nigra*. Yellow-winged and White-checked Honey-eater.—These two fine birds, alike in appearance, habit, and note, often come about in the spring and summer. The White-checked has white about the forehead and particularly the cheeks. Their home is not in timbered country, but in scrub near the sea, about creeks and lagoons, among the Banksias, Callistemons, etc., whence it is not far to the gardens in these suburbs. Both species were to be seen almost every day in summer in a Coral-tree and an Acacia-tree, next to each other and close to some natural scrubby undergrowth. Restless, fussy and selfish and somewhat slow of movement, having feasted on the Coral-tree blossoms, they would move to the Acacia and hop about leisurely, giving their not very pleasing notes, waiting for some excitement—the advent of a brother to be welcomed or a stranger to be hunted. The chief concern seemed to be to keep every other kind of bird out of that tree. They would hasten across and hustle out any innocent Thornbill (*Acanthiza*) or Silver-eye (*Zosterops*) seen on the other side. (It is a transparent tree.) They rarely visit the flower beds and are not fond of fruit. Both species nest not far from the ground in small bushes.

Acanthiza albiventris.—Through the courtesy of the Australian Museum, Sydney, I have recently had the opportunity of examining the type of *Acanthiza albiventris*, North, taken at Dubbo, N.S.W., August, 1876, No. 22917. The species is distinguished from Gould by "rufous chestnut upper tail coverts and lighter under surface." (See "Aus. Mus. Cat.," Nests and Eggs, vol. i., p. 276.) Further and equally important differences have yet to be pointed out. These are the wider tail bar and the lighter tail base of *albiventris*. The colour of the upper coverts ("hazel," according to W. Ridgway's chart) runs well down on the outer webs of the tail feathers, and as these webs are particularly wide, the area so coloured is large. The inner webs of the tail feathers (basal half) are drab tinged with hazel near shaft. These characters of tail and upper coverts cannot be confused with those of *pyrrhopygia*, and constitute in my opinion a separate and distinct species, having a systematic position between *pyrrhopygia*, with the dark tail base and *uropygialis* with light and bright coloured tail base (cinnamon rufous). A coloured figure of what I take to be typical *albiventris* appears in Mathews' "Birds of Australia," vol. ix., plate 447 (1922), bottom figure.—A. G. CAMPBELL, Croydon, Victoria.



Introduced Black Swans (*Chenopus atrata*) on a lake in New Zealand.

Photo. by†R. H. D. Stidolph, R.A.O.U., Masterton, N.Z.



Feeding Wild Black-backed Magpies (*Gymnorhina tibicen*) at "Belltrees," N.S.W.

Photo. by H. L. White, R.A.O.U.

Camera Craft

Black Swan in New Zealand.—Both pictures were taken by me on March 26th last, on a lagoon near the Wairarapa Lake, Lower Wairarapa Valley. As you are aware, the Black Swan was introduced into New Zealand, and now is found in most parts of New Zealand suitable to its habits. As the photograph shows, the birds are quite plentiful on and near the Wairarapa Lake. There are a large number of lagoons around its borders. The nest, which was situated just inside the raupo seen in the



Nest of Introduced Black Swan (*Chenopsis atrata*), N.Z.

Photo. by R. H. D. Stidolph, R.A.O.U., Masterton, N.Z.

other picture, is probably one of the last of this season's. It had six eggs, much incubated. The photograph was taken from another Swan's nest ten feet away. The nests are built entirely of raupo leaves, and average at least three feet across. The water in which they were standing was about three feet deep.—ROBT. H. D. STIDOLPH, 28 Makora Road, Masterton, N.Z.

* * *

Wild Magpies at "Belltrees."—Every winter wild Magpies, the black-backed smaller species (*Gymnorhina tibicen*) are regularly fed at "Belltrees." The accompanying "snap" was taken within ten yards of Mr. White's office, where a staging is provided for a breakfast of chopped meat. The Magpies soon become trustful and tame, and make merry music at early morn and again at eve. When spring arrives the birds distribute themselves over the broad acres of "Belltrees" to breed, when they and their young devour hoards of noxious insects.

The Peaceful Dove (*Geopelia placida*) was rather timid, and visited the nest only four times in three hours. Once in the nest, however, it was an easy matter to secure a photograph. When I approached the nest to change plates, the Dove would fly to a near-by rock and try to attract my attention by fluttering about and feigning a wounded wing.—NORMAN CHAFFER, R.A.O.C., Willoughby, N.S.W.

Stray Feathers

The Name Nullarbor.—The note by Mr. H. W. Ford in the current (July) issue, page 66, interested me, as for some time I have been trying to get at the root of the matter in regard to the name "Nullarbor." The explanation given by Mr. Ford is the one which has been adopted by the Government in their handbook to the East-West Line, but I cannot help thinking that there was a previous native name from which the modern one was altered to suit the bare aspect of the great plain. The Rev. John Mathew, of Victoria, well-known for his writings on aboriginal matters, told me that in Curr's "The Australian Race," to which he himself contributed, the name is spelt "Nullabar"; this work was published in 1880, and had been in preparation for several years. Curr says, "The Wonunda Meening tribe at Eyre's Sand-Patch give the Nullabar a very bad name, say it is beset with savage dogs, which on one occasion devoured some of their tribe, which entered on it. . . . The Yinla Meening tribe have their particular conception of the horrors of the Nullabar Plain; it is the haunt of an immense serpent, which has devoured all the animals, grass, and trees which are supposed, ages back, to have grown on the now barren waste." The country of the first-named tribe was originally settled in 1877, and that of the second (the Eucla district) in 1872, only a few years before the publication of Curr's volumes, so that he is likely to have had the original name. Mr. Whitlock (in the January, 1922, *Emu*), after visiting the plain, and making enquiries among the railway staff, favours the native origin of the name, and was told by a native born in the vicinity that "Boora" means "wind." As the Great Plain is notorious for the high winds which race uninterruptedly across its wide spaces, we have here a likely clue to the original meaning; whatever "Nulla" may have meant in that district (there is still a "Nulla-Wadder" not many miles from Eucla), it is improbable that it "nullified" the meaning of the latter part of the name. I may also mention that Mr. Mathew suggests Olupa, a Central Australian term for "wind," as one that might easily have become modified into "Nullabar," as the natives do not distinguish between the sounds of p and b, and an initial vowel usually implies the elision of a preceding consonant.—H. STUART DOVE, F.Z.S., W. Devonport, Tasmania.



The Peaceful Dove (*Geopelia placida*) on Nest.

The Origin of Nullarbor.—Mr. W. B. Alexander, M.A., C.F.A.O.U., formerly keeper of Biology, Perth Museum, and now in charge of the prickly pear experimental station, Westwood, near Rockhampton, in a letter states: "Nullarbor should be spelt Nullabor. Sir John Forrest was the first to see the Nullabor Plains, and I heard him say that he was greatly amused that people should think he had made the name from the Latin *nulla arbor* (no tree) as he did not know enough Latin to coin such a word. It was an aboriginal name, probably connected with *nulla-nulla* (a club).

* * *

Magpie Cannibalism.—Mention in the April number of *The Emu* of the Magpie (*Gymnorhina hypoleuca*) killing a Sparrow recalls to mind two cases of Magpie cannibalism I have witnessed. Some years ago I noticed the Tasmanian lesser-white backed Magpie sitting on a post with a Sparrow in its beak, and on being disturbed, it dropped the unfortunate victim, which when picked up was almost dead. On another occasion a year or so later, I happened to be breaking down a patch of tall Scotch thistles when a Pipit flew out from beneath my feet, uncovering a nest of three dark-brown spotted eggs. In order to delude me, the bird feigned a broken wing for a minute, dragging itself slowly through the grass some yards away. At that moment a Magpie flashed down and picked up the little bird before it could get away, and flying off, stopped on a fence some distance away, where it killed and devoured its victim.—M. S. R. SHARLAND, R.A.O.U., Hobart.

* * *

The Mopoke.—One of the most famous bird cries in Australia is that of the Mopoke, and nothing has caused so much argument as the identity of the bird that utters it. Some ornithologists give the credit to the Boobook Owl, a bird that has a distinct and equally famous note. Many people identify it with the Frogmouth (*Podargus*), which does occasionally utter a semblance of the much debated call. This bird, in fact, is commonly called Mopoke in many parts of the bush; but the proper Mopoke in my native field, north of the Richmond River, is the Red Owl (*Ninox lurida*). The aborigines called it Mobok, whereas *Ninox boobook* was known to them as Boobook, or Bukbuk. In a great many cases the names given by them to birds were imitative of the birds' call notes. Many a night I have listened to the Boobook and the Mopoke calling in neighbouring trees. Both voices were a great pleasure to hear, but while the Boobook's notes were deep-sounding and quickly uttered, as though the bird were excited, the Mopoke's had much of the quality of the Australian Cuckoo, a sweet, lingering, and far-reaching sound. *Ninox lurida* is variously called Night Hawk, Mope Hawk, Hawk Owl, Red Owl, and Mopoke. Its cousin, the Winking Owl (*Ninox connivens*) also utters the Mopoke note.—E. S. SORENSON, R.A.O.U., Sydney.

Observations at Pittwater.—While walking up a steep grassy slope, I flushed a Pheasant-Coucal (*Centropus phasianinus*), which flew along the grass for some distance, alighting in the lower branches of a gum tree, and hopping by a series of jumps to the top. I was struck with the, what I believe is unusual, locality for such a bird. Though the grass was fairly long, there was no sign of any swampy ground within a mile or so. These birds are, I believe, rather rare as far south as Sydney.

I noticed a pair of Sacred Kingfishers (*Halcyon sanctus*) perching on a dead tree, and was surprised to see one dart into the air, capture a fly and return to its perch. I watched the birds for some time, and found them quite adepts at catching flies. I watched them for about twenty minutes, and only once did one miss a fly. They always returned to their perch before eating their victims.

There had been a fair amount of rain during the last few weeks, and the tank, belonging to one of the week-end cottages, was overflowing. The large round hole in the top was uncovered. A Magpie Lark (*Grallina cyanoleuca*) perched on the top of the tank, and, after having a drink, fluttered right into the water, where it floated for an instant in the fashion of a Sea-gull. It did this two or three times, finally sitting on the surface of the water and fluttering its wings to splash itself. It did not, however, stay very long doing this, but came out of the water very quickly. I have also noticed these birds picking up their food and running along the sand or mud flats after the tide has receded.—GEO. V. SCAMMELL, "Melrose," Middle Hd. Road, Mosman, 27/8, 22.

* * *

Buff-breasted Quail (*Turnix olivii*).—In the latest copy of *The Emu* a long and interesting article with coloured plates of this bird is recorded by A. J. Campbell, F.A.O.U., Melbourne. This bird is quite common in this locality, and I often shoot them when out Quail shooting. Usually found in pairs, and in some cases as many as six may be flushed in one lot by the pointer dogs. These birds frequent high ridgy country, and in sheltered pockets along the creek banks at certain times of year. In size, they are about equal to the ordinary Stubble Quail.—W. H. EDWARDS, R.A.O.U., "Coongoold," Colosseum, N.E. Line, Q.

* * *

Blue Budgerigahs. The blue-plumaged form of *Melopsittacus undulatus*, apparently is not rare in aviaries in England. Mr. A. Burgess, writing in *Natureland* (vol. i., No. 2), states:—"I find my Blue Budgerigahs very strong; in fact I sold two hens last year to a gentleman who has already twelve birds by these two hens only, and there are others now in the nest. I have twenty adults and eighteen young blues of 1920, so next year my runs will be full."

Occurrence of Coot in New Zealand.—In the Hon. G. M. Thomson's exceedingly valuable book, "The Naturalisation of Animals and Plants in New Zealand," recently published, mention is made of two specimens of the Coot (*Fulica atra*) being obtained in 1919 in the southern portion of the South Island. One was taken in May at Kaitangata, Otago, and the other in July at Matakura Island, Southland. Sir Walter Buller reported a specimen in July, 1889, from Lake Waihoia, Otago. ROBT. H. D. STIDOLPH, R.A.O.U., Masterton, N.Z.

* * *

Royal Spoonbill in New Zealand.—A Royal Spoonbill (*Platylea regia*), identified by a description sent by Mr. W. Leith, of Martinborough, to the Dominion Museum authorities at Wellington, was recently observed on the Ruamahunga River, near Martinborough, Wellington. An effort was made to protect the bird, but it eventually was shot, a fate that awaits all strange birds. This species has been recorded in New Zealand on but three previous occasions—*viz.*, 1875, mouth of Manawatu River, Wellington; 1892, Buller River, Nelson; and 1905, Greytown, Wellington. According to the Rev. H. W. Williams, M.A., the Maoris knew this bird by the name of kotuku-ngutupapa, a fact which shows that the bird was not unknown to them.—ROBT. H. D. STIDOLPH, Masterton, N.Z. 23/6/1922.

* * *

Numbers of our common **House Swallows** (*Hirundo neoxena*) stay all through the winter, and camp on the beams of Dunlop's Building over the canal at Dight's Falls, Abbotsford. In the winter of 1919 we used to have thirteen birds come in to roost every night. In 1920 only six birds stayed there. In 1921 some 20 to 30 Swallows camped with us. This year, the autumn being so mild, I noticed numbers of birds going under of an evening. I counted one night 59; next, 65; and following night (26/6/22), 70 birds went to roost by half-past 5 p.m. Unfortunately for them, the fireman went down to pump platform under the flooring with a light before daylight. This disturbed the poor little fellows, and they flew about, even resting on the man's hand. One I saw drowned in the morning. This so scared the birds that only two came to the old roost next night. We have only got as high as 25 now (1/8/22). It was very interesting to watch them coming in. Just after the 5 o'clock whistle blew, a flock of 20 to 30 birds would come up over building and under to roost, and then single birds, and up to five kept coming till near dark. I went down, and had a look, and saw that they rested side by side close together on the three narrow cross-pieces. On 1/8/22 seven birds came in during the rain and thunder-storm between 2 and 3 p.m., and sheltered on their roosts. Later (2/8/22) 27 birds on the roosts this morning only.—H. W. FORD, R.A.O.U.

Meliphaga fusca (Fuscous Honey Eaters).—These Honey-eaters (*Meliphaga fusca*), hitherto regarded as purely bush birds that required, as a rule, some searching for high up in eucalypts, have this year (at Wahroonga) come down to our doors. In the autumn (which was dry) they were observed at the drinking bath a little way from the verandah in company with White-naped Honey-eaters (*Melithreptus lunulatus*), at first one or two odd ones, then in increasing numbers and frequency until, through the winter, the bath was rarely without them. Both these species are very fond of water. Perched on the edge of the bath and taking drink after drink, they hold the water in the bill, and opening the mandibles a little, keep moving the tongue about, frequently beyond the end of the bill, evidently enjoying the feel of the water in the mouth. At other times, they indulge in vigorous splashings until the feathers are quite drenched. Later on, the fuscous birds took to coming to the ground just outside the kitchen door and picking up morsels of food. Here they were usually associated with Yellow-faced Honey-eaters (*M. chrysops*), and soon acquired such a taste for this new diet that they were sometimes flushed out of the scrap bucket. Later still (in July), while the loquat trees were in flower, they were to be seen going over the trees gathering honey and insects. Here again with different companions—their beautiful yellow-tufted brothers (*M. melanops*)—vocal duets were frequently to be heard, pleasing enough to bird-lovers, but not very sweet or melodious. In general appearance their colouring is quite dull—a grey brown above, light grey below with chest faintly marked. The olive yellow about the middle of the wing-quills (which are brown towards the ends) and the touch of the same colour on the side of the outer tail quills is not seen unless the bird is quite close, nor is the small pale yellow patch by the ear or the slight black marking about the eye easily visible. The bill is a clear light brown at base with a dark tip. They have typical Honey-eater notes—some cut short like those of the Yellow-faced; others rather querulous, somewhat resembling those of the Yellow-tufted, but not so rasping. There is a marked difference in the size of the birds—the females seem to be smaller relatively than is usual.—H. WOLSTENHOLME, Wahroonga, Sydney.

* * *

The "Lost" Paradise Parrot. This bird was fairly numerous twenty-five years ago in parts of the Wide Bay district. I saw many of them, also their nests, as described in your last issue. They gradually disappeared. Possibly continual firing of the grass, heavy stocking, and ring-barking on a large scale deprived them of certain grass seeds essential to their natural existence. Further, being ground-loving birds, they would be an easy prey to wild cats, which during late years have become very plentiful, and one of the greatest enemies of many useful birds.—W. H. EDWARDS, R.A.O.U., "Coongoold," Colosseum, N.E. Line, Q.

State Secretaries' Reports

QUEENSLAND.

Merops ornatus, the so-called Bee-eater, has again been the subject of an attack by the Queensland Bee-keepers' Association. A deputation from that body waited on the Brisbane and District Pests Board, and solicited support in requesting the Government to remove the bird from the protected list, and declare it a pest. Instances were given of cases in which, it was alleged, apiarists had to transfer their hives in order to have what bees the birds had left. The State Secretary of the R.A.O.U., who spoke at the invitation of the Mayor of Brisbane (chairman), presented evidence in the bird's favour, and suggested that the case was met by a clause in the new Animals and Birds Act that allowed owners of crops to destroy birds that were robbing them. The board reached a "half-way" decision on the question; they decided that as the bird was common and destructive it should not be protected, but that they could not advise that it be declared a pest. However, the Government with the advice of the chief entomologist, Mr. H. Tryon, R.A.O.U., settled the question by refusing both requests, and keeping the bird on the list of totally-protected species.

Subsequently (5th August) representatives of "Pest" Boards for the whole State discussed the case of *Merops*, and also those of the Crow (Raven ?) and English Starling. Again it was decided that the "Bee-eater" did not merit protection, but that it should not be proscribed. A motion to place a price on the head of the bird was withdrawn after the State Secretary had addressed the conference. Delegates also rejected a motion to increase the bonus on Crows, and carried a motion to remove the Starling from the list of "pests." In the course of discussion one councillor said he did not agree with the placing of a bonus on the head of any bird. The boards would be well advised, he thought, to confine their attention to flying foxes (fruit bats). Another delegate laid it down that the flying fox was the only creature listed as a pest that did not have some redeeming quality. In any case, he considered the whole work of the boards too suggestive of trying to bale the ocean with a bucket.

Sir William Beach Thomas, a distinguished British journalist and naturalist, was in Queensland recently. He was welcomed by officers of the R.A.O.U. in Brisbane, and in the Central district of the State he was hospitably entertained by the virile Rockhampton Native Bird Protection Association of Rockhampton, and by Mr. D. W. Gaukrodger, R.A.O.U., of Alice Downs, Blackall.

Mr. W. B. Alexander, M.A., C.F.A.O.U., who is now stationed in the Rockhampton district, has developed a latent talent for lecturing, and has done much good work of late in

speaking to public audiences and to school children about Rockhampton and Mount Morgan. Most of Mr. Alexander's lectures have been delivered under the auspices of the Central Queensland Bird Protection Association. Many of his slides are from the excellent photographs taken by Mr. Gaukrodger.

An agitation long carried on by Mr. E. J. Banfield ("The Beachcomber") of Dunk Island, has been taken up in Brisbane, with the result that the splendid Nutmeg (Torres Strait) Pigeon (*Myristicivora bicolor*) is to become totally protected for an indefinite period. The flights of this fine Pigeon have long been one of the features of the great coast of North Queensland, and it is not proposed to allow the bird to follow the Passenger Pigeon of America into extinction.

A. H. CHISHOLM,

State Secretary.

Reviews

ORNITHOLOGICAL HISTORY.

Mr. A. H. Chisholm, Hon. State Secretary, R.A.O.U., Queensland, although a busy man, has found time to prepare an excellent presidential address for the Queensland Naturalists' Club. The subject, an inspiration in itself, is "The Ornithological History of Queensland." Queensland possesses the most brilliant and remarkable of birds, while the ornithological history is wrapped up with the romance of the early history of the State. By taste and talent Mr. Chisholm is well equipped to prepare such an address, which appears in *The Queensland Naturalist*, iii., p. 66. It has also been issued as a "separate" in the hope that other States will write their own ornithological history, and thus complete the whole of Australia.

Mr. Chisholm regretted that the following details arrived too late to be included in his address:—The history of the discovery of *Ephthianura crocea* and *Zosterops gulliveri*, in the Gulf of Carpentaria district by Mr. T. A. Gulliver, Townsville. The types were divided between Count Castelnau, Melbourne, and Dr. E. P. Ramsay, Sydney, who together described them.* The Count's type (♂) of the beautiful Chat went to Europe, and is apparently lost, while the co-type (+) remains in the Australian Museum, Sydney. Gulliver was also the discoverer of *Poephila atropygialis*, Diggles. At that time (1875) Mr. Gulliver held out-posts in the Telegraph Department in the Gulf country. On one occasion the blacks intended to raid the station and kill the operator. When they arrived it was night, and Mr. Gulliver was indoors playing a concertina. "Music charms the

* Proc. Linn. Soc., N.S.W. I. (1876)

savage breast." The natives argued amongst themselves, that if they killed "white p'fellow" there would be no more music, and they desisted from their evil intentions, so Mr. Gulliver ascertained subsequently. He is alive and well to-day to tell the story.

Mr. Chisholm's "history" is of especial interest to many members of the R.A.O.U. It contains a group photo, of members and friends who attended the annual meeting, Brisbane, 1910. By a strange coincidence, the only unnamed person in the picture has a "deathless name"—Cadet D. B. Fry, of the Australian Museum, who fell in the Great War.

LIFE HISTORIES OF NORTH AMERICAN GULLS AND TERNs.

This important work, by Arthur Cleveland Bent, is issued as Bulletin 113 by the Smithsonian Institution, United States National Museum. The former part, Bulletin 107, "Diving Birds," for want of space, was only briefly noticed in *Emu*, xix., p. 327.

The present Bulletin, a respectable volume of over 300 octavo pages, is interesting to Australians because it contains nine species which are on the new Check-list of Australian birds, namely:—*Chlidonias leucoptera* (White-winged Black Tern), *Gelochelidon nilotica* (Gull-billed Tern), *Hydroprogne caspia* (Caspian Tern), *Sterna dougalli* (Roseate Tern), *Sterna anathetus* (Bridled Tern), *Sterna fuscata* (Sooty Tern), *Anous stolidus* (Noddy), *Stercorarius pomarinus* (Poramine Skua), *Stercorarius parasiticus* (Arctic Skua). It goes without saying that the work by Mr. Bent and his associates is most thorough, and, as previously stated, "a triumph for the field oologist and observer." The coloured plates of eggs are realistic even to the rough-grained paper, which adds to the natural appearance of the surface of the shells, and the numerous half-tone photos of birds, nests, eggs, etc., enhance greatly the value of the work. "The more useful, the more necessary," as a recent writer has stated, "because there is a tendency to consider the correct naming of a species as the whole end and aim of bird study, to the neglect of its more vital and absorbing phases."

NEW NATURE MAGAZINE.

Natureland, the new English quarterly journal of natural history, founded and edited by Graham Renshaw, M.D., F.R.S.E., devotes a fair amount of space to notes and articles on birds. In the second number, for instance, J. M. Vaughan, writes on "Bird Words," C. B. Horsburgh contributes "Ornithological Notes from Cyprus," and the Marquis of Tavistock discusses "Parrakeet Acclimatisation in England." The Marquis states that Black-tailed Parrots or Smokers (*Polytelis melanura*)

are quarrelsome among themselves, and pairs must be separated during the breeding season. "Their flight," he adds, "is marvellous in its speed and grace, and I should say superior even to that of the Swift."

Dr. Renshaw, who is widely known as a naturalist and the author of several excellent books on wild life in Africa and elsewhere, is to be congratulated on his enterprise in launching this journal, which appeals to all classes of naturalists, both in Britain and the Dominions. Each number is finely illustrated by half-tone plates from photographs on art paper. The Editor's address is Bridge House, Sale, Manchester, England.

THE AUSTRAL AVIAN RECORD

The Austral Avian Record, vol. v., pt. i., is a most interesting number. In the "Additions and Corrections" of Australian bird names many additions are made to synonymy, and two prior names are revealed in the part. *Circus juxta* Peale, p. 64, is figured on the prior plate, xviii.; this may displace *approximans* described on p. 64. *Climacteris superciliosa* of North may be antedated by *affinis* of Blyth, 1863.

Two new genera are also proposed. *Dipardalotus* for *Pardalotus rubricatus* and *Sugomel* for *Myzomela nigra*. Mr. Mathews is steadily approaching the limit of one species, one genus; the only point on which Australians disagree with his fine work.

Perhaps the most interesting section of the present part is that dealing with "Thomas Watling, Artist." It includes well-executed reproductions of seven of those famous "drawings" attributed to Watling. The Check-list Committee is in agreement with Mathews as to the seven names given. The plates are named *Muscicapa cucullata* (the Hooded Robin), *Gracula viridis* (the Olive-backed Oriole), *Lanius torquatus* (the Grey Butcher-Bird), *Turdus frivolidus*, *Turdus tenebrosus*, *Cuculus palliolatus*, and *Tringa aurita*; the four last names are not used by the Committee.

Obituary

The Launceston papers recently announced the death of Frank Mervyn Littler, after a short illness; no particulars were given. Mr. Littler was one of our oldest members, and contributed a paper to the first number of *The Emu* and numerous others afterwards. He compiled a very useful "Handbook to the Birds of Tasmania," many of the illustrations to which were contributed by another Launceston ornithologist, Mr. H. C. Thompson. Besides ornithology, Mr. F. M. Littler distinguished himself in entomology, and was a Fellow of the Entomological Society of Great Britain and a member of the Society of Economic Entomologists of America. His premature decease will be widely regretted.

Library Notes

By F. ERASMUS WILSON, R.A.O.U., Hon. Librarian.

The following publications have been recently added to the R.A.O.U. library:—

British Birds, parts 3-12.

Part 5 contains an interesting article on the "Great Auk," by W. H. Mullens, M.A., LL.M.

Proceedings of the Royal Society of Tasmania for 1921.

The Avicultural Magazine, vol. xii., parts 7-12; vol. xiii., Nos. 2, 3. Vol. xii. (11) contains an article on the successful breeding of the King Parrot in England by M. Amslet, M.B.

Revue Francaise d'Ornithologie, No. 150-156.

Victorian Naturalist, vol. xxxviii., Nos. 6-12; vol. xxxix., Nos. i, 2.

Queensland Naturalist, vol. iii., No. 3.

Condor, vol. 23, Nos. 5, 6; vol. 24, No. 2.

23 (6) contains a splendid article on the Black-tailed Gnatcatcher by Robert S. Woods, which is accompanied by some beautiful photographic illustrations.

24 (2) contains a well-illustrated paper on "A Large Tern Colony in Texas," by J. R. Pemberton.

Bird Lore, vol. xxiii., Nos., 4, 5, 6; vol. xxiv., No. 2.

Nos. 4 and 5 respectively have as frontispieces beautiful coloured plates of Grackles and the Canada Goose.

Proceedings of the California Academy of Sciences, vol. ii., part ii., No. 17; vol. ix., Nos. 9-15; vol. x., Nos. 1-9.

*Notes on the Osteology of the Young of the Hoatzin (*Opisthocomus cristatus*) and other points on its Morphology*, by Dr. R. W. Shufeldt (author's reprint).

South Australian Ornithologist, vol. vi., Nos. 4, 5.

No. 4. "Notes on birds met with during a visit to South-West Queensland," by A. Chenery, M.R.C.S., L.R.C.P., "Some Tasmanian Bird Notes," by Edwin Ashby, F.L.S., M.B.O.U.

No. 6. "A trip to North-West Australia," by A. M. Morgan, M.B., B.Ch. "Notes on birds seen during a recent visit to the Western Darling, N.S.W.," by A. Chenery.

Ibis, 11th series, vol. iii., No. 4; vol. iv., Nos. 1, 2.

iv. (2) "On the sense of smell possessed by birds," by J. H. Gurney, F.Z.S., M.B.O.U.

"*Life History of North American Gulls and Terns*," by Arthur Cleveland Bent.

A valuable acquisition to our library, as the author has most exhaustively treated with the subject. The illustrations, which are very numerous, are of a high order.

Annual Report of the United States National Museum, 1921.

The Auk, vol. 38, No. 4.

Report of the Smithsonian Institute, 1919.

Proceedings of the Royal Society of Victoria, vol. XXXIV. (new series), part ii.

Australian Zoologist, vol. ii., part iv.

Notes on Tubinarks, including records which affect the A.O.U. Check-list, by Robert Cushman Murphy (author's reprint).

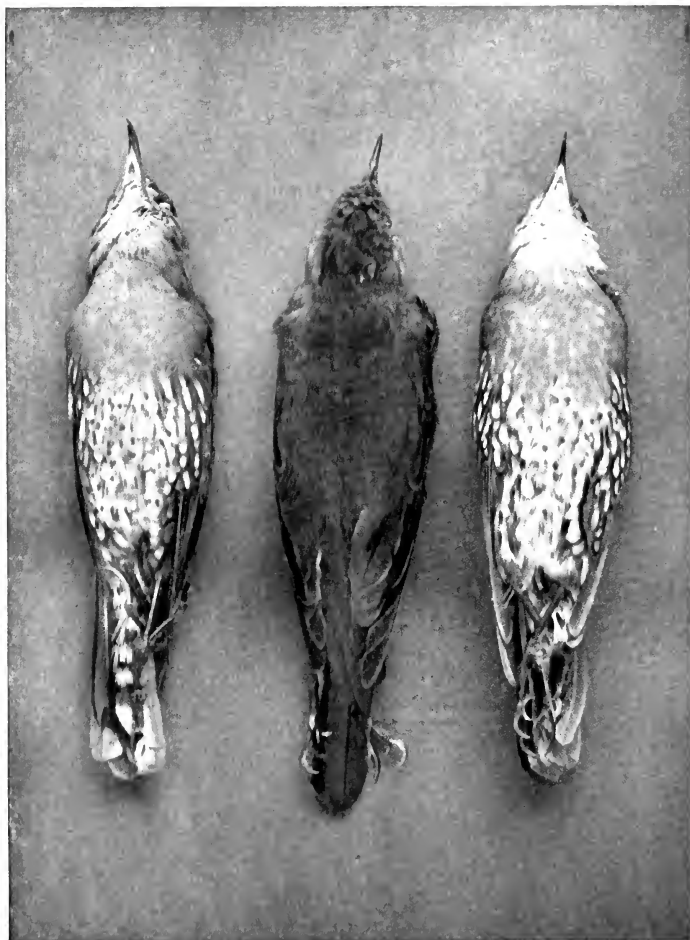
A Critical Study of the Fossil Bird, Gallinuloides wyomingensis castman, by Dr. R. W. Shufeldt (author's reprint).

About Members

MR. H. L. WHITE, OF "BELLTREES," HONOURED.

The June number of "Stamp Collecting," a weekly newspaper for philatelists, published in Great Britain, contains a report of the opening at Bath of the Ninth Philatelic Congress of Great Britain, described as "the Parliament of Philatelists," at the first session of which (on June 20th) the following names were adopted for entry on the Roll of Distinguished Philatelists, these having been approved by the affiliated societies and by the congress, namely: Dr. Ricardo D. Elicabe (Argentina), Mr. Bertram McGowan (Great Britain), Captain H. R. Oldfield (Great Britain), Mr. Nils Strandell (Sweden), and Mr. Henry L. White (Australia). "These names," the record goes on to state, have accordingly been duly inscribed on the Roll; and recognition was publicly accorded them at the closing session of the Congress on Friday last. The Roll now contains the names of forty-five distinguished Philatelists, headed by his Majesty the King." For many years Mr. White has made the collection of stamps, and especially rare stamps, one of his hobbies; and the presentation of his fine and unique collection, valued at about £20,000, to the Mitchell Library, some time back, has been the subject of much eulogistic comment in the world of Philately.

Members are pleased to note the honour conferred on our Honorary Life Member, who is distinguished in Ornithology as in Philately.



THE LITTLE TREE CREEPER
Comateres nino

Left figure—Male
Ventral view

Middle figure—Male
Dorsal view

Right figure—Female
Ventral view

The Emu

Official Organ of the Royal Australasian Ornithologists' Union

"Birds of a feather."

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[PART 4.

Tree-creepers of the Genus *Climacteris*

By A. J. CAMPBELL, C.M.B.O.U., F.A.O.U.

Mr. Gregory M. Mathews, in *The Austral Avian Record*, vol. v., pp. 6-7, and following on his "List of the Birds of Australia" (1913), has rearranged the Tree-creepers (*Climacteris*).

Mr. Mathews "is allowing *C. minor* (the Little Tree-Creeper) as a distinct species." Campbell and Barnard had already shown good grounds why it should be separated. (See *Emu*, vol. xvii., p. 29, which may be read in conjunction with the coloured plate.)

He is "admitting *C. waitei* (as a species) at present." On examination of more material he will find that *C. waitei* (*Emu*, xvii., pl. 1) is the immature bird of the Brown Tree-Creeper (*C. picumna*). The Allied Tree-Creeper (*C. wellsi*), Grant (*Ibis*, 1909, p. 664), appears to be a good species and not merely a sub-species of *C. melanura* (the Black-tailed Tree-Creeper). As Grant has pointed out, *C. wellsi* is a near ally to *C. melanura*, from which it may be readily distinguished. The adult male has the general coloration of the under surface chestnut or Argus brown, not the darker mummy brown; the under tail coverts are strongly barred, not narrowly tipped, white; and the general upper surface is olive brown, not clove brown. The adult female and immature bird differ in similar manner from those of *C. melanura*. The following are the dimensions in mm. of plesiotypes in the "H. L. White Collection," Nat. Mus., Melb.:—

No. 3003, —Length 170, culmen 16, wing 91, tail 70,
tarsus 27.

No. 3002, —Length 165, culmen 15, wing 91, tail 63,
tarsus 25.

Mr. Mathews, on the grounds of priority, would change the name of the White-browed Tree-Creeper (*C. superciliosa*), North, to *C. affinis*, *Journal Asiatic Society of Bengal*, No. 4, p. 453, 1863. The description, plate, type and type-locality of *C. superciliosa* are all perfectly clear (see Rept. Horn Exp. Central Australia," pt. II., p. 96 and pl. 7). Whereas, technically, the description of *C. affinis* is anonymous (described by "The Curator"), and is of a supposed variety of the Red-browed Tree-

Creepers (*C. erythrops*), which was received from the National Museum, Melbourne. Mr. Mathews says: "I have selected as the type locality"—Broken Hill! Broken Hill was not discovered in 1863, or, at least, the avi-fauna of that locality had not been exploited 60 years ago, so it is quite unlikely that the specimen sent from the National Museum, Melbourne, to India could have been connected in any way with Broken Hill.

Notes on the Pied Bell-Magpie (*Strepera graculina*)

By H. L. WHITE, C.F.A.O.U., Etc., Belltrees, N.S.W.

When Mr. Wm. McLennan was in the Cape York Peninsula, I requested him to pay particular attention to a *Strepera* there, the eggs of which he secured.

McLennan has sent some interesting material (now in the "H. L. White Collection," National Museum, Melbourne), which tends to prove that this extreme northern bird differs from the typical species, or, say, birds from Belltrees, N.S.W., in having: (1) Darker or denser coloured plumage; (2) larger and more hooked bill; (3) greater amount of white on the wings, and its larger size, which is contrary to the rule for northern birds.

I described the eggs of this northern bird under the name *Strepera graculina robinsoni*, Mathews (see *Emu*, vol. xxi., pp. 164-5), and drew attention to the different construction of nest in *Emu*, vol. xxii., p. 116. Since I have received what I believe to be skins of *S. g. robinsoni*, taken at the type locality, which prove to be a smaller mountain form, apparently wedged in between typical southern *graculina* and the larger Cape York bird.

As the range of *S. graculina* extends from the Grampians, Western Victoria, to the Cape York Peninsula, some interesting work devolves upon students to work out the species. In the meantime, I furnish comparative dimensions, in millimetres, of typical birds, and of the two supposed northern forms. If after examination the Cape York bird is worthy sub-specific rank, I suggest the name *Strepera graculina magnirostris*.

Coen Specimens (Cape York Peninsula)

♂	Length, 520;	Culmen, 68;	Wing, 266;	Tarsus, 53
♂	.. 534;	.. 70;	.. 280;	.. 55
♀	.. 484;	.. 56;	.. 254;	.. 51

Cairns or Mountain form (Queensland)

♂	Length, 415;	Culmen, 58;	Wing, 240;	Tarsus, 51
♀	.. 432;	.. 55;	.. 230;	.. 48

Belltrees or Typical (New South Wales)

♂	Length, 496;	Culmen, 57;	Wing, 258;	Tarsus, 51
♀	.. 457;	.. 52;	.. 254;	.. 51

A Trip to the Fortescue River and Hamersley Ranges, North-West Australia

By F. LAWSON WHITLOCK, R.A.O.C., Tudor,
via Albany, W.A.

The Fortescue River and Hamersley Ranges are intimately connected. Both run in the same direction—roughly E.N.E. to W.N.W.—and, generally speaking, in parallel courses some twenty miles apart. The ranges, however, have considerable extensions to the southward, where they are connected with other, at present unnamed, ranges. Still further to the south lies Mt. Bruce, 4,024 feet, the highest point in Western Australia. Mt. Bruce lies immediately to the east of a large tributary of the Fortescue River, known as the Lyons River, or Southern Branch. The length of the true Hamersley Ranges is about 150 miles. The course of the Fortescue River, where it is recognisable as a river bed, is about 200 miles. The ranges proper have a width of from twelve to twenty miles. They rise abruptly from a plateau elevated about 1,400 feet above sea level. All their northern slopes drain into the Fortescue River. One of the highest mounts of the Ranges is Mt. Pyrton, 2,727 feet.

In June, 1922, it was arranged that I should pay a visit to the Fortescue River and the Hamersley Ranges on behalf of Mr. H. L. White, of Belltrees, New South Wales, who financed the trip.

Of course, in a period of a few months it would not be possible to do more than run over such an extensive area of country, and with small chances of observing rare or secretive forms of bird-life. It was decided, therefore, that I should make for the most convenient point accessible from Roebourne. Outside the north-west, it is always difficult to obtain reliable information as to the character of any part of the country, and also as to the presence of drinkable water, unless one is lucky enough to run across someone who has actually lived in the area to be visited.

Lately, Mill Stream Station has been much before the public eye in connection with cotton growing in the north-west, and the description in the press of the magnificent pools of water found in the Fortescue River, which passes through the run, decided me to make my headquarters there.

I left Fremantle by the S.S. *Muideroo*, on July 16th last, and arrived at Point Samson some six days later. The voyage was calm and uneventful. The only birds met with of special interest being a few examples of the White-headed Fulmar

(*Pterodroma lessoni*), and a few petrels of dark plumage and smaller dimensions. The steamer, however, ran close to North Sandy Island, in the Dampier Group, and with the aid of my field-glass I could make out a pair of Sea-Eagles, whose acquaintance I had made some three years previously.

A short run by train took me to Roebourne, and on 25th July I travelled by motor to the Fortescue River, distant some eighty-five miles. The journey was more interesting as a motoring experience than from an ornithological point of view, as one attains a height of 1480 feet in a journey of a very few miles. This altitude is reached on what is known as the Tableland—an elevated tract of country which rises abruptly from the low-lying plains to the south of Roebourne. The most interesting bird observed was a single example of the Black Kite (*Milvus migrans*), which rose from the ground on being disturbed by the motor. The general appearance of the tableland is barren and treeless, the surface being covered as a rule with a sparse growth of Spinifex (*Triodia*), but the rocky hills and steep gullies around and across which the road twists and turns, and the extensive views of the plain below are picturesque in the extreme.

I reached the Fortescue River about 4 p.m., and decided to camp within view of Mill Stream homestead on the south side. The river was running freely, but the flow of water was divided into four or five streams. I chose a pitch on an elevated part of the river bank, out of the reach of a possible flood, and sheltered by several River Gums (*Eucalyptus rostrata*). Near at hand were three fine specimens of a species of fan-palm that I had never previously met with in the north-west.

On the margin of the river was a fairly thick fringe of reeds and other aquatic vegetation, whilst Cajuputs (*Melaleuca leucodendron*), River Gums, and trees of smaller species were abundant on the various gravel banks and more elevated portions of the river bed. The surface of the ground was thickly carpeted with couch grass. My camp was sheltered from the strong east winds which often prevail in these latitudes by a steep flat-topped hill, the side of which, facing the river was almost precipitous, and much encumbered by fallen debris from above.

The night proved to be very cold, and I was glad when the notes of *Meliphaga carteri*, *Stigmatops indistincta*, and *Acrocephalus longirostris* (Western Reed Warbler), warned me that it was sunrise. Whilst erecting a camp I was visited by two parties of Purple-backed Wrens (*Malurus assimilis*), the males being in full nuptial plumage. In no part of this State I have visited, have I seen this species so common. I afterwards found it was present in most unlooked-for places, where cover, which the *Maluri* favor, was conspicuous by its absence.



Photo, by F. Lawson Whitlock, R.A.O.C.

Mr. Whitlock's Camp

The only other species of this genus noted during the trip was the White-winged Wren (*Malurus leuconotus*). But this species was comparatively rare, which accords with previous observations made in what may be termed the heart of the true north-west. I saw more of this *Malurus* later on in the plains near the foot of the main Hamersley Ranges, and I found two nests from which the young had recently flown. I may as well mention here, that the year had so far, unfortunately, proved a dry one. Up to the time of my arrival in Roebourne only three inches of rain had then been recorded. These conditions prevailed during the four months I was conducting my observations. Not a single day occurred with a completely overcast sky. It was not until October that a few very local thunderstorms occurred, the fall of rain being meagre in the extreme. The natural result was that the necessary food being absent, birds, with very few exceptions, did not breed.

My earliest efforts were directed to the country in the neighbourhood of the river, and to the plains of Spinifex (*Triodia*) and grass intervening between it and the ranges, distant some fifteen miles. It was not until the end of September that I camped at the foot of the latter. Bird life near the river was plentiful enough, though the numbers of species observed was not great.

Amongst the most conspicuous were Magpie Lark (*Grallina cyanoleuca*), Blue-winged Kookaburra (*Dacelo leachi*), Sacred Kingfisher (*Halcyon sanctus*), with scattered pairs of Red-backed Kingfisher (*Halcyon pyrrhopygius*). Late in October a pair of Sacred Kingfishers were flying in and out of a cavity in a large Cajuput, but I am very doubtful if they really nested there. The fawn-breasted birds were quite as noisy as usual, especially in the morning and evening. I found them in parties of three to five. I could detect no young birds amongst them, and saw no signs of pairs which had taken up their stations near hollow-limbed trees.

The Dusky Miner (*Myzantha obscura*) was common among the river gums in parties of five to eight. The Black-faced Cuckoo-Shrike (*Graucalus nova-hollandic*) was also present, and was one of the few species I found nesting. Three nests were observed, but all in inaccessible situations, being placed in a small fork near the end of a horizontal limb of a Eucalypt. A little aboriginal girl brought me a fully fledged young bird, when camped nearer to Mill Stream homestead in November. About that period the Cajuputs were much infested with a large grey grub. The Cuckoo-Shrikes resorted to these trees in small flocks, and they, with the assistance of the Crows, must have destroyed numbers of them.

The Crow on the Fortescue, as far as I could make out, was exclusively the smaller Short-billed Crow (*Corvus bennetti*).

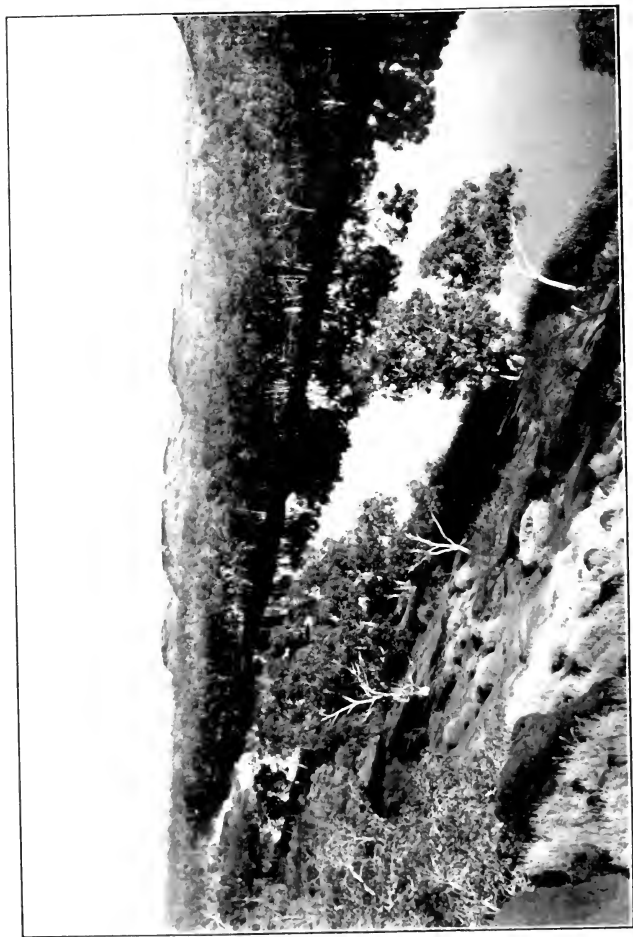
They were plentiful enough around the homestead, but were educated to the appearance of a gun. They waited their opportunity, and as soon as I was at a safe distance from camp, swooped down on any scraps of food thrown away. A pair breeding at the foot of the ranges as remarkably wary, and though I tried to ambush one or other of them when they came to drink at a trough, they never gave me the chance of a shot. This pair was nesting a mile and a half from the bore where I was camped, and came to drink several times a day. Their nest was fairly high up in a large River Gum. The Parrot family was poorly represented as regards species. This seems to be the case all through the heart of the true north-west. The Corella, or Bare-eyed Cockatoo (*Cacatua sanguinea*) was the most abundant. Large flocks frequented the river, but I could find no evidence of their breeding. The aborigines, when questioned, reported the same, "very few young this season." Galahs (*Cacatua roseicapilla*) were much less common than the preceding species, but in November they seemed to be coming in to the river from the dry back country. The largest flock I saw was feeding in a paddock not far from the ranges. They searched the ground for seed in a compact body rather than in extended order. One pair took up their station in a hollow Bloodwood Eucalypt (*Eucalyptus pyrophora*), but they appeared to abandon the idea of breeding, eventually.

A single pair of the Cockatiel (*Leptolophus hollandicus*) was seen. Their behaviour was much the same as that of the foregoing pair of Galahs.

Yellow-banded Parrots (*Barnardius zonarius*) were common in trees. Though scarce in the ranges, small parties were seen every day by the river. About the end of September I found a pair frequenting a "Myceim tree," which was much hollowed in its branches. This is a small species of Eucalypt found growing on the ironstone ridges, or on the precipitous sides of the rugged gorges intersecting the ranges. It appears to have only recently become known to botanists, and is yet to be described and named. I do not know for certain that the before-mentioned Parrots bred, as I shifted from this camp almost immediately, but appearances were promising. No young birds were brought in by the aborigines.

The Budgerygah (*Mclopsittacus undulatus*) is plentiful at Mill Stream in good seasons, but owing to the dry weather I saw few of them. I questioned the more intelligent of the aborigines as to the presence of a Parrot breeding in the Spinifex, but all shook their heads. They had never heard of a Parrot that did not breed in a tree.

Of the birds of prey the Little Eagle (*Hieraeetus morphnoides*) was the most common. I saw as many as three pairs



A fine reach in the Fortescue River, N.W.A.

Photo. by F. Lawson Whitlock, R.A.O.C.

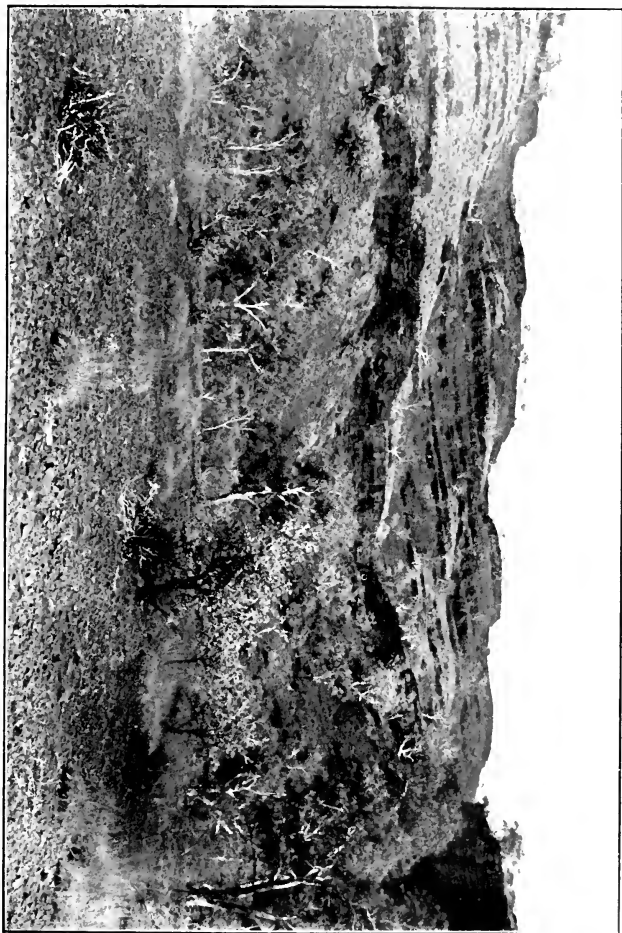
on the wing at the same time, over the Crossing Pool. This fine pool is over a mile long, and for some distance a hundred yards wide. The depth is considerable. Its margins are much frequented by Reed Warblers. An occasional Harrier (*Circus assimilis*) was also observed flying low over the reed-beds growing in the shallower parts of the pond.

Odd pairs of Whistling Eagles (*Haliastur sphenurus*), too, were occasionally seen. The Wedge-tailed Eagle (*Uroaetus audax*), was not much in evidence at Mill Stream. But Mr. Reginald Cusack, of Tambug Station—40 miles to the East—told me that pairs had bred on the run, and that the young bird had been destroyed when the nest was accessible. The common Brown Hawk (*Ieracidea berigora*) had also nested. Mr. Cusack kindly gave me a pair of eggs. He also gave me what he said was a Kite's egg taken from a nest also containing a young bird. The appearance of the egg confirms Mr. Cusack's identification. Of the smaller Hawks I noted a few pairs of the Western Kestrel (*Cerchneis cenchroides unicolor*)—locally called the "Sparrow Hawk," and also the true Sparrow Hawk (*Accipiter cirrhocephalus*). An odd example of the Goshawk (*Astur fasciatus*) was seen in a Cajuput near my camp late in November.

Owls were heard calling, when at a flying camp I had near the Crossing Pool. The night was bright moonlight, but for all that I could not distinguish either bird amongst the foliage of the River Gums. The note of one bird was distinctly lower pitched than that of the other. I shot a pair of what I took to be *Ninox ocellata* near this camp. Their plumage was much paler than that of specimens of the Boobook Owl (*Ninox boobook*) from further south. The iris of one bird was bright yellow, the other hazel brown. I was told on good authority that other species of Owls occurred along the river. Magpies (*Gymnorhina*) were very scarce on the Fortescue, and I saw nothing of them in the Ranges. The dry season may possibly have temporarily driven them away. I identified only two pairs, both near Mill Stream homestead. One pair built a nest, but I never saw the female sitting. It was in a very big River Gum. A Crow's nest was in a neighbouring tree. There were frequent squabbles between the two species. I am doubtful if either nest contained eggs. The Magpies appeared to be the Black-backed (*G. tibicen*). The Pied Butcher-Bird was sparsely represented too, but I heard this species whistling in the ranges at daybreak. Some birds appeared to build nests and then abandon them. This was the case with a pair of Magpie-Larks which built a nest near the Mile Stream spring. This spring rises suddenly in the bed of a creek, and has a flow of water estimated at 14,000,000 gals. every twenty-four hours. The water rises at a temperature of 82 deg., Fahr.,

and is wonderfully clear, and pleasant to drink. The stream divides into four channels near the homestead, and after irrigating the gardens, spreads out into the flats towards the main river. The depressions in these flats comprise large and almost impenetrable reed-beds, the haunt of several interesting species of birds. These comprise Reed Warblers (*Acrocephalus australis longirostris*), various Crakes (*Porzana*), Western Swamp-Hens (*Porphyrio*), Water Hens (*Gallinula*), and a species of Fantail-Warbler (*Cisticola*). These *Cisticolae* were very interesting, and I think their plumage was of a paler tint than that of a typical specimen. I found them very silent, but they had a feeble call-note, which at first I took to be the note of a nestling Crake. It was disappointing to see no signs of their breeding. They had a habit of getting up from the rushes almost at one's feet, and then dropping into the nearest dense cover, from which it was difficult to entice them. Occasionally they would perch in some conspicuous situation, showing but little fear at such times. The plumage of the upper parts was much striped. But in the specimens procured the nape was always greyish buff and unstriped. I could not get a view of the Crakes (*Porzana*) inhabiting the reed-beds, but the notes were identical with those of the Spotless Crake (*P. plumbea*), with which I am very familiar. I obtained, however, a small *Porzana* I could not identify with certainty. It was nearer to the Little Crake (*P. pusilla*), and had greyish white stripes on the mantle. Another bird seen swimming on the Mill Stream spring was a small species, and appeared to have a shield on the forehead. Mr. C. R. Irvine told me he had seen small Crakes running on the aquatic vegetation there, and that they had red eyes. The bird I saw had a feeble call, like the syllables "ik-ik-ik."

I could not get a specimen of the Swamp-Hen (*Porphyrio*), but a little aboriginal girl found an egg near the main river. This was kindly given to me by Mrs. C. R. Irvine. It resembles an egg of the Western Swamp-Hen (*Porphyrio bellus*). Pairs of the Darter (*Anhinga nova-hollandiae*) were on the Mill Stream Creek, and also on all the pools of the main river. Their clattering cries often called my attention to them when otherwise I might have overlooked them. Another aquatic bird I occasionally flushed when I went to the spring for water was the Black Bittern (*Dupetor flavicollis*). A pair of Little Grebes must have nested on the Mill Stream Creek, as I saw them with one very small chick. There was quite a fleet of this species of Grebe on the Palm Pool—so called from the proximity of many palms growing on its margins. This species of palm does not appear to be botanically known, and I was told on the best authority that it is indigenous, and peculiar to the Fortescue River. It is a water-loving species, and I never saw it more than a couple of hundred yards away from the



Typical view of timbered flats and hills showing sandstone strata

Photo. by F. Lawson Whitlock, R.A.O.T.

river or Mill Stream Creek. It produces a round seed the size and shape of a sandalwood nut. The flowers and flower stalks are red. The seeds are swallowed by Emus, as they have a soft outer covering which an Emu can digest. These palms reach a height of nearly twenty feet—measured to the topmost frond.

Pied Cormorants (*Phalacrocorax varius*) occurred as stragglers on all the pools. I picked up a feather, referable to the plumage of the Nankeen Night-Heron (*Nycticorax caldonicus*). Mrs. C. R. Irvine showed me a clever painting, executed by her daughter, Mrs. Roberts, of the head of a Mangrove Bittern (*Butorides stagnatilis*). This was drawn from life. At a pool near an out-station I observed a specimen of the Black-tailed Native Hen (*Tribonyx ventralis*). Mr. Irvine told me that one season this species appeared around the homestead in hundreds. They were very fearless, and it was difficult to give the fowls a feed whilst they were present. Individuals even came into the house. They disappeared as suddenly as they arrived.

Pelicans (*Pelecanus conspicillatus*) were not infrequent on the river. I identified only two species of Herons, viz.: the White-necked and the White-faced (*Notophoxr pacifica* and *N. nova-hollandica*). White Egrets (sp. ?) were occasionally seen. In the wet flats towards the river, I noted small flock of the Straw-necked Ibis (*Threskiornis spinicollis*), but they were not in breeding plumage. I saw but little of the Bustard or Plain Turkey (*Eupodotis australis*). Usually they were solitary individuals. But on one occasion I saw a party of three. It is strange that this wary species is not alarmed by the hum of a motor car, and allows of a very near approach. Several were shot for the table from a car by Mr. Irvine during my stay at Mill Stream.

On the grassy plains between the river and ranges a Bush Lark (*Mirafra woodwardi* ?) was not uncommon. During the heat of the day, for want of better shade, they camp on the lee side of fence posts. The Pipit (*Anthus australis*) was far from common, compared with other districts of this State. The Chats (*Epthianura*), owing to the dry season, were absent. The Crimson Chat (*E. tricolor*) was, however, well known as a regular visitor. Three other genera, common to most parts of this State, were also absent, viz.: Scrub-Wrens (*Sericornis*), Thornbills (*Acanthiza*), and Ground-Birds (*Cinclosoma*). This is in accordance with my other experiences in the heart of the true north-west. A form of the Yellow Silvereye (*Zosterops lutea balstoni*) was present by the river, and was also found near the homestead at Mill Stream. This is the first time I have found this species far from the coast. Another species not previously met with by myself in the north-west, was the

Western Fly-eater (*Gerygone culicivora*). It was, however, distinctly rare, as was the Mistletoe-Bird (*Dicaeum hirundinaceum*). Mistletoe was growing plentifully on the Cajuputs and other trees by the river and in the ranges.

Honey-eaters were not well represented as regards species. The Carter Honey-eater (*Meliphaga carteri*) was, of course, found in the River Gums near water, and in searching a big gorge in the ranges for a spring, I came across a small party there. I did not find this spring, but from the presence of these Honeyeaters I think it was not far away. In November this species was feeding amongst the flower heads of bushes growing in the river. The Grey-headed Honeyeater (*M. keartlandi*) was in scattered pairs in the ranges, and in the tributary creeks to the river. I missed the familiar call-note "chee-toyt, chee-toyt," which seems to be uttered only when pairs are breeding. The Brown Honeyeater (*Stigmatops indistincta*) was the commonest of the true Honeyeaters. Specimens varied much in size, and the song differed considerably from that uttered by this species in the south-west. Two species of Pardalotes were present; *viz.*, the Pallid (*Pardalotus pallidus*) and the Red-tipped (*P. ornatus*), the latter rather rare. The Pallid Pardalote attempted to nest. I dug one out, and found only two incubated eggs. Other pairs started tunnels, and then abandoned them when half finished. The same thing happened with the Rainbow-Bird (*Merops ornatus*), which was common by the river. The White-shouldered Caterpillar-eater (*Campephaga tricolor*) appeared in small parties in August. It was not till November that I saw individuals in full plumage. Three species of Wood-Swallows were present: The Black-faced (*Artamus cinereus*), the Little (*A. minor*), and the Grey-breasted (*A. hypoleucus*). It is the first time I have met the latter away from the coast. The Little Wood-Swallow occurred on migration by the river in July. In the ranges I observed pairs hawking about the rocky gorges. Occasionally one or other of a pair would fly into some inaccessible cavity in the cliffs, but whether or not they were really nesting, I cannot say. The Western Fantail (*Rhipidura flabellifera priessi*) was very rare on the river, but its congener, the black and white species, (*R. leucophrys*), was common everywhere, and a few pairs bred.

Amongst the Finches, the Chestnut-eared (*Tacniopygia castanotis*), was abundant near the river, and near sheep-troughs. It was not breeding, which was a wonder. The beautiful Painted Finch (*Emblema picta*) and the delicate Red-faced Firetail (*Bathilda ruficauda*) were present in very small numbers near the river, but in the ranges, near water, the Painted Finch was rather more plentiful. Near Mill Stream Spring a family party of Golden-backed Honeyeaters (*Meli-*

threptus lator) was flitting about amongst the huge Cajuputs, and in a gorge in the ranges I met with another party.

The Crested Bell-Bird (*Orcoica gutturalis*) was very rare, and the only pairs noted were found in Spinifex country dotted over with larger bushes or small trees. At intervals between the river and ranges were tracts of Snake-wood, with a rough growth, something between a large bush and a tree. This Snake-wood closely resembled the Wanyeo tree around Shark Bay, and also the Mulga of the East Murchison. A handbook of the trees and large bushes of this State would be invaluable to the field naturalist. Much confusion exists as to their vernacular names. In the same country inhabited by the Crested Bell-Bird I found scattered pairs of the Rufous-crowned Emu-Wren (*Stipiturus ruficeps*). They had much the same habits as the south-western species, and were difficult to entice from the large clumps of Spinifex (*Triodia*). Some birds were in moult and lacked their conspicuous tail-feathers. I spent much time in a vain search for nests. In climbing up to the summit of a big hill in the ranges in search of the playground of the local Bower-Bird, I saw a pair of Emu-Wrens at a height of quite 2000 feet. There was little cover on the sun-baked summit. Another bird found in company with the Emu-Wrens, was my old friend the Spinifex-Bird (*Eremiornis carteri*). It was, however, distinctly rare, and only occurred where the Triodia was growing in very large clumps. The males were not calling. The slopes of the rocky gorges in the ranges were clothed with innumerable clumps of Triodia, and in one gorge I came across a pair of Grass-Wrens (*Diaphorillus*). I watched them at intervals for about a week. They were evidently not breeding, as they shifted about so much. I therefore secured the male. Writing from memory, I think it is the Rufous Grass-Wren (*D. whitei*). I had a glimpse of a second pair in another locality, but could not find them again. A third pair were reported in some hilly country on the northern side of the river. The male called a little in the evening, but his voice appeared to be feeble in comparison with that of East Murchison birds; or perhaps its volume was dwarfed by the desolate surroundings.

Both at the river and in the ranges, the cheerful song of the Rufous-breasted Whistler (*Pachycephala rufiventris*) was heard, and pairs of Shrike-Thrushes (*Colluricincla* sp. ?) also added their music. A rare bird amongst the Snake-wood and dwarf Eucalypts was *Climacteris wellsi*, the Allied Tree-Creeper. I obtained a single example near Tambrey Station, some forty miles to the east of Mill Stream. Probably it had a mate, but a strong wind was blowing, and the ranges were almost invisible owing to clouds of dust. This will give some idea of the droughty conditions prevailing. Near the river, parties of Red-breasted Babblers (*Pomatostomus rubeculus*)

were present. I saw a number of old nests, and believe a few pairs bred. The Hooded Robin (*Melanodryas cucullata*) was in scattered pairs all over the run, but the Red-capped Robin (*Petroica goodenovii*) was confined to the river. I saw one pair feeding a young one. Curiously enough I did not see a single male in full plumage. Had this anything to do with the dry season? The Weebill (*Smicrornis brevirostris*) was common enough in the dwarf Bloodwood Eucalypts, but was not breeding. The Welcome Swallow (*Hirundo neoxena*) was present, and Tree Martins (*Hylochelidon nigricans*) were present in the ranges, and more commonly by the river. I think occasional pairs bred.

The notes of the Pallid Cuckoo (*Cuculus pallidus*) were heard in all parts, but the smaller Narrow-billed Bronze Cuckoo (*Chalcites basalis*) was almost absent. This was no doubt due to the dry season. Night-Jars were heard, but not identified, except the small Owlet Nightjar (*Egotheles cristata*). This species often called from the hole it was roosting in during the day. Mr. R. Roberts, the overseer of Mill Stream, reported putting up a pair of "Ghost-Birds" (*Eurostopodus* sp. ?) but was not able to get a specimen.

The Pheasant-Coucal (*Centropus phasianinus*) was not uncommon by the river, and a pair lived in a reed-bed near the homestead. Some years ago Mrs. R. Roberts, when out riding, flushed a female from her nest in the Spinifex. The eggs were brought home; they were at once put under a hen and hatched out in a week into very ugly nestlings. The hen promptly abandoned them, but they were successfully reared by hand. As pets they proved undesirable, and two were sent down to the Perth Zoo. The third was liberated, and for some time got its living in the homestead gardens.

It might be reasonably expected that Ducks would be abundant on the fine pools in the river. This was not the case, but in a better season things might be different. Perhaps a truer explanation is that the pools, owing to their great depth, do not contain a sufficiency of the necessary food to suit ducks. The magnificent "Deep Reach" pool, which is two and a half miles long, attains an average depth of fifty-two feet. Soundings up to sixty-one feet have been made. All these pools contain an abundance of edible fish. I separated six distinct species, but could not name any of them, except in a general way. I identified the common Grey (Black) Duck (*Anas superciliosus*), and saw another flock of a smaller species, with much white on the flight feathers (*Nyroca australis* ?), Kimberley Geese, Plumed Whistling Ducks (*Dendrocygna cytoni*), I was told, occur at certain seasons of the year. A bird common enough on the Coongan and the Grey Rivers, *viz.*, Black-fronted Dotterel (*Charadrius melanops*), was rare on the

Fortescue. I saw only one small party. Southern Stone-Plovers (*Burhinus magirostris*) were heard calling at night, but none was seen during daylight. On the pools were a few Black Swans (*Chenopsis atrata*).

At wells and at the springs in the ranges the little Diamond Dove (*Geopelia cuneata*) was very common indeed. On the river its place was taken by the Peaceful Dove (*G. placida*). I saw but one Bronzewing (*Phaps chalcoptera*). This was near a spring in the ranges. Quails were rare. Only one or two were seen. They looked like the Little Quail (*Turnix velox*). Parties of Emus (*Dromaius nova-hollandiae*) were occasionally seen in the country between the river and ranges. At one of my camps, three came regularly to the troughs to drink. A white specimen was reported on Mount Enid run, a station to the north-west of Mill Stream.

Other species of birds were seen at too great a distance to be identified with certainty, and single individuals of the two Song-Larks, *viz.*, the Brown Song-Lark (*Cinclorhamphus cruralis*), and the Rufous Song-Lark (*C. rufescens*), were noted.

One of the chief objectives of my trip was to see if I could not locate a Bower-Bird in the ranges. Mr. Tom Carter, a few years back, found a new sub-species at Yardie Creek, near the North-west Cape. Still further back I saw a single bird on the Talga River, near its junction with the Coonyan. This bird was so close above my head, that I dare not shoot at it with a twelve bore gun. The bird eluded me, in a subsequent chase. A few weeks later, I recognised a party by their flight on the de Grey River, and a local naturalist told me he had seen play-grounds on the neighbouring Ridley River.

The result of inquiries at Mill Stream as to the presence of a Bower-Bird in the neighbouring Hamersley Ranges did not give me much encouragement. However, I accidentally came in contact with Mr. T. Brown, a teamster. He had camped in different parts of the ranges, hunting dingoes during slack times. He told me that Bower-birds visited the springs for water at several of his camps. He gave such an accurate description of the bird and its habits that I had full confidence I should find the information correct.

Mr. C. R. Irvine told me at the same time of a gorge which he knew contained a spring within five miles of a bore, where I could camp. On 23rd September he very kindly motored me to the spot, and also conducted me to the mouth of the gorge. The following day, leaving camp very early, I went in search of the spring. The going was very rough, the bed of the creek being much encumbered with rocks of all shapes and sizes, which had fallen from the precipitous sides of the gorge.

Growing scrub and flood debris also added to my difficulties. The flies, too, were savage. I was told I should find the spring surrounded by a growth of Cajuputs, and naturally looked for trees of this species. This led me to overshoot the mark, and after tramping six miles or so, I turned back to where I had seen a number of Ground Doves, Red-plumed or Spinfex Pigeons (*Lophophaps ferruginea*) and Painted Finches. These birds led me to the spring, the cajuput trees being nothing more than bushes with a white papery bark, and quite a different foliage from that of the river-side species.

The appearance of the spring itself was discouraging. A feeble stream of water was slowly oozing from the bank of the creek into a black-looking depression choked up with decaying vegetation; the whole surrounded by a growth of rushes. There was only one thing to do, and that was to clean it out, as I intended to establish a flying camp there. After an hour's work repeatedly baling out the polluted water, things looked better. I retired to the other side of the creek, and sat down to wait. Many Doves and Finches came to drink. Presently, in a eucalypt overhead, I heard the well-remembered, raucous notes. I looked up, and there was a veritable Bower Bird. This was presently joined by three or four more. They hopped lower and lower until one was within a few feet of my head. I could see the beautiful pink nape and his glossy, velvety plumage to perfection. I sat quite still and watched one after the other drink and bathe at the spring. They were much interested in my appearance. Probably I was the first white man they had seen, as these ranges are seldom visited by prospectors or kangaroo hunters. After a time this party of Bower-Birds cleared out. They seemed to go to the north. I still waited, and presently other birds came. Their behaviour was much the same, and after drinking they flew away quietly, but not before I had noted that they disappeared in an opposite direction to the first party.

I followed as well as I could. One bird almost deceived me with a nearly perfect imitation of the ringing notes of the Golden-backed Honey-eater. The ground being so difficult, I eventually lost sight of them, and returned to the spring. No more birds came during a further wait.

I returned to the spring a day or two later to arrange for a flying camp, and saw the Bower-Birds again. On 30th September I carried rugs and camping utensils with a supply of food to a pitch I had chosen. The birds came as usual, but only once during the whole day. Indeed, few birds came to drink after four p.m. Next morning I was on watch early, but no Bower-Birds came until about 9.30. Observations quite satisfied me that there were two and possibly three distinct parties visiting the spring. It was easier, owing to the gorge



Grassy flats, vegetation and rocky walls of gorges

Photo. by F. Lawson Whitlock, R.A.O.U.

being clearer to the south, to watch the party which flew away in that direction.

The gorge at the spring was contracted, and with very steep slopes, capped with precipitous cliffs. These cliffs were formed of horizontal strata of what looked like ferruginous quartzite, capped with great masses of ironstone conglomerate. The strata were much laminated, and between the plates wild figs (*Ficus pubercula*) and other bush-like trees managed to maintain an existence. One of the birds I was watching flew towards a large wild-fig tree near the summit of the cliff. A search along the slopes of the gorge for a nest or playground proved fruitless. It was a sultry day, with distant thunder. This set me thinking. If a rain storm came all rock holes might be filled with water and I should have small chance of locating the Bower-Birds under such conditions. I resolved to secure a pair of specimens whilst I had the chance. This was easily done, and I returned to my base camp to skin them as I had no facilities to do so with me. I packed everything carefully, and put rugs, etc., in the fork of a gum tree to be out of the reach of dingoes, which are plentiful in the ranges. I did not reckon with the white ants, however, which ate enormous holes in the tent fly.

On dissection, both birds proved to be males. One a real old bird, the other a younger individual, but not showing signs of being a last season's nestling. The older bird had naturally the more brilliant pink nape, but this was quite prominent in the younger specimen also. Both showed few feathers and other signs of moult.

There were local thunderstorms the next few days, and I could see a smart shower falling over the Bower-Bird Gorge. While I obtained the above mentioned pair a third bird remained overhead in a gum tree. I watched this individual, and raising my head at the right moment saw it fly away. It headed straight for a precipitous bluff some 500 yards distant. With the aid of my field-glass I could make out a large wild fig bush growing on the edge of this bluff. It seemed a likely place to look for both a playground and a nest. Mr. Tom Carter, though he did not get eggs, found old nests in wild fig trees at Yardie Creek, but failed to find a play-ground. I resolved to try and reach the summit of the bluff by climbing the cliff. Two attempts near the front failed. The precipitous part was quite thirty feet in height, and composed of horizontal bedding, in many places perilously insecure. I knew that the gorge forked at the rear of the bluff, so followed it round for half a mile. At one point the cliff was lower and broken away. I made a third attempt and by zig-zagging reached the summit. It was a simple matter then to walk over to the north side of the bluff. I soon located the wild fig tree, and could see birds

hopping about in its branches. A close approach revealed three Bower-Birds, and partly under the wild fig, and partly under a neighbouring bush of another species, whose branches interlaced those of the fig, was a veritable play-ground, 2,000 feet above sea level. It was occupied, though very bleached in appearance. The platforms of short dried twigs on which the inverted archway was erected measured about five feet in length and two in breadth. The archway, about eighteen inches in length, with an interior space of about five inches; the walls being nearly three inches in thickness, and composed of slender twigs of uniform size. A lining or decoration of *Spinifex* flower stems completed the structure. The "playthings" were all accumulated at the north end of the platform. Except for a few *Acacia* seed-pods in the archway itself, these consisted of small flat stones, the largest a little over an inch in length, and colored either white or slate grey. Other articles were buds of the Moon flower (*Capparis nummularia*), the "Bagula" bush of the aborigines. This bush produces a beautiful white flower, with buff stamens, and is much infested with ants. The flowers open during the night and give off a sweet perfume. They soon flag under the influence of the hot sun. A fruit, eaten by the aborigines, follows the flower. The play-ground also contained green pods, almost like those of a garden pea, but the seeds were close packed and resembled maize seeds, when in the green stage. After watching the attendant birds for some time, I searched every tree and bush within a radius of half a mile for a nest, old or new, but without success. A final interview with the birds showed that all possessed in well marked degree the brilliant pink nape. I climbed down the cliff again, and returned to my base camp, resolving to return to the playground in a week or so.

I camped again at the spring, 10th and 11th October, and had another search for a nest. Rain had fallen in the ranges in the interim. The Painted Finches had left the spring, and the most numerous birds watering there were the little Ground Doves and *Spinifex* Pigeons.

Going to the spring in the half-light of the early morning, I became aware of what looked like a nearly submerged wheel of a motor car. A closer inspection revealed a large rock python, curled up in the water, and with its head concealed in the rushes. With such an intruder present birds were hardly likely to visit the spring. I put a bullet through the python, and hauled it out by its tail. It measured eleven feet. Specimens have been obtained up to eighteen feet, so this was a small one. After breakfast I commenced my watch at the spring, but though I waited hours not a Bower-Bird came near. The rain had filled some more convenient rock-hole. My second search for a nest proving vain, I resolved to visit the

play-ground again. I successfully climbed the cliff at a nearer point, in the neighbourhood of another wild fig tree. This tree was in fruit, and as I saw a Bower-Bird fly to it, I presume they were feeding on the fruit to some extent. I tasted one myself and found it very insipid and dry. When I reached the play-ground there were three birds there. I watched for a long time in hopes of getting a clue to a nest, but with no success. The wild fig tree was nearing its last days, and gave but little shade. I could see it had been at one time the host of many Mistletoe plants, and also of climbing vines, the scars of which were plainly visible around the main trunk.

The heat and ants in the end tired me out, and as I had lost hope of finding a nest I sacrificed two of the attendant birds. It went much against the grain to do so, but I reflected how rarely an ornithologist visited these inaccessible ranges, and that the specimens I secured would be put to a better use in the H. L. White Collection than in furnishing a meal for some lurking Rock Python. I returned to the spring, and was packing up, when a Bower-Bird suddenly appeared from the north, in a bush just behind me. I was fortunate enough to shoot this, as it proved to be the only female out of the five specimens I got. This is curious, as Mr. Tom Carter secured four females and one male out of the same number, and is exactly the reverse of my experience. On dissection this female proved to be fully adult, with ovules the size of No. 6 shot. Like the males, she showed signs of moult. The pink nape was very little in evidence in this specimen. This agrees with my last East Murchison experiences. The aborigines told me Bower-Birds are seldom seen near the Fortescue River, though wild fig trees grow in the adjacent cliffs. They know the bird as the Tarra-dee.

I returned to Mill Stream Spring October 11th, after vainly attempting to locate other springs in the ranges. The aborigines are acquainted with them, but could give but little idea of their distance away—"perhaps four mile, perhaps eight mile" was all I could get out of them. For the remainder of the trip I worked near the river. In spite of all my efforts I could find neither nests nor young birds. I resolved to return home. I left my very kind friends, Mr. and Mrs. Irvine, on 14th November, and I take this opportunity of acknowledging the innumerable kindnesses in the shape of hospitality, advice and assistance I received at their hands, and also for the readily granted permission to camp and collect on any part of the run I liked. I am also indebted to Mr. Kenneth Cookson, one of the owners of Mill Stream, for the interest he took in my work during a brief visit he paid to the station.

I left Roebourne 21st November, and landed at Fremantle a week later.

Birds of Lake Frome District, South Australia

By J. NEIL MCGILP, R.A.O.U., King's Park, Adelaide.

Part II.

Phalacrocorax carbo, Cormorant; *Phalacrocorax fuscescens*, White-breasted Cormorant; *Phalacrocorax ater*, Little Black Cormorant; *Microcarbo melanoleucus*, Little Pied Cormorant. The two small Shags are found throughout the year on stock tanks, bore streams and springs, yet no record of its breeding has been made. The two large Shags come in company with more of the smaller species in good seasons, when lakes are full, but certainly do not breed here nor remain long.

Anhinga novaehollandiae. Australian Darter.—Only one solitary bird noted in Wattakilla Lake in June, 1918. No other record.

Pelecanus conspicillatus. Australian Pelican.—In good seasons companies of Pelicans pay us a visit, but do not remain long, as the waters do not contain fish.

Circus assimilis. Spotted Harrier.—Fairly plentiful. A useful bird, destroying many rabbits. Often seen hovering above rabbit warrens in search of young. Breeds in district, nesting in large stick structure lined with green gum leaves in fork of high gum. Clutch, 2 to 3 white eggs. The young have a very different plumage from adult birds. Young from nest has head, back and rump covered with greyish down, with rich brown feathers on back of neck and back wing coverts are rufous, tail feathers almost black tipped, with a wide band of light brown; breast and abdomen a light rufous down, with a few feathers of a darker colour, and with long reddish-brown down on thighs. This specimen was almost ready to leave the nest. Breeds August to October.

Circus approximans. Swamp-Harrier.—A very rare bird, an odd visitor appearing in good seasons only; does not breed in locality.

Astur novaehollandiae. Grey Goshawk.—A single specimen, identified from close observation, noted in June, 1917, on bore stream, near N.S.W. border.

Astur fasciatus. Australian Goshawk.—A common bird, recognised as of great value in the destruction of rabbits. Often seen stooping to secure a young rabbit. Breeds freely in small flat-topped stick nest lined with gum leaves, usually placed very high up in eucalyptus. Clutch, usually 3, but sometimes only 2 eggs. Young birds have cream-coloured down. The eggs vary considerably in size and markings, some being quite white though often nest-stained, while other eggs are marked with brown spots and streaks. The Goshawk usually seeks its food near water, and waits in a tall tree till it sees its victim come to drink. Usual breeding season August to October.

Accipiter cirrhocephalus. Collared Sparrow-Hawk.—Not plentiful, only odd birds seen. The male of Common Goshawk often confused with female of Sparrow-Hawk. Hard to identify on the wing. Very expert on wing, it is wonderful to note it twisting about amongst low shrubs in chasing small birds. No nest recorded in district, but does probably breed as birds are permanent residents.

Ureætes audax. Wedge-tailed Eagle.—Very common, as many as 40 to be seen in air from a given point. The writer has written up his observations in the "S.A. Ornithologist" as to its habits, etc. Breeds freely, but only rears one brood a season. Nest is a huge structure of sticks, lined with green gum leaves and placed in fork of a tree at any height from ground. One, the bottom of which was only 18 inches clear of ground, was built in the central forks of a needle-

bush. Others up as high as 60 feet from ground. Clutch, in bad seasons one egg is often hatched only; in good seasons two eggs are usually found, and occasionally three eggs. The clutch generally comprises one heavily marked egg; the other, which is the first laid, is of a much lighter colour. The writer has observed hundreds of sets, and has not seen a heavily marked set of two eggs, though two pure white eggs have been noted. This is usually the second laying, in the event of the first set meeting with accident. A great many feeding platforms are to be seen in high gums. Though the Eagle invariably adds to and repairs an old nest, I cannot recall a feeding platform being made into a nest. The young are clothed in pure white down, bill and feet blue, iris yellow. The Eagle often lays another egg, to complete set, if the first egg is removed, but otherwise seeks another nest for its second laying. Breeds from April to July.

Hieraetus morphnoides. Little Eagle.—Fairly common, resident, a valuable bird in the destruction of rabbits. Breeds freely, generally using an old Hawk's nest, which it repairs and lines with green gum leaves, placed high up in gum trees. Clutch usually two eggs, though in adverse seasons, one egg is often a full setting. Eggs usually faintly marked or washed with reddish brown; and like most of the Hawk family, the inside appears to be green when held up to a light. There are two distinct forms of Little Eagle, one a much darker variety; they appear to inter-breed. Nestlings are covered in a dark cream-coloured down, that on head and neck being particularly long and hair-like; iris orange, eyelids black, bill blue-black, feet very light blue. The Little Eagle is easily distinguished from all other Hawks on the wing. It is quiet and easily approached when resting in a tree. Almost a miniature of the Wedge-tailed Eagle, except for wings and tail. Nesting takes place from July to September.

Haliastur sphenurus. Whistling Eagle.—A very common bird, also a great destroyer of rabbits. Breeds freely. Nest, usually a "borrowed" Hawk's nest, repaired and lined with green gum leaves. Clutch, 2 or 3 eggs; markings of reddish-brown, but sometimes pure white. Eggs are more pointed than those of Little Eagle as a general rule, otherwise indistinguishable. Usual breeding season, July to September, but, as with all Hawks, it varies according to season from April to November. Nestlings covered in white down, the head being covered in white hairs, bill dark horn colour, feet blue, and iris light hazel.

Here I would mention that although preferring to use an old nest, all the Hawk family occasionally build their own structures. A Little Eagle and Whistling Eagle have been seen sitting on eggs in same tree and invariably these two species and Black Kite form colonies in the large gum creeks.

Milvus migrans. Black Kite.—The Forked-tailed Kite appears in great numbers about June or July, sometimes breed freely in district, and usually leave before the end of November. A great destroyer of grubs and caterpillars. In favourable seasons it borrows an old Hawk's nest, but beyond scratching out an egg cavity the nest is not repaired. The egg cavity is lined with rag, pieces of rabbit skin, wool and bark, but in no instance has the writer noted green gum leaves. The clutch is two or three eggs, varying in size and colour, but usually well marked with brown spots sparingly on surface and often confined to one end of egg, have seen a set of three eggs, one egg nicely marked on smaller end, another on larger end, while the third was sparingly marked all over. Nestlings are covered with rufous coloured down, bill dark horn colour, legs yellowish, iris light brown.

Gypcictinia melanosterna. Black-breasted Buzzard.—Rare, only three pairs identified. Very quiet birds, allowing close observation

when resting on tree. Easily identified, a conspicuous white patch on wing seen when flying. Breeds in district, on October 18th, 1919. Used an old Wedge-tailed Eagle's nest about 25 feet up in box tree. Two young with bluish-white down, iris light brown, bill dark colour, also space round eyes, legs light red. No record of eggs. A pair of birds watched from June to October, 1921, but did not nest; left their locality, and may have bred elsewhere. The call is a peculiar short cry, somewhat like that of the Wedge-tailed Eagle. Though the writer has often watched these birds, he has never seen them seek food, and has seen a pair perched on a dry branch of eucalyptus for hours at a time. Has not been observed on the ground.

Falco peregrinus. Peregrine Falcon.—Very rare visitor; only identified twice in many years.

Falco hypoleucus. Grey Falcon.—Fairly numerous, usually seen in pairs. A very beautiful bird, and easily approached closely when nesting in trees. Food chiefly small birds. Breeds in district. Usually takes possession of an old Raven's nest, which is enlarged and repaired. No lining is added to egg cavity. Clutch 2 to 4 eggs. Size and colour varies, and the eggs closely resemble those of the Brown Hawk, but the markings are more freckled and the blotches smaller. Breeding season August to November according to season. These birds take charge of the nest months before eggs are laid. The same nest is used year after year if available, even a second clutch has been noted from same nest, and then a third setting was hatched out in another nest in same tree. The young birds almost ready to fly were noted on 18th November, 1921; they were of a much darker colour than adults, legs orange, bill blue, skin round eye bluish yellow (not bright yellow as in adults), iris reddish brown or hazel. No record of nestlings in down.

Falco subniger. Black Falcon.—Not plentiful. Breeds in district. Like Grey Falcon, long before its eggs are laid, it takes possession of an old nest such as a Hawk's, Eagle's or Raven's, but little is done to alter it. Only once have green leaves been found in egg cavity, and then I was informed the nest was fought for between Whistling Eagles and Black Falcons, and the latter had hunted the rightful owner out. Eggs, two to four to setting; resemble those of Grey Falcon and Brown Hawk, vary in size a great deal; usually very handsome eggs, but occasionally of a "washed" appearance. Nestlings are covered in grey down hair-like on head and neck only, iris hazel, legs yellowish blue, bill leaden colour. The Black Falcon is a splendid bird, and courageous, but of a more laboured flight than the Grey, until in actual chase, when its speed is terrific, and its shooting glide is wonderful. It seldom touches the smaller birds, and appears to prefer Galahs as food. Hunts all large birds from nesting locality. Like the Grey Falcon, it is never observed feeding on anything it has not itself killed. The writer has not observed a test of strength between the Black and Grey Falcon. I believe the Grey is satisfied to keep well away from his black congener. The Little Falcon, however, does not fear its black cousin, but the two do not appear to molest each other. Both species clear the locality of all birds, but the Grey is not so particular. Breeds from August to November and usually chooses those nests that are high up in gum trees.

Falco longipennis. Little Falcon.—Fairly numerous. A beautiful bird, courageous, and the swiftest in flight of all birds when after food. Food mostly small birds, but eats a quantity of grasshoppers, which it captures and eats while on the wing. Breeds, though only one set of eggs noted. It usually constructs its own nest in topmost fork of the highest tree in its vicinity. The nest is small, like that of the Kestrel, made of small sticks, and the egg cavity lined with fresh green gum leaves. One was placed 35 feet from ground in

topmost fork of a gum. Birds seen attacking other birds in vicinity, and watched till female returned to nest. Both birds became very agitated when tree was being climbed, flying round close to the climber, uttering their short, twittering cry all the time. Did not actually attack, but swooped with closed wings unpleasantly near. Three eggs formed the sitting; the eggs are miniatures of the Grey or Black Falcon. Date, 25th September, 1920, which is apparently the breeding season as several inaccessible nests have been noted in September with birds in attendance.

Ieracidea berigora. Brown Hawk.—Very numerous, both dark and light forms, though the light forms are much more numerous. Breeds, usually commencing early in May or June; borrows any old Crow's or Hawk's nest, which is scratched out to form an egg cavity. This is then lined with green leaves. With one exception, gum leaves were used, the exception being ti-tree leaves. Clutch, 2 to 5 eggs; eggs vary a great deal in coloration, some being very handsome, while others are of a "washed-out" appearance. Nestlings are clothed in a rusty coloured down, iris brown, legs almost white and bill of a deep lead colour. Nestlings of light and dark forms are indistinguishable. Occasionally builds its own nest, which is then usually constructed with light straw-coloured twigs. Male bird carries most if not all of the food to female on nest if with eggs or young. Female flies out of nest, takes the food in its claws from its mate while in flight, and returns to a branch close to nest. When attending a brood, she tears off pieces of rabbit or bird or other food and feeds the young. The young do not feed from the carcasses till they can leave the nest.

Cerchneis cenchroides. Nankeen Kestrel.—Very numerous, and breeds freely in hollow tree-spouts, caves, and in stick nests, which are usually of "Crow" construction. Clutch, 4 to 6 eggs. Nestlings are covered in white down, legs yellow, bill almost white, iris almost red. A great destroyer of rats, mice, grasshoppers and grubs.

Ninox boobook. Boobook Owl.—Common. Calls "Mopoke"; so also does the Podargus, but of a duller note and more prolonged, like "Moorpoerk." Apparently two forms in district, one much redder in appearance. Breeds in district. Clutch, 3 eggs.

Tyto alba. Barn Owl.—Fairly numerous; breeds. Clutch, from 3 to 6 eggs. Nests in deep hollows; lives in same hollow throughout year till breeding time.

Cacatua roseicapilla. Galah.—In countless numbers, largely increasing. Its wonderful company flight must be seen to be appreciated. One moment they appear a mass of silver, when suddenly they "side-slip," and show the glorious pink colours of the breast. To see a flock of a thousand Galahs in "action" is a beautiful sight. These birds intermingle with Bare-eyed Cockatoo (*C. sanguinea*), but do not inter-breed so far as the writer has observed. Breed in great numbers, almost every hollow in trees being tenanted by either Galah or Bare-eyes (Little Corella). The nesting hollow is usually well bitten around entrance, and for several feet down the trunk on sky-side. The eggs, four in number, are placed on a bed of green gum leaves. Young take almost the adult plumage from nest. Feeds mostly on seeds, and may be seen in large flocks on the ground. Usually breeds in July to September, whether the season be good or bad. Has at least two broods in good years.

Cacatua sanguinea. Little Corella (Bare-eyed Cockatoo).—Even in greater numbers than the Galah, they twist and turn in flight, but their colour does not allow them to form such a picture as given by the Galahs; breed freely, nesting in hollows; eggs, 3 usually, rarely deposited on wood dust only, no lining. Only once have I found their eggs on gum leaves, and as one egg of Galah was with three of

Corella, I presumed it was a case of "possession is nine points of the law." This species often hunts the Galah out of its home, but invariably cleans out the leaves. Nests from May to October, according to season, nesting very freely in good years, when two or more broods are reared, but in bad seasons most of the birds seek better quarters for nesting. The eggs are much coarser in texture and thicker of shell than Galah's eggs.

Leptolophus hollandicus. Cockatiel.—Only in good years does this splendid Parrot visit district, rarely nests with us. Its eggs, five or six in number, are laid on wood dust in a hollow spout of tree, invariably near water.

Aprosmictus erythropterus. Red-winged Parrot.—Seen only twice, one taken for identification identified by Mr. Frank E. Parsons—first record for South Australia. Seen during the very bad season of 1920.

Barnardius barnardi. Ring-necked (Mallee) Parrot.—Fairly numerous; breeds, laying 4 to 5 eggs on wood-dust in hollow spouts of eucalyptus during August-September.

Psephotus haematogaster. Blue-bonnet Parrot.—Rarely seen except in good seasons. No record of its breeding. Usually found in open sand-hill country towards N.S.W. border.

Psephotus varius. Many-coloured Parrot.—Common, in pairs generally; breeds in hollow spouts of eucalyptus; eggs, 4 or 5 in number, placed on wood dust. Female sits closely on eggs or young, and mostly will remain on eggs or young until nest is cut out. Have taken five eggs from under female and left her in hollow; first placed a handkerchief over bird and gradually worked eggs from under her. Male "gives the show away" when near nest. He is greatly disturbed, and flies to and from the tree. Striking the tree with a heavy object will seldom flush the female.

Neophema elegans. Grass-Parrot.—Fairly numerous in good season; no record of breeding. Only seen in open plain country.

Neophema splendida. Scarlet-chested Grass-Parrot.—Rare. Specimens sent to Mr. Frank E. Parsons for identification, now in his collection. Seen only in pairs or at most three or four together on open flats in sand-hill country. I have no breeding record. This bird was generally considered to be almost extinct.

Melospittacus undulatus. Budgerygah (Shell-Parrot).—In good seasons their numbers are unlimited, flocks of thousands arriving one after the other; breed freely, as many as five nests being noted in one tree, and at times almost every suitable hollow spout is tenanted by a breeding female. Lays from four to seven eggs on wood dust in hollow; nesting period regulated by season; breeds at almost any time of year. Even in a good year these birds may not appear, and it is apparently only when driven in by adverse conditions in the far interior that they favour us with a visit. Have taken eggs from an old Babbler's nest; female flushed.

Podargus strigoides. Tawny Frogmouth.—Common; known as "Stick-bird." Their calls are a deep grunt and "moorpoork." They breed freely, laying two or three eggs on a very flat platform of sticks placed in a horizontal fork of a tree, on top of parasitic growth in small trees or on the end of a broken-off branch. They are easily caught on nest. The mate is usually perched "stick-like" in neighbouring tree; breeds July to November.

Geotheles cristata. Owllet Nightjar.—Very common; breeds; three or four eggs are placed on a bed of gum leaves in hollow spout of eucalyptus; bird easily caught in hollow. The eggs have peculiar sound when rubbed together after being blown; nesting from July to October, regular.

Halcyon pyrrhopygius. Red-backed Kingfisher.—Few appear till August; stay till November-December, and breed freely in tunnels

in banks of creek and similar places. Clutch, 5 eggs. Tunnel is short, and is enlarged for egg cavity. Heads of beetles, etc., often found in tunnel; usual breeding season September and October; young take adult plumage from nest, though of a duller colour, and the collar round neck is washed with brown. Their "Chow chow" call can be heard at some distance. Single birds are seen in district all the year round.

Halcyon sanctus. Sacred Kingfisher.—Only two pairs noted, both of which nested in high gum close to water. The nest was in a hollow and the birds were feeding young on 17th November, 1920, and 2nd November, 1921. Possibly the same pair, though nests were 60 miles apart.

Merops ornatus. Rainbow-Bird (Bee-eater).—At times very numerous, usually arriving in October; breed in great numbers, drilling a tunnel into a bank or slightly rising ground. The tunnel is usually deep and lengthy, as great a length as 4 feet having been recorded. An enlarged chamber for eggs, no nest. Bird sits closely in nesting tunnel, and is often caught when digging out burrow. The earth excavated does not appear at entrance. Nesting period from October to December, and birds usually leave in February. Clutch, 5 pearly white eggs. Captures its food on the wing. Young birds take adult plumage from nest. The long central tail feathers of the adult birds apparently reach maturity only at breeding season, though I have taken several females from nest with no lengthy plumes in tail. In some dry years it does not visit district at all.

Eurostodopus guttatus. Spotted Nightjar.—Not often seen, but in certain spots odd birds can be flushed, and just at dusk a pair visit the homestead every night after scraps of food thrown out. No record of nest, but undoubtedly it does breed in district, as one egg was described to me. It was placed on ground almost under a small shrub on stony ground.

Micropus pacificus. White-tailed Swift (?).—My brother, who has done much field work with me, reported that on 14th February, 1921, in the evening, a large number of Swifts arrived on Moolawatana at a hut ten miles from homestead. A heavy rain fell until 5 p.m., and shortly afterwards flock after flock of Swifts gathered. They circled round and round at a low elevation for about an hour twittering all the while. They left in a south-westerly direction, but appeared to arrive from the north. The next day at homestead, due west of the hut mentioned, he saw another large flock circling round for a short time, but he did not see them arrive or depart. He did not take a specimen, and as the birds were new to him, he is not certain of identity. This is the only record for district. From his description they were probably White-rumped Swifts.

Cuculus pallidus. Pallid Cuckoo.—Usually numerous from June to August; absent for rest of year; no record of breeding in district.

Mesocallius ocellans. Black-eared Cuckoo.—Not numerous, occurring during early autumn months. Young birds just able to fly noted being fed by several Wrens (*Malurus assimilis*).

Chalcites basalis. Narrow-billed Bronze-Cuckoo.—Fairly numerous in August and September, only staying a short time. Egg found in nest of Tree-Tit (*Smicrornis*) on 17th August, 1920.

Hirundo neoxena. Welcome Swallow.—Not common, but those seen appear to be residents. Practically no increase by migration. Nests in wells, huts and under overhanging rocks. Clutch, 3 or 4 eggs. One nest was placed 25 feet down a well shaft. Nests, September, October.

Cheramceea leucosternum. White-backed Swallow.—Fairly common; breeds in small tunnels in high creek banks. The tunnels average 2 feet in length, and the end is enlarged. A mass of small pieces

of bark and leaves is used as a bed for eggs, which are four to five for sitting. Tunnels freshly excavated have a circular entrance hole, but when eggs or young are in nest, the hole gradually loses its circular appearance and becomes something like a semi-circle, caused by the wings of the bird scraping away the earth each time it enters hole. It nests from August to November. This bird is a resident, and usually nests in companies in suitable localities. The tunnel is excavated some time before eggs are laid. The birds appear to roost only in old tunnels. On several occasions I have noted them settled on a dry gum branch, and once on a wire fence, but they seem to spend almost the whole of their time in the air. Both birds feed the young. Food is caught on the wing.

Hylochelidon nigricans. Tree-Martin.—Very numerous; residents. Breed in great numbers, choosing a small knot-hole in eucalypt; a handful of dry gum leaves is used to line the bottom of hollow. Clutch, 3 to 5 eggs. When a suitable small hollow is not available, these birds take a large hollow, and the entrance, being too large, is plastered up with pellets of mud to reduce it to the desired size. Both birds feed young in nest. Breeding season appears to last from August to January, and I think two broods at least are reared in the season.

Hylochelidon ariel. Fairy Martin.—Visitors, appearing some years in very great numbers, while other years scarcely any arrive; arrival usually takes place in August; breed in colonies in caves, under verandahs, overhanging rocks and on under-side of leaning trees, always close to water. The usual bottle-shaped mud-pellet nest is lined with grass and a few feathers. Clutch, 4 to 6 eggs. An average-sized nest, built singly (not built on to others), measured 9½ inches long by 5 inches diameter through egg cavity. The entrance hole was a little over 1 inch in diameter. For some days after the young are hatched, only one bird feeds them. One, presumably the female, stays in the nest with young, and takes the food from its mate. After about a week both parents collect food. The arrival of these birds in district is a puzzle to me. They come at irregular intervals, sometimes two years between visits, and at other times two years in succession. In 1920 they appeared for first time since 1918, and have not yet returned. The season does not seem to affect their movements, as 1920 was a very bad year, while 1917 and 1918 were good years. I have never actually seen the arrival or departure of these birds. During August colonies are formed in favourite spots, and the birds begin to build immediately in the old places. They are usually all gone by November. I have found several sets of eggs deserted by the birds towards end of September; some had reared their young, and possibly the owners of the eggs had preferred to depart with the rest of the colony rather than stay and rear what was possibly a second brood. The earliest arrival of a colony was in July, 1917, while in 1918 none were noted till 12th September, but they were then busy with their nests.

Petroica goodenovii. Red-capped Robin.—One of the commonest birds; breeds in accordance with season, at any period of year, but in spring if favourable. Its beautiful nest is constructed of fine shreds of bark and dried grasses, matted together with cobwebs, and the whole is matted on to a horizontal or upright fork and ornamented with lichens to make the nest closely resemble its surroundings. The egg cavity is formed by fine rootlets worked horizontally round inside, and it is then snugly lined with fur. Measurement externally, 2½ inches diameter; egg cavity, 1½ inches deep by a full 1½ inches in diameter. The nest is often built close to ground, one being found 18 inches up and another as high as 18 feet from ground. In good seasons three eggs form the full set, but in normal times only two eggs are laid. The eggs are almost covered with the fur in nest. The

birds desert nest once it is touched, even if eggs are in it, but will continue to feed young after they have been handled. Both birds share in the incubation, but I am afraid the male's share is very small, possibly because he is very conspicuous when on the nest. I have never seen the male assist in feeding young until they leave the nest. Young have adult female plumage minus the dull red cap when leaving nest.

Melanodryas cucullata. Hooded Robin.—Not plentiful; young birds just out of nest being fed by parents is the only record of breeding in district.

Smicronis brevirostris. Tree-Tit.—Numerous in eucalyptus country. It is a very tame bird, which will feed about amidst gum leaves within a few feet of man; breeds in great numbers. Its beautifully constructed purse-like nest is often seen hanging amid the drooping gum foliage. The alarmed note and the actions of the male soon give the clue to the whereabouts of the nest. This is made of fine shreds of grass, flower seeds, grass heads and cobwebs and cocoons all matted together, with an occasional feather in structure. It is snugly lined with delicately coloured feathers, usually the small pink feathers of the Galah. It is truly a "jewel box." The entrance is near the top of the nest, and it has a slight hood. The nest is suspended to drooping foliage of a eucalypt. Measurement, overall, 2½ inches in diameter, by 3¾ inches in depth; the entrance hole is a little under an inch across. Clutch, 2 or 3 eggs. The eggs vary much in size and markings. The sitting bird sits close, and I have cut off the branch and let down the nest to the ground before the bird has left the nest. It had left before I started to saw, but had returned and entered it again. Both birds feed the young. Possibly two or more broods are reared in good seasons. Nests have been found from 2nd July to 16th January, in 1920-21. Practically all their food is secured amid the foliage of eucalypts.

Oreocia gutturalis. Crested Bell-Bird.—Numerous; breeds freely according to season; nests with eggs or young noted from May to December. The nest is a deep cup shape, made of five sticks and twigs; inside of this strips of bark are worked around to form an egg-cavity, which is lined with fine rootlets and shreds of bark. It varies greatly in size, according to situation. An average nest measures 5½ inches in diameter externally, and the egg-cavity 4 inches diameter by nearly 3 inches in depth. It is almost invariably placed in a fork of a dense shrub, and within a few feet of the ground; but I have noted one in a hollow stump. Eggs are two to three in number. Hairy caterpillars are frequently found on the nest. I have several times flushed a male from the nest, and he also shares in collecting food for the young. The young birds have the adult female plumage on leaving nest.

Pachycephala rufiventris. Rufous-breasted Whistler.—Common. Rarely seen except at beginning of breeding season, when its glorious notes can be heard. Birds very shy except at breeding time, when they become very tame. Breeds from August to December, and two broods are reared in good seasons. The nest is a frail structure of dried rootlets, lined with a few dry rootlets and placed in the fork of a tea-tree or on top of a parasitic growth. Eggs are usually visible from beneath nest; measurements of an average nest, 3½ inches diameter over all, egg cavity 2¼ to 2½ inches diameter by 1½ inches in depth. The eggs are incubated wholly by the female. The male feeds the female on the nest, and shares in feeding young, which have adult female plumage on leaving nest. Immature plumaged males are often found breeding. This bird is *P. r. maudaei* and in the writer's opinion is the best songster of the group.

Rhipidura flabellifera. Fantail.—Not plentiful; appears to be a visitor; odd birds appear in autumn and remain through winter, but

they are rarely seen in spring or summer; not known to breed in district; I have no record of the White-tailed Fantail (*R. f. albicauda*) being seen in district.

Rhipidura leucophrys. Black and White Fantail.—Very common, and breeds freely; clutch, 3 or 4 eggs.

Seisura inquieta. Restless Flycatcher.—Not often seen, probably a visitor; no nesting record; noted making "grinding noise" when perched on wire fences and stumps.

Pteropodiceps maxima. Ground Cuckoo-Shrike.—Rarely seen, visitors during May to September; does not appear to breed in district.

Graucalus novae-hollandiae. Cuckoo-Shrike.—Common; known as "Summer Bird"; some birds remain in the district, but most appear about August and leave in October. The movements are, however, regulated by season; have known them to be in numbers throughout the year. Breed in November and December when season favourable. The usual small flat cup nest of pieces of twigs and bark matted together and on to a fork of tree usually placed from 12 feet and upwards above the ground. Nest resembles surroundings, and is hard to locate unless bird seen on nest. It is a close sitter, and when disturbed will quickly return to the nest. Young birds have dark grey faces when leaving the nest; clutch, 2 to 3 eggs, varying much in size and colour. Nest measures nearly 5 inches in diameter over all; egg cavity, $3\frac{1}{2}$ inches diameter by from $\frac{1}{2}$ to $\frac{3}{4}$ inches in depth. The top rim of the nest is about level with the two limbs forming the fork.

Campephaga tricolor. Caterpillar-eater.—In some good seasons, flocks of these birds arrive about end of October, and commence nesting shortly afterwards. Every year a few put in an appearance about this time, but rarely breed, as they stay but a few weeks. In December, 1920, a great number nested in creeks. They nest in communities, sometimes as many as five nests being seen on a small tree. The nest is the well-known frail, cup-shaped structure built usually in fork, but occasionally on bare limb. It is easily detected, as the male bird sits close by most of the time. The nest measures about $2\frac{3}{4}$ inches diameter over all, egg-cavity 2 inches diameter by from $\frac{1}{2}$ to $\frac{2}{3}$ inches in depth. The inside of the nest is lined with fine grass and rootlets. The male appears to construct the nest, as I have never seen female assist. Both birds feed the young, which have the female plumage from nest.

Cinclosoma castanotum. Chestnut-backed Ground-Bird.—Not often seen. It prefers wooded foothills. It has not been seen breeding in district.

Cinclosoma cinnamomeum. Cinnamon Ground-Bird.—Common. This district is about the southern range of this species; breeds freely. The nest is typical of the family, and is placed in a depression in ground near a fallen bough, small bush and sometimes right in centre of a small saltbush. The depression is lined with small twigs and pieces of bark. Grass seed and flower pods are used internally. The nest measures 4 inches in diameter over all, sometimes much larger; egg-cavity 3 inches diameter by $1\frac{1}{2}$ inch depth. These measurements are of a typical nest, but there is considerable variation in over-all measurements and depth; clutch, 2 eggs, but 3 are sometimes found in good season; breeds usually in August, but regulated entirely by season. Eggs have been found in February, March, July, August, November, and December. Probably the bird breeds at any suitable time of the year. It has a peculiar squeal-like whistling note. The bird, when closely flushed, frequently pretends injury. It spends most of its time on the ground, but is sometimes seen perched on a small shrub a few feet from the ground.

Hylacola (sp. ?). Ground Wren.—A pair of *Hylacola* was seen, but not handled, probably it was *H. cauta*. It must be very rare in this district.

Pomatostomus superciliosus. White-browed Babbler.—Very common; breeds freely. Large quantities of wool are used in nest construction. The bird nests in low bushes such as tea-tree; clutch, 3 to 4 eggs; breeds to suit season at almost any period of year.

Pomatostomus ruficeps. Chestnut-crowned Babbler.—Not as common as preceding species; breeds freely, but prefers to nest at some height from ground in eucalypt when available; clutch, 3 to 4 eggs. The eggs cannot be distinguished from those of the White-browed Babbler as a rule, but one type common with *P. ruficeps* is not known with the White-browed. This type of eggs has spots intermingled with the usual hair-like markings. This species is noisier than the White-browed, but its note is more pleasing.

Calamanthus campestris. Field-Wren.—The desert form (*C. c. isabellinus*), is common in suitable localities, tablelands and saltbush-clad flats; not found in timbered parts; breeds freely; a very pleasing song given only during nesting period. The nest is a straggling domed structure of dried grass, snugly lined with fur and feathers, and placed low down in saltbush, bluebush or samphire, sometimes resting on the ground. Nest measures 4½ inches in diameter by 5 inches in depth over all. Entrance, irregular, about 1 to 1½ inch diameter; clutch, 2 to 4 eggs, according to season; about earliest to breed after summer rainfall, eggs being found in November to April. Little nesting appears to take place from April to November, but occasional nests are found during this period if rainfall occurs late in the year. The bird deserts nest, eggs or young, once it is touched or even if the bush is opened up to inspect the nest. It is a very shy bird, and rarely seen when not breeding. Its mouse-like habits take it from bush to bush and out of sight. The nest is hard to find unless the bird is flushed. Young birds have adult plumage from the nest, but the crown is very slightly rufous.

Cinclorhamphus cruralis. Song-Lark.—Very common in good seasons. Breeds freely according to season; usual nest and complement of 3 to 4 eggs.

Epthianura albifrons. White-fronted Chat (*Tintae*).—Occasional visitors in very good seasons; not known to breed; remains a short period only.

Epthianura tricolor. Crimson Chat.—Very numerous in good seasons. Immature males and females are the first to appear after the first good summer rains; full plumaged males come on later; breed freely. Prefer company; builds typical nest; 3 to 4 eggs in clutch. Male does a great deal of the incubation; female apparently does most of the feeding of young. They usually arrive in November, and are generally absent by July. Young birds have adult female plumage of dull colour; male bird sits close to nest and pretends injury when flushed; breeds from December to May.

Epthianura aurifrons. Orange Chat.—Very common, especially in good seasons; breeds in great numbers; clutch, 2 to 4 according to conditions of season. Male bird takes his place on nest about daylight and sits till about 10 a.m.; female then takes his place. Both birds pretend injury. Nest typical, and generally set low down in shrubs like saltbush. Nestlings take female plumage from nest.

Ashbyia lovensis. Desert Chat.—Always present in fair numbers, but largely increasing in good year; breeds freely; clutch, 2 to 4 according to season. Writer has written up notes on this bird in *Emu*, vol. xix., part i. From further observations it is noticeable that this bird prefers to nest in company in suitable localities, nests often found within a hundred yards of each other. If a nest is robbed

of eggs, all the birds that have incomplete nests or nests ready for eggs will desert and seek new nesting site, only those with eggs or young remaining.

Acrocephalus australis. Australian Reed-Warbler.—Rare visitors in years of good rainfall, during April to July; no record of breeding.

Acanthiza pusilla. Brown Thornbill.—Numerous; breeds during July to September; typical nest attached to twiggy branches; clutch, 3 eggs. Both birds feed young, which have adult plumage from nest. Bird sits closely to eggs, and when flushed remains close at hand, and soon returns to enter nest.

Geobasileus uropygialis. Chestnut-tailed Thornbill.—Fairly common, residents; breed freely; a small hollow with knot-hole entrance is usually chosen in which to build its nest; outwardly it is composed of fine twigs and pieces of bark, entrance up against knot-hole of hollow. The inside of the nest is snugly lined with feathers, usually of delicate colouring; clutch, 2 to 3 eggs.

Geobasileus chrysorrhoa. Yellow-tailed Thornbill. — Common throughout year; breeds freely, according to season; typical nest; clutch, 3 to 4 eggs.

Pyrrholaemus brunneus. Red-throat.—Rare; found in saltbush flats in hilly country; probably breeds, but no record of nesting.

Malurus leuconotus. White-winged Wren.—Very numerous; breed according to season. The usual nest; clutch, 3 or 4 eggs. I have not seen a White-backed Wren, but have handled specimens with white feathers on the back. These, in writer's opinion, appear in the male before the plumage changes to blue.

Malurus assimilis. Purple-backed Wren.—Numerous, confined to watercourses; breed freely from July to November; odd nests throughout year. Nest is more neatly made than the typical *Malurus* nest with perhaps the exception of the nest of the White-winged Wren. It is made of very fine strips of shredded bark woven together very strongly, snugly lined at bottom of egg-cavity with fur or camel hair. Measurements, overall 4½ inches in height by 2½ inches in width, entrance 1 inch; placed low down in brushwood, but sometimes up as high as 10 feet in a mistletoe or suspended in drooping foliage of tea-tree; clutch, 3 or 4 eggs. Birds desert nest if it is handled. Female does most, if not all, of incubating and feeding till young leave nest.

Diaphorillas (sp. ?).—An undoubted example seen a few times, but not identified; no record of breeding.

Artamus leucorhynchus. White-breasted Wood-Swallow.—Frequently seen along bare streams in good years. Two nests noted both built in nests of Magpie-Lark in trees surrounded by water; the Magpie-Lark's nest was simply re-lined with rootlets; clutch, 3 to 4 eggs; both found in September. The bird is not found anywhere but in sandhill country adjoining the New South Wales border.

Artamus superciliosus. White-browed Wood-Swallow.—Occasional visitors about the beginning of summer. One was noted nesting in December, 1920, when nests in incomplete stage were being constructed by the birds, probably they reared their young. They prefer creeks and timber to open plains.

Artamus personatus. Masked Wood-Swallow.—Visits district almost yearly about October; found nesting freely in December, 1920; typical cup rootlet nest; like the foregoing species, it leaves the district about February or March.

Artamus cinereus. Black-faced Wood-Swallow.—Sub-species (*A. c. melanops*); residents, numerous; breed according to season, but prefer springtime. Usual *Artamus* nest of grass and roots lined with root-

lets placed at varying heights in trees; clutch, 3 or 4 eggs, which vary greatly in markings; rarely seen in flocks like the two preceding species.

Artamus cyanopterus. Wood-Swallow.—Rare visitors in good seasons, about October, only in small parties; not known to breed in districts, but does so in hilly country a few miles south of district.

Celluricincla harmonica. Shrike-Thrush.—Common in creeks with timber; breeds freely; builds typical nest; clutch, 2 to 3 eggs.

Celluricincla rufiventris. Western Shrike-Thrush.—Rarely noted in timbered creeks and hills; not residents; only one record of breeding; a nest with three eggs being found on 12th August, 1920. The nest was placed in a hollow broken-off stump a few feet above ground; it was more neatly made than that of *C. harmonica*, and measured across the egg-cavity hardly $3\frac{1}{4}$ inches; it was nearly 3 inches deep, composed solely of strips of bark. The eggs marked with black blotches and spots are somewhat smaller than typical eggs of (*C. harmonica*).

Grallina cyanoleuca. Magpie Lark.—Common along bore streams and creeks with water; nest freely; typical cup-shaped nest of mud and grass. It is an expert dodger on the wing, and though often chased by Falcons and other birds of prey, I have never seen one captured. Both birds feed young, which take on a dull adult plumage from nest. Young males can be distinguished from young females with ease; breeds from August to December; in good years at least two broods are reared. Very often nests of the Black and White Fantail are found in the same tree as this species.

Aphelocephala leucopsis. Whiteface.—Very common; breed freely in all manner of situations such as in hollow spouts, old Kingfishers' tunnels, clefts in rocks, under verandahs and in parasitic growth in tea-tree. Nest typical, snugly lined with feathers and fur; clutch, 3 to 4 eggs; both parents feed young.

Aphelocephala nigricincta. Black-banded Whiteface.—Found in fair numbers in sandhill country. For further notes read Emu, vol. xxi., part i. Young have adult plumage from nest. Writer presented young birds to S.A. Museum.

Sphenostoma cristatum. Wedgebill.—Not common; breeds in district; one of first birds to call in early morning, locally known as "Daylight Bird"; has a beautiful call. Nest an open cup-shape, made of small sticks, lined with grass and rootlets and placed within hand's reach in thick scrubby bushes; clutch, 2 beautiful eggs, green colour with comma-like markings. Breeding commences about July, but is regulated by rainfall. Eggs have been noted in December; only nest measured gave, external diameter $5\frac{1}{4}$ inches, depth $2\frac{1}{2}$ inches, egg cavity $2\frac{1}{2}$ inches diameter, by nearly 2 inches in depth.

Neositta pileata. Black-capped Tree-Runner.—Odd parties visit district, but do not stay more than a few days in the timbered country in hills.

Climacteris picumna. Brown Tree-Creeper.—Occasionally noted, probably visitors only. Fairly numerous 50 miles south of district, where, I am informed, they sometimes breed.

Zosterops lateralis (?). White-eye.—A small flock noted in October, 1920, evidently migrating as not seen again; only record.

Dicaeum hirundinaceum. Mistletoe-Bird.—Common when mistletoes are in fruit; no nesting record; arrive about May and depart October or November.

Pardalotus striatus. Pardalote.—Very common in eucalypt country; breed freely. A nest of strips of bark is built in a hollow spout

of gum tree or in a tunnel into bank. The nest is a complete dome-shaped structure of finely shredded strips of bark, no lining; clutch, 3 to 4 eggs; bird sits closely to eggs or young, often remaining on nest till hollow or tunnel is opened out; breeds from August to December, early or late in accordance with season.

Pardalotus rubricatus. Red-browed Pardalote.—Not plentiful; breeds in tunnels into banks; no record of a hollow tree being used. Instead of the typical domed nest one would expect to find, this bird simply makes a cup-shaped nest in an enlarged chamber at end of tunnel. The nest is made of strips of bark, and lined with grass. Bird sits so closely on eggs that it is nearly always captured on nest when tunnel is scratched out; clutch, 2 to 3 eggs; breeds late; eggs only found in November to January; cup-shaped nest measured $3\frac{1}{2}$ inches external diameter by $1\frac{1}{2}$ inches deep.

Plectorhyncha lanceolata. Striped Honey-eater.—Few visitors in good years; probably does not breed.

Myzomela nigra. Black Honey-eater.—Visits district in good numbers in favourable seasons. No record of nesting.

Glyciphila albifrons. White-fronted Honey-eater.—Visits district about June to September; no record of its breeding; its loud metallic note can be heard in creeks and timbered country; very shy birds.

Certhionyx variegatus. Pied Honey-eater.—Generally a few residents throughout year, largely increased in numbers from June to September; no record of breeding other than of young being fed by parents in October, 1919.

Meliphaga virescens. Singing Honey-eater.—Very numerous, resident; breeds freely, laying its 2 or 3 pink eggs in an open cup nest made of roots, stems of plants and grass matted together with wool and cobweb, lined with rootlets, wool, and hairlike tendrils, measurements, overall diameter $4\frac{1}{2}$ inches, cup measures diameter 2 $\frac{1}{2}$ inches by almost $1\frac{1}{2}$ inches deep; nest suspended by rim to small branches; usually placed within 10 feet of ground.

Meliphaga ornata. Yellow-plumed Honey-eater.—Visits district in fair numbers, but some usually remain during year; prefers eucalypt, and have much same habits as the White-plumed Honey-eater; not found nesting, but probably does so.

Meliphaga plumula. Yellow-fronted Honey-eater.—Not common; found only in mallee country in district; found breeding only occasionally. One nest measured overall diameter scarcely $2\frac{3}{4}$ inches, and just over $2\frac{1}{2}$ inches deep, the egg-cavity was almost 2 inches in diameter by $1\frac{3}{4}$ inches deep; nest made of bark finely shredded, cobwebs and cocoons, lined with flower down. It was suspended by rim in drooping foliage of a low mallee, about 6 feet up from ground. Two eggs formed the set, which was incubated about a third of incubation period.

Meliphaga penicillata. White-plumed Honey-eater.—Very common in eucalypts. It is (*M. p. leilawalensis*); breeds freely; nest typical of dominant sub-species; clutch, 2 to 3 eggs; breeds in accordance with season, usually from July to October, but odd nests with eggs may be found throughout the year.

Meliornis nova-hollandiae. Yellow-winged (New Holland) Honey-eater.—A few birds noted during each winter, but they do not remain long; no record of breeding.

Myzantha flavigula. Yellow-throated Miner.—A common bird, which appears to be gradually increasing in numbers; breeds according to season, though most nests are found from July to October; typical nest; clutch, 2 to 4 eggs. Time after time one finds its nest either in same tree as a nest of the Black-backed Magpie or in the

adjoining tree, and both birds rearing young in the same tree. A large quantity of wool and horsehair is used in the nest if such is available.

Acanthagenys rufogularis. Spiny-cheeked Honey-eater.—Common; breeds freely at any period of year when conditions are suitable, but generally from June to December; probably rears two or more broods a year. The nest is rather a crude one; first a rim of green plant tendrils is attached to several twigs, usually of a tea-tree, then tendrils are passed over and the ends worked into the rim, allowing the centre of tendril to loop down; this method continues until the tendrils cross and recross like a basket, but nothing is put on in a horizontal manner except the rim. Into these tendrils is worked wool and cobweb, and when completed the nest has quite a woolly appearance. So much variation in size occurs that measurements are of little use; an average nest measures about 4½ inches diameter by 2 to 3 inches in depth. The inner cup is usually about same size, diameter 3 inches by nearly 2 inches in depth. The guttural call of the "Spiny Cheek" is more often heard during nesting time than at other periods of the year. Both birds assist in constructing nest, and feeding young.

Anthus australis. Australian Pipit (Ground-Lark).—Very common, and in drought years is often the only bird visible on the open plains; breeds freely; 3 or 4 eggs to clutch.

Taniopygia castanotis. Chestnut-eared Finch.—In thousands; our only Finch; breeds all the year round according to season; seldom build new nest, an old one is repaired and relined; clutch, from 4 to 7 eggs. Usually found only close to water in summer time; a number of nests often found with eggs or young on same shrub; sometimes eggs are laid in an old nest, and the repairing continues for some time afterwards.

Corvus ceciliae. Australian Crow.—Not as numerous as the Short-bills. Destructive to ewes and lambs; breeds freely; typical nest and habits as elsewhere; clutch, 4 to 5 eggs; down smoky grey.

Corvus hennetti. Short-billed Crow.—Very numerous; breeds freely; spends most of their time searching after grubs and insects and prefer open plains to timbered country; typical Crow's nest; clutch, 4 to 7 eggs.

Cracticus nigrogularis. Pied Butcher-Bird.—Only one pair of these beautiful birds noted, evidently visitors; better songsters than our own "Coollady" or Grey (Collared) Butcher-Bird.

Cracticus torquatus. Grey (Collared) Butcher-Bird.—Fairly numerous in hilly country, but no record of its breeding in district.

Gymnorhina tibicen. Black-backed Magpie.—Common, and without doubt increasing; breeds freely, nesting in tall trees when available; clutch, 3 to 5 eggs. The eggs are often covered with fur when bird leaves nest, but whether she covers them or whether the fur rises up as she gets off nest I am unable to record. Odd nests are not lined with fur.

Sparrows and Starlings.—Former in fair number, two or three of latter.

Note.—It will be observed that I have not dealt with the birds sub-specifically, except in a few instances. Many of the birds in district have been made sub-species, but the writer claims that conditions of season alter the colour of the birds to a certain extent; for instance, a Yellow-tailed Thornbill taken in drought time has the rump of a much paler colour than one taken during a good season. Leigh's Creek, a locality quoted by Mr. G. M. Mathews, is not far from the Lake Frome District.

The Small Birds of the Granite Belt

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and

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During recent months the attention of the authors of this article has been focussed upon insects and insect control, and many side issues, amongst them birds, have cropped up and been under discussion. One of us is a professional entomologist, the other an amateur dabbler in ornithology and entomology, with a strong leaning to applied and comparative anatomy. So if we ride our hobby horses overmuch at times, we ask indulgence.

We happen to be working in an area which we both think highly interesting from our points of view, and one of us (S. R.) briefly outlined in *The Emu* of April, 1922, the geography of the place. Too much detail is to be discouraged, and yet certain topographical facts must be put clearly. This Granite Belt, as it is termed, is the meeting point of the Dividing Range of South Queensland, covered for the most part in sub-tropical vine scrub, and of the New England highland, mainly granite, and a cold country. Further, it is in relationship of an intimate nature with the eastern waters of N.S.W., a humid, moist climate, and the great western country of Queensland, a dry hot plateau. So it draws upon all these diverse sources for bird and insect life, besides having some peculiarly its own; but only the hardy may remain, as it is a bleak and inhospitable country for a great part of the year. And just as too great detail is to be deprecated, so with thinking aloud. Nevertheless the main ideas which have guided the development of our article should be stated. We have been profoundly impressed by the heat and chaos in regard to the principles underlying classification and nomenclature; by the former term meaning generic and suchlike distinctions, and by the latter those pertaining to priority and its attendant evils.

So it has come about that our study has commenced with the Small Brown Birds with which we meet, giving each the name in the R.A.O.U. Check-list (Draft of Second Edition), with details of their general habits, their nesting, food, and superficial features. If the Eskimo, from his hard food and peculiar taste in treating hides by chewing them, can modify his facial skeleton, so, we argue, *Smicrornis brevirostris* may develop a facies of his very own, if he does similar strange things. And we also bear in mind that for a century, and until comparatively recently, male and female of certain parrots were separated as distinct species, even distinct genera, and that the first field workers to state they were one and the same met with, to put it mildly, disbelief.

What, now, are these Small Brown Birds which in the field are so much alike? Here they happen to be—

(1) *Smicrornis brevirostris* (Brown Weebill); (2) *Acanthiza lineata* (Striated Thornbill or Tit); (3) *Acanthiza pusilla* (Brown Thornbill); (4) *Geobasileus chrysorrhous* (Yellow-tailed Thornbill); (5) *Geobasileus reguloides* (Buff-tailed Thornbill); (6) *Gerygone albobularis* (White-throated Warbler); (7) *Gerygone fusca* (Brown Warbler), and (8) *Chthonicola sagittata* (Speckled Warbler).

The grouping of them together may seem ludicrous. But it is asked that this may not cause even the skilled ornithologist to deride us. We said happen to be advisedly in introducing our subjects. Let the skilled man ask himself does he know a piece of bush where counterparts of all may *not* be found in association? Perhaps *A. nana* takes the place of *A. lineata*, but on the whole they are similar; he will draw his field glasses, focus them, and still be in doubt. Recall any piece of bush road with the undergrowth cleared up by stock, the near-by paddock rung, but suckering. *Chrysorrhous* will be on the road, and the others, except perhaps *Fusca*, which wants thicker stuff, will be in the suckers. *Brevirostris* and *Lineata* are in the trees, rapidly flying hither and thither searching the leaves. *Albobularis* moves rather lazily amongst the twigs, and *Pusilla* darts from the low bush. *Reguloides* potters about the ground, but *Sagittata* seems almost to creep. *Fusca* is an inhabitant of the only piece of vine scrub which we have, but is legitimately introduced as a type, and his habits are most like those of *Brevirostris*. Will they be scattered over the feeding grounds? More likely than not the whole assemblage will be found in a small sector, and this association is undoubtedly a striking feature. They seem to range systematically their whole feeding ground, whatever the other insect-hunters may do.

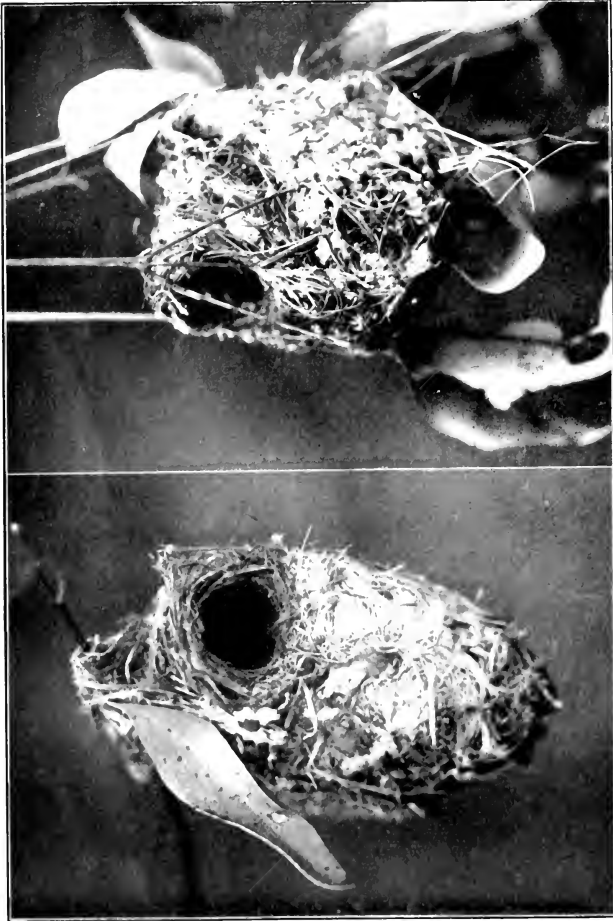
Here immediately, then, is our association, and a grouping utterly foreign to a strictly systematic view.

What brings about this assemblage in the first place? It may be thought that perhaps so great a crowd will disturb and make visible the insects, but more probably it is for purposes of protection, the warning note of all being the same. As regards food they are remarkably homogenous, which will be seen by a glance at the tables given later. They do not seriously compete with the Honeyeaters, who derive most of their insect food from prying into deeper bark crevices and from true-blue flying insects, caught on the wing with a wonderful display of "stunting"; their spare time they spend peering into hollows and chattering at the sleepy owl, as though they did not know he was there; nor do they compete with the swift-flying Pardalote, who has a much greater range and is a more venturesome customer in the big timber. These you will know by their silhouettes, colour and

flight; but not so our small brown fry, who pursue the more slow-moving, heavily camouflaged insects and proclaim themselves only by the very intimate signs which they make to one another.

Brevirostris has a tiz-tiz (which is a human palate sound), but in addition has a loud song-like whistle quite unmistakable; the former he uses as he feeds amongst the leaves, sometimes hovering for a few seconds, the latter he utters when he has flown to a fresh tree and wishes to proclaim it to his mate. *Alboquularis* you will know by his sweet song, his dash for the flying insect with *snapping beak*, and his peculiar tail movement. *Lineata* has a dental tiz-tiz and nothing else (E. J. Christian, Mathews' B. of A., ix., p. 446, notwithstanding); but he puts uncanny meaning into it when in flight, and it then sounds like the flight-call of the Red-browed Finch. He clings and flutters and braves any wind. *Reguloides* is the plodder of the party, but he is likewise the most numerous and ubiquitous, and surely he must be brainy; in fact, he looks a wise, worried old thing. His forehead seems to have wrinkles in it, and his washy white eye completes the picture. He has a short friendly note, and a little song; but further, he is the first dealt with to have a distinct tribe mark, a widely shown buff rump in flight.

Pusilla usually sits in dark places, with his tail slightly erect, his wings drooped, brown, alert, and with an air about him; sometimes he even seems slightly to erect the feathers of his forehead. As a rule in two's and three's, at times in the winter he collects his friends to feed up amongst the cypress and bottle-brush husks; but more often he will be found close to the ground. He has a tribe call, and a rather harsh angry song. If the nest with young is approached, the parents will come quite close, and the bird will frequently utter a note like that of the Yellow Robin, but whether this is accidental or not we do not know, as we have never heard him imitating other birds, though we are aware it has been recorded. *Chrysorrhous* everyone knows; his twitter and song, the black line from the gape to the eye, and the lovely spotted head which appears to be covered in a close-fitting cap of Venetian lace; his yellow rump is widely displayed in flight. *Sagittata* is a camouflage artist; let an alarm note be sounded, and he at once, without commotion, merges into his surroundings. He is as quiet a mover as the Ground-Bird (*Cinclosoma*), but his gait is a short inconspicuous jump unlike that of the larger bird, which walks or runs. Otherwise his full breast and whole bearing is like some miniature of that bird. But at times he takes to the trees with strong flight, and sitting there sings more sweetly than any other small bush bird. *Fusca* hovers in front of a bunch of leaves more often even than *Brevirostris*, spreads the tail to show the white spots, and after a real bird's-eye view proceeds to gather up his observations.



The domed but laterally-suspended nest of the Brown Weebill (*Sonicornis bicoloris*). Note super-added dome and hood to original cup-nest

The lateral-domed nest of the Striped Thornbill (*Acanthiza lineata*)

In numbers the birds would be: *Reguloides* 6, *Lineata* 5, *Chrysorrhous* 3, *Brevirostris* and *Albogularis* 2, *Pusilla* and *Sagittata* 2, *Fusca*—and we have thus far pictured them at a normal time, the more numerous in flocks, the less in pairs. As the nesting season approaches a pair of *Brevirostris* anchor themselves, become fierce and pugnacious, whilst the courting display is very beautiful for so small and sombre coloured a bird; he ruffles his head and cheek feathers, his dull coloured eye takes on a sheen, and he literally hangs by his toes with out-spread wings and tail. *Albogularis*, too, anchors himself, and the song is very sweet; in fact, this seems to be the male bird's contribution to the nesting. *Pusilla* becomes more than ever the stern, silent fellow. *Reguloides*, *Chrysorrhous* and *Lineata* still wander considerably, and their courting is of the nature of a sparrow fight; nor do they seem to mind others of their kind prying round their nests.

As regards the nests, it is surprising that each species has such individualistic ways of building. *Smicromis* builds either in a hanging or an upright bunch of twigs, but always starts with a cup, the hood and dome being added as a sort of afterthought, and not attached to the twigs of the tree. Building is very prolonged in this species and we have seen the birds carrying lining after the full clutch was laid. The nest is beautifully built from the green needle-like leaves of the dog-wood woven, but usually fastened in addition by the egg-containers and webs of spiders. It is lightly lined with feathers and soft things, and is quite diminutive.

"This least of the Australian birds," as Gould puts it so beautifully, lays a tiny egg. *Albogularis*, on the other hand, first suspends by its top a hollow almost shapeless mass of bark fibre, taken from the inner layers and consequently khaki in colour. It hangs from a point where two or three twigs branch out, and act as an anchor, is heavily woven, and, in addition to fastenings from the useful spider, resin from the trees is used as a binding and maybe waterproofing material, for it is usually concentrated on the upper surfaces. This mass of bark, etc., is shaped by putting in of stiffeners on the inside, and the bird, in doing this, leaves her hindquarters protruding from the nest, an action which is almost characteristic. The result of this bulging of the centre is that the completed nest is shorter than the incomplete. *Lineata* builds high or low, and the nest is a gem when finished. It is usually suspended from a single slender twig, and anchored by a leaf; pear-shaped when viewed from its front, but square from the side, the entrance in the long axis of the supporting twig, the whole thing is beautifully modelled, and the selection of material—brown bark fibre, white bark fibre, green spider egg-containers, and so forth—is worthy of the shape. If one watches the bird to find the nest it is immediately apparent, to your sorrow, how far it will go for material, as it often flies

out of sight. *Pusilla* is intensely interesting on account of the suspension. The nest is placed a few inches from the ground usually, in a low bush, and attached to a twig which, in many cases, is loose, and has fallen from above; this was the case in the nest illustrated (Plate No. lxxviii.). It is built on long bark with a small amount of spiders' web, and immediately calls to mind a cheap suburban house which is all front; the entrance is ornate, but the living chamber is a rough structure woven into the back of this front, and supported by the twigs of the bush, but *not* woven into them. So it is often possible, as in the plate mentioned above, to lift the nest out without breaking a twig. The birds love to use brightly coloured feathers as a lining. *Reguloides* builds a "humpy" of short bark just anywhere, the fork of a tree, the end of a spout, a piece of hanging bark, or the top of a dog-wood sufficing. It is never woven to anything, the dome is a true piece of thatch and in the case of the nest in the dog-wood frequently gets lopsided; so he maintains his reputation as a happy-go-lucky, lovable old chap.

Everyone knows the bulky nest of *Chrysorrhous*, with its double chambers, the one open, the other hooded. It is most frequently in a hanging bough, but is often in a thicket with its main support a thick limb behind or on one side. She owns to her kinship by sometimes laying a spotted egg in her white clutch. *Sagittata* is still the artist at concealment; he is truly a master, for of all the common birds, his nest is the most difficult to find. A hole is scooped in the ground and the nest of rotting short gras, with a hood and dome of recently dead material to imitate the surroundings, is built in this. We can but gaze in wonder at the pure art colour of the three chocolate-coloured eggs.

So we pass from the pleasant out-of-doors to considerations which can be followed to a conclusion only after scenes which we hate to look back upon. Our object, hitherto, has been to characterise rather than to differentiate, and the task of collecting these notes has been one of many pleasant hours. The examination in a systematic way of nestlings has suggested itself to us, and we are seized by its importance; but the difficulty of doing so in hooded nests will be apparent, more especially to those who have done field work. And we would beg to be excused.

On a critical examination of the stomach contents of these birds, one cannot help being impressed with the part they must play in aiding the control of insect pests and also maintaining a balance of nature. They wage ceaseless war against small insects of almost every order, and though at times they may take toll of some which are beneficial to man, the harm they do is surely balanced by their good work so far as one can judge; their numbers, nimbleness and ubiquity render them a factor which must be considered.

Smicrornis brevirostris has a fondness for leafhoppers (Jassids, Fulgorids). The insect which escapes its bright eye must be well concealed indeed. Many insects, such as small Diptera (two-winged flies) and Hymenoptera (four-winged flies) must be caught by him on the wing. The various species of *Eucalyptus* when flowering yield him a rich harvest of small beetles, etc.

Acanthiza lineata confines himself apparently to an insect diet. Hardness of shell (wing case) appears to be no bar to him; down goes the insect whole, and it may, when recently swallowed, be found in the stomach in this state.

Acanthiza pusilla has very similar taste to the preceding, but in addition includes in his dietary a quantity of vegetable matter and a few seeds.

Geobasiliscus chrysorrhous has an insatiable appetite. All is grist that comes to his mill; every order of insect is represented in his daily menu, and spiders do not come amiss.

Geobasiliscus reguloides has developed seemingly a penchant for eating ants, and must devour a large quantity during the day, in addition to the general run of insects.

Gerygone albobularis is a terror to all insect life, attacking boldly quite large insects, and his strong beak ensures him quick victory. He is probably one of our most useful birds, destroying, as proven, numerous small weevils and plant-eating beetles.

Chthonicola sagittata must be also very useful, his diet being composed chiefly of scale insects, leafhoppers, and other economic pests, but there is in addition a small quantity of seeds and vegetable fragments.

We would not dogmatise on the point as to whether the stomach contents show positively that the birds live on the ground or in the trees, but the examination of many stomachs of the species dealt with would lead us to conclude that the food can in a measure be taken as a guide to the habits of the individual species.

TABLE OF STOMACH CONTENTS.

Smicrornis brevirostris.—Insects: Coleoptera, fragments of small beetle, sp. undeterminable; Hymenoptera, several small wasps, also ants (*Dolichoderus* sp.), very numerous fragments; Diptera, large quantity of wings, heads, etc., undeterminable; Homoptera, fragments of leafhoppers (*Fulgoridae*, etc.). Vegetable Matter: A small quantity. Seeds: None.

Acanthiza lineata.—Insects: Coleoptera, one small plant-eating beetle (*Fam. Chrysomelidae*), 3 Chrysomelid beetles (*Calomela* sp.); Hymenoptera, several ants, and one or more Chalcid wasps; Diptera, one Syrphid-fly, many fragments of Diptera undeterminable; Homoptera, one Fulgorid, and fragments of leafhoppers undetermined. Vegetable Matter: None. Seeds: None.

Acanthiza pusilla.—Insects: Coleoptera, several plant-eating beetles (Chrysomelidae); Orthoptera, one or more small earwigs (Forficulidae), one small cockroach (arboreal species); Homoptera, leafhoppers Jassidae, Delphacidae (numerous fragments), one small Cicada (*Melampsalta* sp. ?); Lepidoptera, four or more small moth caterpillars; Thysanoptera, one Thrip (*Idolothrips spectans*). Vegetable Matter: Fragments of flowers. Seeds: One or two seeds of weeds.

Geobasileus chrysorrhous.—Insects: Coleoptera, two Tenebrionid beetles, large quantity of fragment of small ground weevils (Curculionidae); Lepidoptera, two or more small moth caterpillars; Homoptera, two or more Jassidae and numerous Psyllid fragments; Hymenoptera, several small ants, species undetermined; Orthoptera, fragments of immature grasshopper (*Oecanthus* sp.); Heteroptera, one spined plant bug (Tingidae); Diptera, several wings and fragments undeterminable. Arachnida: One spider. Vegetable Matter: None. Seeds: None.

Geobasileus reguloides.—Insects: Coleoptera, one small Longicorn beetle, three or more weevils; Hymenoptera, eight or more small ants; Lepidoptera, three or more Moth larvae; Hemiptera, small bug, fragmentary condition; Homoptera, leafhopper (*Fulgorid* sp.). Vegetable Matter: None. Seeds: None.

Gerygone alboocularis.—Insects: Coleoptera, one Staphylinid beetle, three small weevils, one fairly large Chrysomelid beetle, one Longicorn beetle, one Tenebrionid beetle; Lepidoptera, several moth caterpillars in fragments; Orthoptera, one earwig; Hymenoptera, numerous small wasps in fragments, one large flying ant and large quantity of small ants; Homoptera, numerous leafhopper fragments; Diptera, a few wings and fragments undeterminable. Vegetable Matter: None. Seeds: None.

Chthonicola sagittata.—Insects: Coleoptera, one weevil (Amyrictinae), one plant-eating beetle (Chrysomelid), large quantity of beetle fragments; Lepidoptera, three or more small caterpillars; Homoptera, leafhoppers, Jassids, etc., one small cicada, scale insect fragments, one mealy bug (Coccid); Hymenoptera, one small ant; Orthoptera, one immature grasshopper. Vegetable Matter: A fair quantity. Seeds: A few.

As we are of opinion that it is probable, almost to the extent of a certainty, that different species of Passerine would not interbreed under any native conditions, and that sub-species of the same type should do so if given suitable surroundings, the matter of nesting habits seems most important. Those building dissimilar nests could not be of the same species, whilst those building similar nests might be. Approaching the matter from this standpoint no detail is apparently too trivial to be overlooked.

In Mathews Birds of Australia, vol. ix., *Pusilla* is the first *Acanthiza* treated, and this species is illustrated on three plates



The careless nest of the Buff-tailed Thornbill
(*G. regalisoides*)



The Double nest of the Yellow-tailed Thornbill
(*Geobasiliscus chrysorhynchus*)

containing in all nine figures; in the letterpress many pages of detail are given as to colour and synonymy; habit is to a certain extent considered, and likewise habitat. For it all we can only express the utmost admiration without reservation. The more closely it is studied, the more illuminating it will be found. It is, however, a matter of regret, so far as we are concerned, that nesting is not more fully considered from the point of view which we have taken. But it is realised that, though Mr. Mathews has magnificent material to work upon, this aspect of the subject may not have presented itself to him through, curiously enough, lack of material. A hope that our study may to some extent rectify this is expressed; and although the framework of this article was constructed prior to 1922, and plans laid for building in the detail, we take pride in the fact that in July, 1922, this eminent authority wrote: "Also more stress must be laid upon bird habits in connection with classification than hitherto. The best way to arrive at such results will be the study of small groups by local workers, as instance the relationships of *Gerygone* and *Acanthiza* in their widest sense and then the inter-relationship of the species. It may prove that the most different superficially are really the most allied, and *vice versa*" (preface to vol. ix., B. of A.). That there is doubt, at least, of the inter-relationship of species which he speaks of, is amply proven by a comparison of his work and the Check-list of the R.A.O.U., both of this year of grace, 1922. The R.A.O.U. Check-list lists among the *Acanthiza* the following as distinct species: *Apicalis*, *Albiventris*, *Ervingi*, *Hamiltoni*, *Katherina*, and *Whitlocki*, whilst Mathews makes these subspecies of *Pusilla*. Further, such well-known names as *Diemenensis* and *Pyrhopygia*,* to take some at random, disappear from both lists, evidently being merged into *Pusilla* by both authorities.

We have already indicated sketchily the nests of the subjects chosen; but it is necessary to make a closer study if essential differences are to be found. *Smicrornis* begins with a cup mostly attached to its supports, which, as already mentioned, may be upright or hanging by its lips and sides, and adds a dome and hood, which are unattached to the supports. This attachment to either upright or hanging supports is interesting, and is always accomplished in the same manner. *Albogularis* begins with a hollow collapsible mass suspended by its top. The three accepted *Acanthizoid* species (for *Chrysorrhous* has for long been placed outside this genus) pass from the magnificent structure of *Lineata*, solid yet swaying to every breeze, through the roughly woven nest of *Pusilla*, with its rudimentary suspension to the bark hut of *Reguloides* devoid of any suspension and innocent of adornment.

Detailing of structure requires the use of two terms which must be defined: Homologous meaning having a similar origin,

* *A. pyrrhopygia*—a preoccupied name—is replaced by *A. hamiltoni*. Eds.

analogous meaning having a similar function. The dome of *Albogularis* and of *Lineata* are, it will be seen, even on reference to the plates, analogous to the side of *Brevirostris* and to the front of *Pusilla*. In the case of the two former the nest is a true hanging nest, and its mode of attachment is by producing the sides upwards, enclosing in this sweep the dome, which becomes rudimentary, whereas in *Brevirostris* the sides are not produced upwards, and the dome is fully developed and exposed to view. *Pusilla* is most interesting, and there is evidence that the nest is transitional. In one illustrated, and this is typical of the nest built in a fairly open bush, there is distinctly one point of suspension, but in the other (an assurance is given that it is absolutely accurate and made without exaggeration, a photo. being useless on account of lack of detail), in which there are apparently several points where weaving into the supports has taken place, it will be noted that these points are all derivatives of the front, which is apparently "slipped" upwards and as well slightly overlapped the sides. So it will be seen that the "dome" in the ordinarily accepted term of the word, of *Lineata* and *Albogularis* are homologous; they are not homologues of the dome of *Pusilla*, and none are homologues of the dome of *Smicrorhis*. In *Reguloides* the dome is apparently a true dome, in that it is a derivative of the top of the nest. In *Sagittata's* case the dome is, as in the case of the *Malurus* group, a derivative of the back of the nest.

For the sake of more accuracy we would suggest, therefore, in scientific descriptions, that some prefix should be given to "domed" indicating its origin. The true domed nest of *Reguloides* might be termed domed, *Lineata* lateral-domed, *Pusilla* anterior-domed, *Sagittata* posterior-domed, and *Brevirostris* domed but laterally suspended. It is not wished to labour any points, but the difficulty in the matter of the anterior-domed group we are the first to admit; these with us are all built by *Pusilla*, and present a certain amount of divergence and variation which warrants some elaboration. We would define as anterior-domed those nests which are suspended above from one or more points situated higher than the nesting chamber and in which the suspension points converge to form a lower lip to the opening of the nest, thus forming an anterior sling for the nest.

Now, what emerges from all this? Simply, apart from *ipso facto*, that it may be the key in certain cases as to what are species and what are sub-species: as an instance take, say, the points in dispute in regard to the *Acanthizae* (Mathews v. R.A.O.U. Check-list). All the species agreed upon by both build nests which should each be recognisable by an expert: those in dispute are lumped by Mathews under *Pusilla*, which presupposes that their nests are similar to an extent equal to the similarity in the birds themselves; if this supposition is correct an impartial judge would award the case to him; if the nests do not conform to the derivation of the anterior-domed nest given



Nest *in situ* of Brown Thornbill
(*Acanthiza pusilla*)



The lateral-domed nest of the White-throated Warbler
(*Ceryle albigularis*)

above, we would suggest that a separate species is justified, a contingency provided for by Mathews in these words (B. of N., ix., p. 434, *re Pusilla*): "We see here the process of the formation of species, and that in more generations we should have three or four distinct representative species . . . whereas now the definition is indistinct." So it seems to us that as the bacteriologist by looking through a microscope at organisms would not classify on this alone, but would turn to culture methods, so the cabinet ornithologist should not, without equivalent cultural details, but simply on appearance, dogmatise as to species and sub-species.

We admit we have no theory to offer as regard *Chrysorrhous* in connection with the evolution of the nest. Does she stoop to conquer? Is it because it is a puzzle to the cuckoo that it is an enigma to the human? But we record this one case. A pair built in the garden out of reach of the small boy; suddenly the birds deserted, after sitting for a time, and built close by. This first nest was examined, and found to contain a Cuckoo's egg in addition to the clutch of Tit's eggs. But woven into the upper nest and in full view was a mummified Spotted-sided Finch. It is not suggested that it was actually used as anything more than a mass of feathers, nor do we insist on forcing some significance from all that comes before us. It is simply recorded as a sign at most of the mentality of the bird, a further proof of which is its adoption of human beings wherever opportunity offers.

In approaching the subject of external features two points have to be borne in mind: First, that, as a zoological class, birds with thirty orders roughly, do not in the aggregate muster as much diversity as many a single order of Amphibia, Fishes, or Reptiles, and second, as a corollary, that almost microscopic attention has been paid to macroscopic features in dividing the various orders into genera. In fact, any recognisable modification in beak, wing or leg has certainly been thought to warrant, at least, generic differentiation.

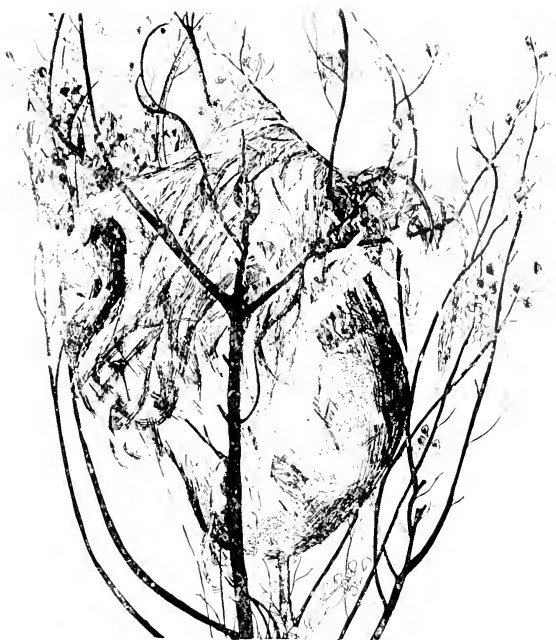
All the species here treated have bristles surrounding the mouth to guide the erring insect into the right path; as would be expected, the ground-feeding species have these less developed than those which pursue insects amongst the leaves and twigs.

The shape of the beak itself is governed chiefly by two factors: the use to which it is put and the necessity for a minimum space to house the nostrils. If the bird requires a stout beak, as in *Brevirostris*, there is no necessity for the provision of special space for the nostrils: it is already there. If on the other hand the bird requires a sharp beak, as in the *Acanthizac*, a basal expansion is required for the nostrils. At times it is necessary that the heavy beak should have a sharp point: a typical case is the Parrot, and it is obtained by inserting a notch a little way from the tip. Exactly the same occurs in *Albogularis*, even to the

slightly decurved point, and also in *Brevirostris*, but in this case the tip beyond the notch is not decurved. In many of the other species this notch is also represented by a greater or less number of serrations. At times, too, a heavier underbeak is required, and this is got by various modifications; in *Chthonicola* and *Albogularis* it has the shape of a miniature cricket bat, looked at from the side, and laid face upwards, but in *Brevirostris* it is obtained by reinforcing the edges. In *Fusca* the beak is as broad as it is high at any given point.

In regard to the wing, much is made of the wing formula, and particular attention has been paid to the length of the second primary compared with the secondaries. In order to make clear which are primaries and which are secondaries a plate is given of the wing of a young pigeon which has recently shot its quills. Let it be said at once that of all the external differences this is as debatable as any, for it is really in many cases a hard matter to detect the difference, which is only a fractional part of an inch. And their meaning and application anatomically is complicated by the fact that the last two primaries are undergoing atrophy in the majority of birds, and the reason is this. The secondaries are attached to the bird's fore-arm, the primaries to the rudimentary hands and fingers; of these latter there are three—two having a single joint, and one, two joints. The second joints of two have disappeared, but in the other it is still present, though undergoing degeneration: hence the structures which it carries, and these are the last two primaries, are also undergoing degeneration. In some birds the process is complete, and the bird has nine primaries instead of the usual eleven. As an example of a nine-primaried bird, the swallow may be cited, so that although use is a factor, no one can say where the atrophic inherited element ends and the hypertrophic from use begins. For the purpose of clearness of expression the *ala spuria* is neglected. Certainly we are willing to admit that the second primary of *Albogularis* is distinctly longer than the first secondary, and that this is reversed in *Fusca*. We also admit that *Brevirostris* follows the formula of *Albogularis*, but the position in regard to the *Acanthizae* and *Geobasileus* is not so clear; *Chrysorrhous* certainly has a second primary, which can be said to be longer than the secondaries, but this we have not been able to confirm in regard to *Reguloides*, *Lincata* or *Pusilla*: in fact, this point in them is not constant. One other point needs mention, and this in regard to the method adopted for comparing the feathers mentioned: it is done by noting which feather projects the further in the folded wing, but as the wing in this position lies with its bones folded parallel the point of origin of the first primaries is lower than that of the corresponding secondaries, and hence a fallacy may creep in.

In regard to the legs, feet and tail, we are forced from observation to take up the attitude that modifications of these are simply



Sketch drawn by D. Eden



Upper—The anterior-domed nest of the Brown Thornbill (*A. pusilla*);
outer twigs removed to show several points of attachment
Lower—Wing of a young Pigeon to show developing primaries and
secondaries; only 10 primaries are visible, one has been atrophied

adaptive. A bird with the habits of *Chrysorrhous* has large feet and stout legs, to enable him to hop about the ground, and a short tail, so that he won't drag it, unless, indeed, he adopts the Wren's dodge and cocks it. But *Lincata* has smaller feet and legs for grasping purposes, and a larger tail for balancing, and in regard to the small grasping feet we would instance the fore-feet of the monkey as analogous. And so it goes on *ad infinitum!*

But it may be asked where does this virtual negation of all these external features lead to? We would answer, it is simply by its negative exaggeration our plea to take the bird in the field as a whole, and to attach to this whole an importance at least equal to that which is attached to the individual features taken separately. Is it correct that the shapeless cabinet specimen gives the only true picture, and that the bird in life on its native heath, if examined with interest, will not add something? Emphatically no! From this standpoint, then, we would place in a pigeonhole of its own, *Smicrorhis*, *Fusca*, *Albogularis*, and *Chthonicola*, and, presuming we knew no other, make a type of each without indicating any inter-relationship or systematic position. And we would place *Lincata*, *Pusilla*, *Chrysorrhous*, and *Reguloides* together. They are diverse in habits of feeding, song and nest-building, but this very diversity has a gradation about it which cannot fail to impress. From the field-worker's point of view they are divisible into species which feed and live chiefly upon the ground and others. And this same is expressed by systematists by differentiating them into two genera—*Geobasileus* and *Acanthiza*. The former includes *Chrysorrhous* and *Reguloides*, and considering them for a moment as types differing from *Acanthiza*, it is interesting to glance at the differences and see how they work out. Take the Yellow-tailed Thorn-bill from the point at which he is first seen feeding on the ground. The shorter tail and stronger feet and legs have already been referred to; on taking flight he spreads his tail, and to show the exposed rump, the tribe-mark, to his mates, presumably on the ground, he drops the point of his tail and seems to fly slightly erect. One way to counteract this fractional displacement would be a fraction the greater wing area with the increase as far as possible from the displaced part. What more natural than that the tip of the wing should be produced by lengthening the second primary, the first being beyond hope?

If it is considered by the Check-list Committee that differentiation is really called for, we will not for a moment question that it is wise. And further, we recognise, and it is equally important, that those interested in the bird world require, like England, tranquillity in order to do good work; for many a promising recruit retires before the wordy storm, and it is often the man of limited scientific attainments who plunges into it.

We would wish, however, that the spirit of those old English Naturalists who chose the original names could always be with

us, for they had a beauty of expression far exceeding that in our own hard-working matter-of-fact world, though we personally do not mistake literature for natural history. Everyone knows that the Gold Finch is a thing of gold when he breaks into glorious flight; so, surely, this must have been a thought behind the mind of Vigors and Horsfield when they, in 1827, looked upon *Reguloides* and chose the classical name *Akanthis*, a Gold Finch, for their genus. Verily it must pain their spirit to have their gold-coloured idol bearing the name *Geobasiliscus*, king of the world, coined in 1851. And even in these days their poetic souls are so misunderstood that no man has, to our knowledge, contradicted the statement that *Regulus* means nothing more than "a staff." Was it not also given to *Regulus*, the English Wren? Surely this Wren, beloved of English children from time immemorial, was in their thoughts, and they rejoiced that English children in distant lands should at least have something to call it to mind. All this may not be in strict keeping with modern ornithology, but it is the spirit in which we approach it, and from which we have had great pleasure. And these Small Brown Birds are to us part of a greater scheme conceived by a sublime mind, a scheme which cares for its children, and if life is too hard changes them slightly, makes *Lineata* into *Nana*, and gives to *Reguloides* a chestnut tail, to make them fitted to be happy wherever they are placed, bringing into being what is termed by us mortals the Law of Representation.

The Crimson Honeyeater, *Myzomela sanguinolenta*.—On a warm November afternoon a little grey-brown bird flew down to a row of French beans that had just been watered, and hopped and fluttered among the dripping leaves, giving little chirps of keen enjoyment, until, quite drenched, it flew off to a peach tree to preen and dry its feathers. The bird was the female *Myzomela sanguinolenta*—the "blood-bird" of the Sydney schoolboy—and the sight was the more noteworthy because, compared with the male bird, it is rarely that the female is seen at all, even allowing for her lack of song and absence of bright colour. Her throat shows just a touch of the male bird's scarlet, clearly seen as she sits on the nest with head and beak pointing a little upwards. The nest resembles that of the Yellow-faced Honeyeater (*Meliphaga chrysoptera*) in shape, construction, and situation; but is smaller and made largely of shreds of fresh bark, which give it a reddish colour. One of this year's nests was made in a small pine (*Pinus insignis*), about 10 feet from the ground. The young birds were fed partly on gnats and mosquito-like insects by both parent birds, and were out of the nest by 17th October.—H. WOLSTENHOLME, R.A.O.U., Wahroonga, Sydney.

Notes on Birds Observed at Sea

By TOM CARTER, C.F.A.O.U., Sutton Grove, England.

Between Nov. 5th and Nov. 27th 1921, from the S.S. "Suevic," outward bound for Australia, South Atlantic Ocean.

1921.—Nov. 6th, Lat. 18 deg. s. (1200 miles south of Equator).—One large Wandering (?) Albatross and one large Black Petrel.

Nov. 7th.—One rather large Black Petrel.

Nov. 8th.—About 12 Albatrosses, with pale fleshy bills, some with dark brown wings, interscapular region, and brown collars; some similar birds had white backs between the wings.

Nov. 9th (2000 miles S. of Equator).—Only one large Albatross (Wandering ?) seen. Blackish wings with white patches near the centre, white nape, back and rump; below, black wing tips, rest white. One Yellow-billed Albatross, blackish across wings and back. Three large Wandering (?) Albatrosses, mostly brown plumage. Immature? One medium-sized Black Petrel, with very narrow wings.

Nov. 10th.—Several Albatrosses following all day, and in the afternoon a few Petrels resembling the Cape Hen (*Procellaria equinoctialis*), with yellow bills, small white chin patches, and short, wedge-shaped tails. About 100 miles from Cape Town saw a few small Penguins with whitish throats, and a few all dark brown Petrels.

Nov. 11th.—Several Cape Hens inside Cape Town Harbour, and a few Cape Petrels (*Daption capensis*) feeding under ship's counter. Several large Black-backed Gulls, with yellow bills, and some smaller Gulls resembling the Silver Gull (*Larus norvegicus*) were also inside the harbour.

Nov. 13th., 500 miles S.E. from Cape Town.—Two Cape Petrels seen in afternoon, and a few Silver-grey Petrels about the size of the Cape Hen. One very small Grey Petrel with white under parts, and two or three Wandering (?) and Black-backed Albatrosses and Cape Hens.

Nov. 14th.—Two or three Wandering (?) Albatross and a few Cape Hens. Many small *Prions* (?) greyish blue above and white below. These latter birds, often seen subsequently, kept well away from the ship.

Nov. 15th.—Many Wandering (?) and two Black-backed Albatrosses. Many Cape Hens, Giant Petrels (?) or Great Skuas (?) but only a few small *Prions*. I saw a large Albatross flying

close round the steamer at 10.30 p.m. The moon was about full that night.

Nov. 16th.—Not so many Albatrosses, but many more Cape Hens, Silvery-grey Petrels, and two Cape Petrels. (No Prions were seen this day.)

Nov. 17th.—A few Wandering (?) Albatrosses, and more Black-backed Albatrosses. Great numbers of Cape Hens, but only a few Prions.

Nov. 18th.—A few Wandering (?) and Black-backed Albatrosses, and greater numbers of Cape Hens. A few dark brown Petrels, and one small blackish Petrel with white rump (about midway between Cape Town and Albany, Western Australia).

Nov. 19th.—Birds not nearly so numerous. Three large Wandering (?) Albatrosses, two Black-backed Albatrosses and a good many Prions.

Nov. 20th.—A few Wandering (?) and Black-backed Albatrosses and a few Cape Hens; not many Prions (none seen after this date).

Nov. 21st (1800 miles west of Albany).—Saw three Wandering (?) Albatrosses, a few (twelve) Cape Hens, and no Prions.

Nov. 22nd.—Three Wandering Albatrosses, only a few Cape Hens, and four full-plumaged *Daption capensis*, also several that seemed to be immature *Daption capensis*. They were dull grey above, with white patches on primaries, brown head and chin, and under tail dark.

Nov. 23rd.—Fewer birds yet seen. A few Wandering (?) and Black-backed Albatrosses. Very few Cape Hens, but a good many of the Petrels like imm. Cape Petrels. I saw one of these immature birds go out of sight under the sea in the ship's wake, after scraps of food thrown overboard.

Nov. 24th (800 miles west of Albany).—Saw six Wandering Albatrosses; no Cape Hens; a few of the mottled Petrels as seen Nov. 22nd.

Nov. 25th.—Several large Wandering (?) Albatrosses, six Cape Hens, and a few of the "Mottled" Petrels.

Nov. 26th.—About twenty large Wandering (?) Albatrosses; two dark brown Petrels.

Nov. 27th.—A few Wandering (?) Albatrosses, and two dark Mutton-Birds, probably the Fleshy-footed Shearwater (*Puffinus carneipes*), as far as Bald Head, near Albany.

I was much amused one day on the above run to hear one of the passengers call out to his son to come quickly and see such lots of "flying fish" over the sea. We were much too far south for any of them, but the gentleman had mistaken the numbers of small Prions flying some distance from the ship, and flashing their white underparts as they turned, for flying fish. I did not enlighten him.

**Birds observed at Sea between June 3rd and June 27th, 1922,
in the South Indian and South Atlantic Oceans.**

June 3rd.—Near Rottneest Island, out from Fremantle, W. Australia. Saw two or three Skuas (*Catharacta*), and two Yellow-billed Black-backed Albatrosses.

June 4th.—One Black-backed Albatross.

June 5th.—A few Wandering (?) Albatrosses (550 miles out).

June 6th.—A few Wandering (?) Albatrosses, one Black-backed Albatross, one Skua.

June 7th.—One adult Wandering Albatross, one Black-backed Albatross, and one fair-sized Prion (1000 miles out).

June 8th.—Two large Wandering (?) Albatrosses, with no white wing patches, and one large Black-backed Albatross.

June 9th.—Two brown Wandering (?) Albatrosses and one Black-backed, also one large Wandering Albatross with black primaries and black terminal half of wing, remainder of plumage all white.

June 10th (1900 miles out).—Two large Wandering (?) Albatrosses, with black wings; one small dark Petrel, and one Great (?) Petrel.

June 11th (2200 miles out). Long. 73 deg.—Two great Wandering (?) Albatrosses, one large Sooty Brown Albatross, and one adult Cape Petrel (*Daption capensis*).

June 12th.—Three Wandering (?) Albatrosses, one dark brown Albatross, one small Prion.

June 13th.—Three large Wandering (?), three dark brown Albatrosses, and one Prion.

June 14th (3000 miles out).—One large Albatross, all dark brown above excepting white head and nape; underparts all white.

June 15th.—About five large Wandering Albatrosses.

June 16th.—A few Wandering and Brown Albatrosses, also a good many Prions, some distance from ship (long. 45 deg.; Madagascar about north of us).

June 17th (4000 miles from Fremantle).—Seven large Wandering Albatrosses, and several Prions.

June 18th (150 miles from Durban at noon).—No Albatrosses seen until midday, then saw three. No other birds noted. A few Cape Hens seen after 3 p.m., the first seen. Then one hundred miles east of Durban a good many Prions also seen.

Birds noted June 20th to June 23rd, 1922, between Durban and Cape Town; in sight of land nearly all the way.

June 20th. —No Albatrosses observed, but several Cape Hens, some Gannets and Gulls.

June 21st.—Off Cape Agulhas. —Good many Black-backed Albatrosses, some with orange bills, and distinct white stripe above eye; great numbers of Cape Hens, and some large dark brown Petrels, with wings mottled with whitish patches. These Petrels were about the same size as Cape Hens. A few Prions were seen.

June 22nd.—About three Albatrosses (Wandering ?), a few Cape Hens, and some Brown Petrels (about same size as Cape Hens), with a whitish stripe along primaries. Apparently these birds are the same as those seen on my outward passage, and with whitish patches on upper side of wings.

June 24th, north of Cape Town in South Atlantic.—About fifteen large Wandering (?) Albatrosses, and a few Black-backed with orange bills. Also one speckled with white on upper side of wings, and dark brown beneath. Saw some very tame Petrels with wedge tails. A few Prions.

June 25th (550 miles N. of Cape Town).—Saw three large Wandering (?) and three Black-backed Albatrosses, with black bills, black tail, and white rump. One Brown Petrel with white marks on wings.

June 26th (850 miles N. of Cape Town).—About six Albatrosses. Five of them Wandering (?) and one black-billed and -backed. One large Gannet. (Entered tropics this evening.)

June 27th. —Only one large Wandering Albatross, brown plumage. (This was the last Albatross observed, about 1200 miles north of Cape Town, and about same distance from Equator.)

No birds were seen on June 28th. One Prion (apparently) was seen on June 29th and 30th, and no birds were seen on July 1st, 2nd, and 3rd.

October 3, 1922.

Emu Skins for New Zealand.—Owing to being particularly numerous and being a menace to the prickly pear districts, an open season has been declared for Emus, as they certainly want reducing in numbers in our north-west (N.S.W.). The Dominion Museum are anxious to dress an imitation of the Moa, using certain Emu feathers for the purpose, and they have asked our Government if they can procure 50 skins, and as this number can easily be procured, and will make no difference to the species, we will undertake to procure the skins and ship to Wellington.—A. S. LE SOUFFE, C.M.Z.S., Taronga Park, Sydney.

On the Nest and Eggs of the Kent Island Scrub-Wren

(*Sericornis frontalis gularis*, Legge)

By CLIVE LORD, F.L.S., the Tasmanian Museum, Hobart.

The Kent Island form of the mainland White-browed Scrub Wren (*Sericornis frontalis*, Vig and Hors.) has always been an interesting species to the ornithologist. Owing to the limited area of its range, and the fact that the Kent Group is so seldom visited by natural history workers, the species has not had a very great deal of attention paid to it. Some information was gathered when the Field Naturalists' Club of Victoria visited the Kent Group in 1890, and in the *Victorian Naturalist*, vol. xiii., p. 84, Colonel Legge proposed the specific name of *S. gularis* for this form.

Mr. A. J. Campbell ("Nests and Eggs of Australian Birds," p. 245) refers to the differences which are to be found in the insular form, but does not describe the nest and eggs separately.

Recently I wrote to Mr. Campbell on the subject, and in the course of an instructive reply concerning the species he stated that he believed the nest and eggs were undescribed to date.

Recently Mr. Hollingsworth, of Glenorchy, asked me to describe the nest and several clutches of eggs of this species, which he had obtained some time ago. He also supplied me with the date, etc., concerning the time of taking the eggs.

The general appearance of such specimens as I have for comparison tends to show that the Kent Island eggs differ somewhat from the mainland *S. frontalis*--in fact, in some cases they tend towards the appearance of the eggs of the Brown Scrub Wren (*S. humilis*) of Tasmania and the Bass Strait Islands, but it would need a longer series of specimens of each species than I have at my disposal before this could be accepted as a true general characteristic. Another point is that the Kent Island variety appears to lay but two eggs in each clutch, whereas with the mainland *S. frontalis* the usual clutch is three.

The exact position of the species or sub-species needs to be determined, but this requires further material than is available at present. The following brief description of the specimens submitted by Mr. Hollingsworth may prove of interest:

Nest: Of the *Sericornis* type, roundish, compact-looking, in spite of the fact that it is loosely constructed of grass woven together with very fine twigs and small roots. Lining composed of fine grass and a thin layer of feathers. External dimensions: Vertical diameter, 160 mm. (6¼ inches); entrance, 30 mm. (1¼ inches).

Clutch: Apparently two, stout oval in shape. The general colour being very pale buff with spots and blotches of umber,

and purplish brown; in most cases the markings are pale, but are more pronounced near the apex. In some cases the apex with the exception of the extreme point, is generally purplish to umber in general coloration.

Dimensions in millimetres of four clutches:—

Clutch A.	Clutch B.	Clutch C.	Clutch D.
(1) 23 x 17 mm.	(1) 23 x 17 mm.	(1) 22.5 x 17.5 mm.	(1) 24.5 & 17
(2) 24 x 17.5 mm.	(2) 23 x 18 mm.	(2) 22 x 18 mm.	(2) 24 x 17.5

The specimens were collected by Mr. T. McGuire, who supplied the following information, which Mr. Hollingsworth forwarded with the specimens:—

"I have the pleasure of informing you that I have been successful in finding the five clutches of eggs and the birds. The first nest was found on the 9th September with two young birds, and on the 14th with two young birds. And the second nest was found on the 15th, with two eggs in, and another one on the 20th and 25th September, and October 6th and 13th, all with two eggs, so I think they lay only two eggs. They were found by my eldest son, Jack.

"I am sending you two birds, one old and one young. The young one is this year's. They were found north-east of the jetty in some scrubby grass, and low bushy trees."

Turquoise Parrot in the New York Zoological Gardens.—With reference to my letter some time ago to your valuable Journal on the Turquoise Parrakeet (*Neophema pulchella*), which you so kindly printed, I have just come on a most interesting note on this beautiful Parrakeet (now called the Turquoise Parrot) in the September, 1922, issue of the *Agricultural Magazine*. It is written by Mr. J. B. Housden, and is entitled "My First Visit to New York Zoological Park, Bronx Park (Winter Season)." "Of this splendid collection, there were two birds certainly that the writer coveted (although I have stuffed specimens, I have not seen a living specimen for many years), one a beautiful male of the nearly extinct Australian Turquoise Parrakeet, the other a male Cock of the Rock." Mr. Chisholm in his article in the July *Emu* quotes my letter of 1913, but he goes on to say that no response came to my question, so I take it the bird is almost extinct in Australia. It is therefore very strange that one should have turned up in the New York Zoo.*—W. H. WORKMAN, M.B.O.U., Belfast.

* Since this latest letter from Mr. Workman arrived, I have made further inquiries regarding the beautiful Turquoise Parrot, but with little success. Mr. A. S. Le Souef, who recorded in "The Emu" the re-appearance of a small company of the birds near Sydney, understands that one or two of these were captured and sent abroad, and that at least one other was held as a call-bird. The whole business goes to show what urgent necessity exists for guarding the vanishing *Neophema* and *Psephotus* Parrots, both inland and at the seaports†—A. H. Chisholm, Sydney.

† See "Notes from Stanthorpe," p. 320 (Eds.)

Notes on the Tawny Frogmouth (*Podargus strigoides*)

By DONALD F. F. THOMSON, R.A.O.U., Canterbury (Vic.)

Perhaps one of the best examples of protective coloration and mimicry by Australian birds is afforded by the Tawny Frogmouth (*Podargus strigoides*). Though its characteristic pose and its simulation of a broken limb are well known to all bird-lovers, probably many people have never noticed the bird at all, except for a glance, as it faded like a ghost through the shadows of the night, passing it by with the slightest suggestion of a shiver, as an "owl." The owl has always been regarded as ghostlike and sinister—as a bird of ill-omen, but the *Podargus* is not an owl.

No doubt, however, the strikingly protective coloration and pose of this bird have had much to do with its survival in the struggle for existence, and with the fact that of all our nocturnal birds the various species of the *Podargidae* are the most numerous and widely distributed.

One cannot but notice the wonderful provision of nature in the adaption of this bird in a country where insect life is extraordinarily abundant in species and numbers. Probably there is no other bird so entirely useful, from the point of view of man, as the *Podargus*, nor one which does so much to preserve the "balance of nature" of which we hear so often. Not only is the *Podargus* thus one of the most economically valuable of all our birds, but it is perfectly adapted for its "work"—the capture of its insect prey—as well as for its own survival.

A truly nocturnal bird, it is active just at the close of day, when myriads of insects come forth to disport themselves in the evening air. Though quite large—about 24 inches over all—the *Podargus* (*Podargus strigoides*) is very light in weight, and has the same facility for silent flight which characterises Owls at night. The beak, from which the bird derives its name of "Frogmouth," is large, very broad and gaping when open, and serves the double purpose of providing a big surface for the capture of flying insects on the wing and also of increasing the resemblance of the bird to a broken and jagged limb when the creature is at rest. As if the bird were conscious of this, when in repose it will often select the broken part of a limb, and sitting upon it, thrust its head up at an acute angle. In any case it is one of the most difficult birds to detect, and very often is found only by tapping the tree, thus causing it to fly. The bird which was photographed, though not so well concealed as is often the case, was only discovered by chance, being on a box tree at no great height from the ground.

The greyish mottled plumage matched the dark, drab grey of the box bark admirably, and the bird took no notice of my presence until, after exposing the plate, I knocked the tree, when it immediately took to flight. Though often very reluctant to fly, the *Podargus* does not appear to be nearly so stupid in the day time as most other nocturnal birds, possibly owing to its being accustomed to sleeping in exposed positions, often in sunlight, instead of in the dim hollows so much frequented by other night birds.

Though usually found singly or in pairs, last season I was much interested to observe four Frogmouths—all apparently adult—sitting together on a limb. Probably, however, it was a family group—two adults, two grown young.

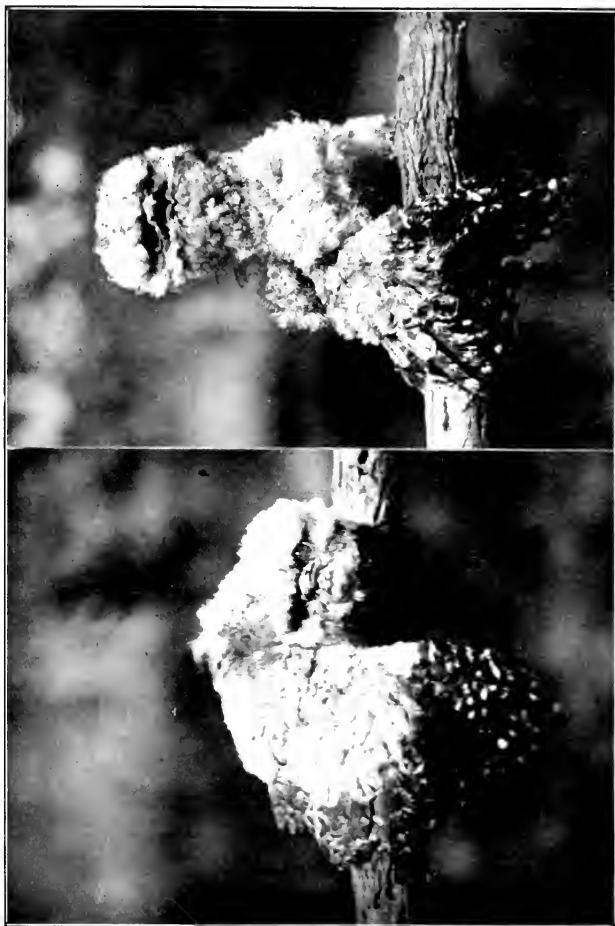
The nest, which is scarcely more substantial than that of a pigeon, is composed of more or less fine twigs placed on a broken limb or in the fork of a horizontal bough, or some similar position, often at no great height from the ground. Here, with no other lining, two, or rarely three, large white eggs are laid. When brooding, the bird will often sit motionless, with its body almost flat along a horizontal limb; and, as the nest is also very inconspicuous, the bird is hard to see. Though the female sits fairly closely, a knock on the limb of the tree usually causes her to fly; sometimes, however, the bird will not leave until actually pushed off the nest.

It was on the evening of December 30th, 1921, while roaming in the bush on the foothills of the Dandenong Ranges—one of my happy hunting grounds—that the dog nosed something near the ground, and passed on. Investigation revealed a young *Podargus* apparently patiently waiting "for something to turn up." It was a rather curious fact that the dog—a big deerhound—though a fierce hunter, learnt, quite of his own accord, never to harm a bird, and, in fact, often accompanied me when photographing.

Placing a box, which happened to be handy, over the young bird, I left him for the night.

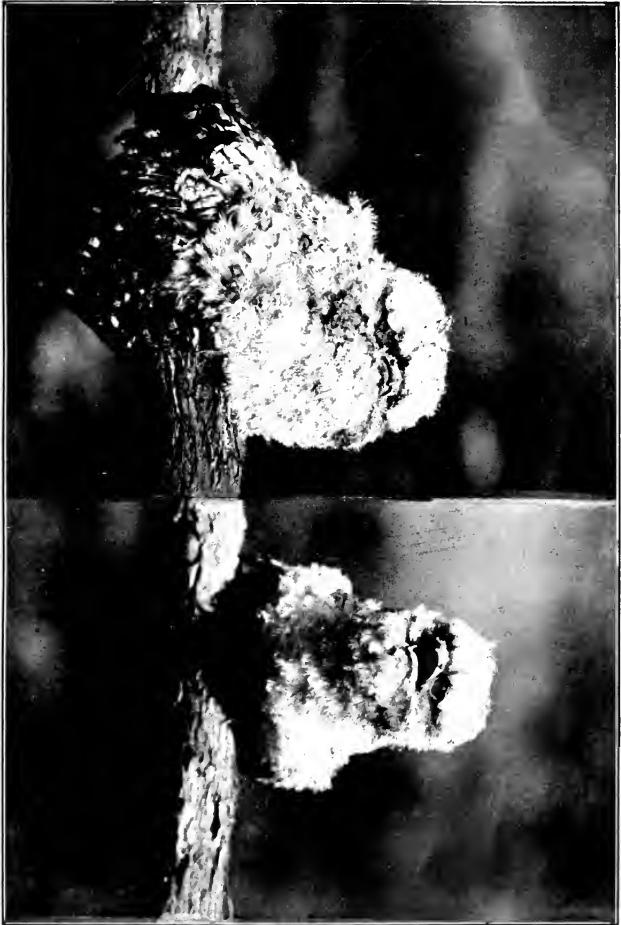
Next morning, December 31st, I returned, and spent about two hours exposing the accompanying four plates on this youngster. The morning was bright and warm, and he was very, very sleepy. Sitting sideways on the limb, wings drooping on either side of the perch, he matched the dull bark of the *Eucalyptus* beautifully.

In color he was of a dull grey on head and body, mottled with darker grey and fading to black on the wings. His beak was very short and broad, and his mouth large. Though he was actually very small in body, he was covered with a great amount of feathers, being peculiarly light, and little more than a fluffy ball. When he slept he would hold his head up and gradually his eyes and beak would fade away amongst the feathers until



Terrifying Attitude adopted by young Frogmouth (*Podargus strigoides*)

Photos. by Donald F. Thomson, R.A.O.C.



Terrifying attitude adopted by young Frogmouth (*Podargus strigoides*)

Photos. by Donald F. F. Thomson, K.A.O.U.

they practically disappeared in the long, downy fluff. I was not able to get a photograph of him really asleep, for he would wake up just as I endeavoured to get to the camera to expose a plate. The first picture shows him just dozing, and as nearly asleep as he could be induced to go while I remained near.

Immediately on being approached he would wake up, open his mouth wide, and stretch his neck to its full extent, ruffling his feathers and going through the most alarming contortions imaginable—well calculated to inspire an enemy with fear. The series of four pictures illustrates stages in his weird antics. Finally he would crouch low on his perch, his whole body lowered, wings drooping, as if about to spring, his great eyes ablaze with a blue light, and almost starting out of his head.

No doubt these fearsome antics are the means of protecting the harmless young Podargus from many enemies. Though he opened his beak widely, it was probably either as a demand for food, or more probably for intimidation. Certainly he could not have done much damage with it.

He apparently disliked being picked up, and expressed his resentment with a squeaking, wailing cry—the only note he uttered.

After studying the protective attitudes of the adult, it was very interesting to note the development in the young bird. Though harmonising with his surroundings in the bush, and depending for protection principally upon this, the young bird, being unable to take to flight if discovered, evidently depended on "bluffing" his enemies by the most amazing evolutions and contortions that I have ever seen performed by a bird. It was one of the most charming features in my experience of wild nature, and the faith of the tiny creature in the success of his antics accompanied by that blue glint of his eye, which I suspected was more of fear than of defiance, was not untouched with pathos.

Interesting Conduct of the Southern Stone-Plover (*Burhinus magnirostris*)

Communicated by Dr. W. MACGILLIVRAY, C.F.A.O.U.,

Sometime President R.A.O.U., Broken Hill.

A station owner and his wife living in Central New South Wales had tamed a Stone Plover, or Bush Curlew (*Burhinus magnirostris*) which, given the name of "Fraser," proved to be an extremely intelligent bird, and appeared to be strangely sensitive to certain things and people. One man who used to visit the station had evidently attracted Fraser's attention to a pair of

new leggings that creaked when he walked, as new leather sometimes does.

Whether Fraser took this to be an unknown bird hidden away one cannot say, but whenever this man came to the house Fraser exhibited every sign of frantic rage, and would follow him about screaming and trying to peck his boots.

This bird, after a residence of many years, fell a victim to a marauding fox. Two more Bush Curlews took up their abode in the station garden, a sweet old-fashioned one, full of lovely old trees, hedges, and shrubs. It seemed an idyllic sanctuary for the following little bird romance.

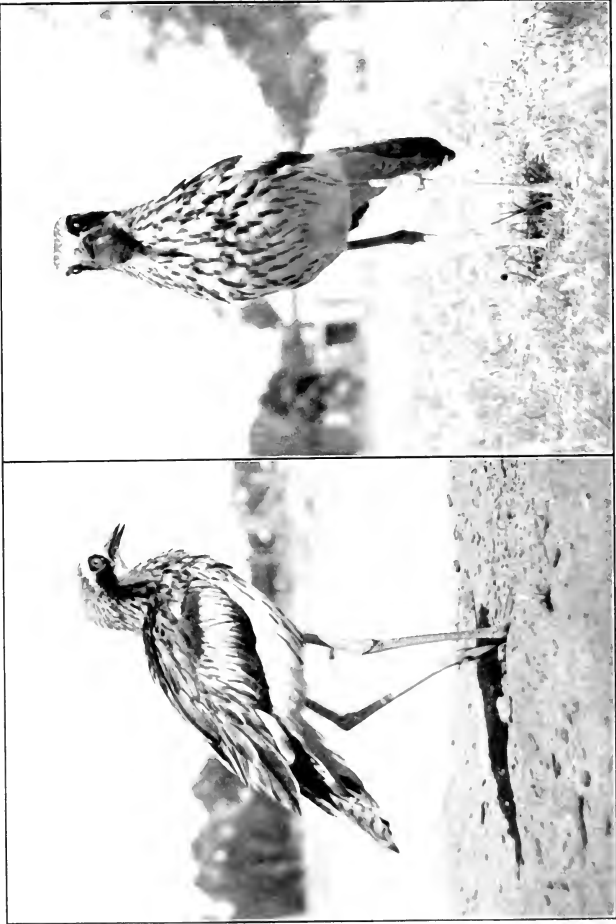
The two birds, "Lady Douglas" and "Fraser"—so called after the earlier one—were particular mates. One day there came in from the wilds a strange Curlew, of a very aggressive type, and he usurped the position of Lady Douglas's mate, and straightway they hunted Fraser to a solitary existence under the orange trees, while they assumed the lordship of the tennis court, and took up their abode under an olive tree.

Fraser dared not approach the tennis court, and he was literally hunted off their territory. One day, much to everyone's interest, an egg was laid in quite an exposed position on a patch of grass under the olive tree, and the fiercest guardianship was displayed over that egg by both parents. If you approached the egg as though to take it, the father ran about uttering harsh cries of anger, dragging his wings along the ground like a "gobbler" does in the poultry yard, while the mother bird would attack you, pecking savagely.

In due time, when the baby Curlew hatched out, the pride of the parent birds was a charming and touching sight. They ran up and down the court with the little one between them, and one of the prettiest episodes was one day when they had apparently decided that "baby" was old enough to be taken to view the outside world in the big garden. With little cries of encouragement, baby being very timid, and trying continually to flatten himself out on the paths, as they do when they hide, the parents, one on either side of the young one, edged him along the garden paths, and after much wandering returned him in safety to the tennis court.

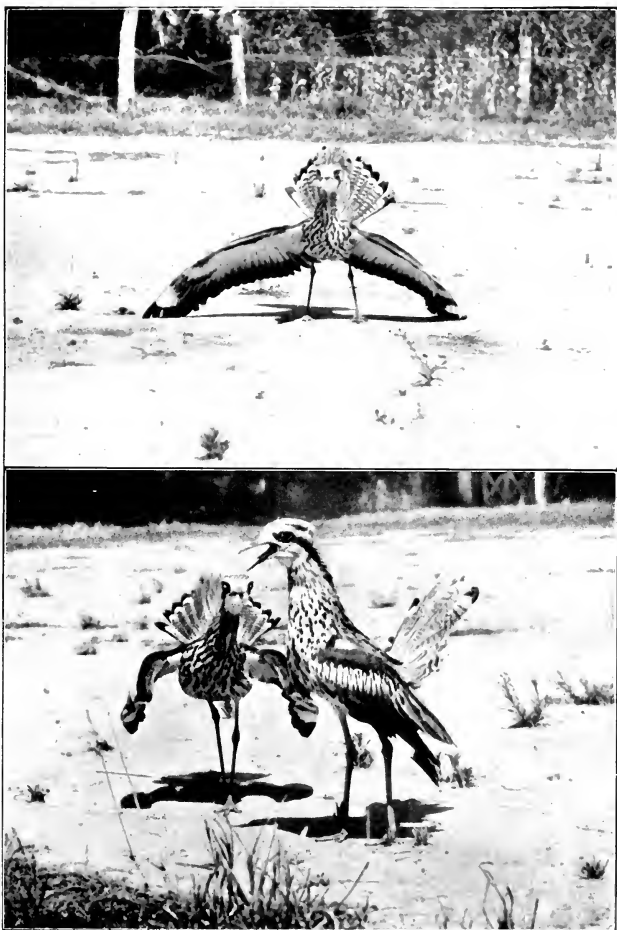
This experiment was never repeated, so it was concluded that it was not regarded as a success by the old birds.

Another strange incident was this. My friends one day chased the young Curlew into a corner as though to capture it, to the frantic rage of the birds; and their cries of distress brought Fraser, the poor discarded mate, quickly to the scene, and he rushed away with the young bird to a far corner, whilst the parents endeavoured together to divert the attention of the would-be captors by pecking angrily and fluttering their wings. When my friends retired the parent birds hunted poor Fraser



Southern Stone-Plovers (*Barhinus magirostris*) in normal attitudes

Photos. communicated by Dr. W. MacGillivray, R.A.O.C.



Southern Stone-Plover (*Burhinus magnirostris*) demonstrating in defence of their young one

Photos. communicated by Dr. W. MacGillivray, C.F.A.O.U.



mercilessly off, and assumed once more sole proprietorship of their offspring.

The strange feature of this incident was the celerity with which Fraser came to their call and went at their dismissal. At no other time would Fraser dare to approach the young one without being hunted, and yet in answer to their peculiar cries of alarm when the young one seemed to be in danger he came immediately. When the parents had charge of the little one, they never appeared to leave it alone for a moment, and "Lady Douglas" would come more than a dozen times a day to the kitchen door, screaming incessantly until given a scrap of meat, with which she rushed off to the baby bird. The cook did not always appreciate the clamorous appeal, as the cries would never cease till the meat was handed over.

Sometimes the owner and the ladies of the station would tease Lady Douglas by stalking the young one, and she would get so angry that when they left the court she would follow for the length of the garden, flapping her wings and pecking and holding on to the owner's leggings as if in punishment for the intrusion.

The ending of the story came, alas! in the shape of a wretched fox. The owner rushed out one night in answer to their cries, only to find the mother and young bird dead. The father bird, after uttering his wailing call all that night, flew away and never returned.

Private Collecting—A Criticism

By A. H. CHISHOLM, C.F.A.O.U., *Daily Telegraph*, Sydney.

At the risk of differing from many co-workers in popular ornithology, I am constrained to say that I rather approve of the publication in *The Emu** of Mr. Edwin Ashby's paper, "Private Collections and Permits."

It seems to me that Mr. Ashby's article (in addition to its usefulness in opening discussion on a matter that required ventilation) has its educative value, and that not only for the insight it gives into the morality of at least one section of private collectors. The article is reasoned in parts, and more or less thorough, and, above these considerations, it carries the stamp of sincerity. Mr. Ashby's years, he tells us, remind him that his life is "nearing its setting," and to this he adds, "I earnestly desire before I pass hence to help the rising generation into fields of study, research, and service that have so brightened my own life." On this basis, a member of the Union is entitled to be heard. But it does not follow that any or all of his experiences, his views, or his desires are necessarily calculated to benefit

*Vol. 22, page 210.

potential ornithologists, either generally or in part. They may, indeed, have a contrary effect.

As a member of what we may term the younger school, I am loth to sit in judgment on a veteran, and one whose ability is undeniable; but it is a duty to express the view that certain of Mr. Ashby's advice is close to being pernicious. This statement is made impersonally, of course, but by one who has been, in recent years, a good deal closer to educative bird work than any collector. In point of fact, the private collector, be he ever so sincere, is heavily handicapped as a public instructor or propagandist. He may preach all over South Australia; he may preach in any other country; he may rise to eloquence in his championship of a fauna; but—where does he arrive? Always his moralising is damned by the force of bad example. Chastity is the first essential of any salvationist.

Mr. Ashby's general attitude, I take it, is that the public at large should be encouraged to protect birds, and that youngsters who promise (or threaten) to be "real student collectors" (whatever that may mean) should be stimulated—and that by the R.A.O.U.!—to carry on the noble work of amassing private collections of skins or eggs. What an ideal is this! How profitable for the youth who is adjudged (or adjudges himself) a "real student collector"! How luckless the lad who falls outside this category!—who is not able to show his envious fellows case upon case of bird bodies or eggs! Seriously, though, the two things—public protection and private collecting—are largely incompatible. I do not doubt the force of Mr. Ashby's pleading in the interests of ornithology. It may be that his "numberless lectures" have not been so much wasted effort. But—well, did he ever fit into a dialogue of this kind:

Child: What pretty birds! But why don't they fly and sing?

Lecturer: They are dead, my dear—long dead.

Child: OO-oo-oh! Who killed them?

Lecturer: I killed them myself.

Child: What did you kill them for?

And did Mr. Ashby, serenely maintaining his scientific composure, gaze into the accusing young eyes and reply that he killed all those birds so that the children could "view the bodies" (as is written of visits to morgues), and learn thereby how good and wise it is to be killers also? Similarly, did Mr. Ashby ever tumble into a dialogue of the kind with the omnipotent individuals known as the man in the street and the man on the land? Of what avail to tell such disciples of the obvious that the birds were shot in the interests of Science? One man, in all probability, would inquire what need or right existed to usurp the functions of a museum; while the other would, most likely, grin indulgently at the arrogance of the man who says, "I may kill, but you may not!" No, it will not do. The man who preaches

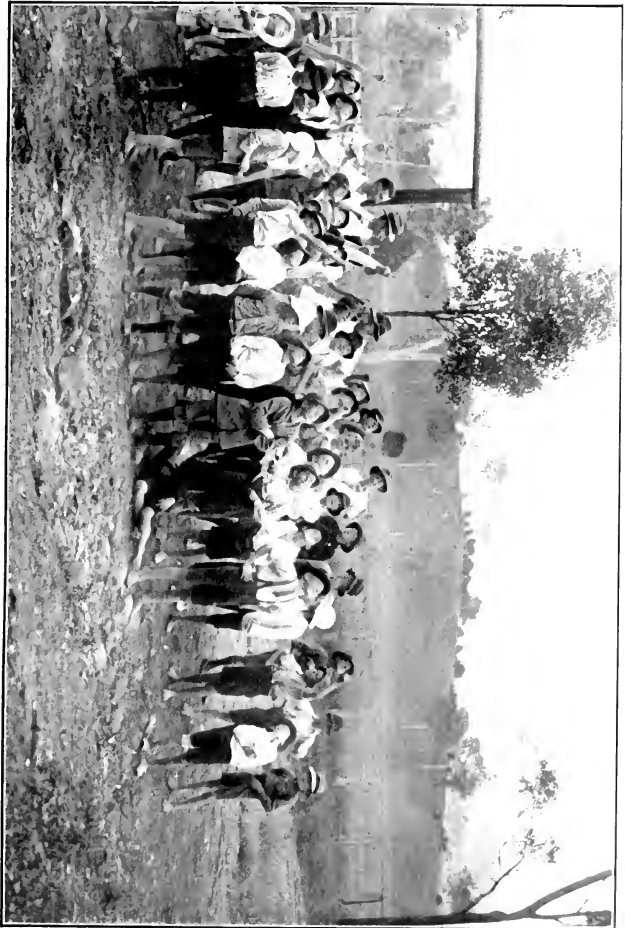


Photo. communicated by A. H. Chisholm, C.F.A.O.U.

Interested Bird-lovers in the Field

private slaughter is on shifting sand as a public protectionist. His logic is bad; but even if it were good it would still be unconvincing to those whom science and scientists exist to serve, *viz.*, the great mass of the people.

It remains to be added, on this point, that I agree with Mr. Ashby regarding the frequent usefulness of bird skins in lecturing work. Where we differ is on the question of the ownership of those skins. He claims that the idea that a collection reaches its highest use when placed in a museum is largely fallacious. In plain language, Mr. Ashby thinks our museums are not doing their jobs. Is it not, then, his duty to start a corrective movement, rather than to encourage numerous little "shows" in opposition to public institutions? Whether museums are as educative as they might be is a broad subject. It is fair to say here, however, that no difficulty is experienced, by recognised lecturers, in securing skins on loan from the Queensland Museum; and it is equally fair to assume that facilities of the kind are just as readily obtainable in other States. But in all such borrowings it should be made clear that the skins are from national collections. I do so because, for one thing, I know something of the disrepute in which private collectors of bird skins—egg collecting is less serious—are held by hosts of commonsense people. It is Mr. Ashby's misfortune that he does not know this. If he did his feelings would be grievously lacerated.

Having shown that the private collector can be no real support, and may even be a menace, to national conservation of birds, there remains to be combated Mr. Ashby's surprising assertion that the "acquisitive quality" of the collector is a necessary stimulus to the securing of results in natural history work. This claim is unworthy of a thoughtful man. It is, to say the least, narrow in the extreme. Without desiring to strike comparisons, I could name two non-collecting ornithologists in Australia who, in my opinion, have done more to promote human interest, human knowledge, and human happiness (in this subject) than the whole bunch of men who kill for private cabinets.* Moreover, I submit that the late W. H. Hudson, of England—than whom there was no stronger opponent of collecting—did more, single-handed, to broaden the lives of his fellow-Britishers than the whole monumental group of British ornithologists whom Mr. Ashby quotes as supporting his championship of "real student collecting."

It is, indeed, a little amazing to find a man like Mr. Ashby, one with tastes for "the things that are more excellent," insisting that the making of skins (with killing as an amiable prelude) has disciplinary value for careless youth. Is there not infinitely more restraint exercised in controlling the impulse to meddle with

* It will be well, in the interests of clarity, to state that the two men to whom I refer are Donald Macdonald, of Victoria, and E. J. Banfield, of Queensland.

beauty and freedom? The merest child has a primitive desire to possess a pretty bird's egg; when self-control comes that child recognises, however dimly, the ethical wrong and futility of taking the egg. He senses the fact that the egg of a wild bird is not fulfilling its destiny as an empty shell in a secluded cabinet. Perhaps he appreciates also the fact that environment is an essential to the full appreciation of beauty—he "cannot bring home the river and sky."

There you have the discipline born of the development of finer feelings. It is these feelings that Mr. Ashby, consciously or unconsciously, would have us sink in the making of private collections. No, no, it is *not* the place of the R.A.O.U. to "throw its whole weight" into the encouragement of collecting; it is our duty merely to stimulate *appreciation* of birds. Then, if a youngster develops an inclination towards the more rigid (or frigid) side of ornithology, by all means let him study such; but let those studies be pursued among national collections.

Mr. Ashby is afraid that there is a lack of "work" to be done outside the collecting sphere. Pish! Can he, or anyone else, name half a dozen Australian birds of which the complete life-histories have been written? There is ornithological work a-plenty awaiting the youth of this country, and that work will be much better done, and of vastly greater value, if carried out without the sinister aid of a gun. It may be said that not all students are capable of setting down the inner details of bird life. The pages of the *Emu* do not bear out this postulation; but—what if it were true? G. K. Chesterton points out that the old poets preferred writing about great men to writing about great hills, but they sat on the great hills to write it. "They gave out much less about Nature, but they drank in, perhaps, much more." So I suggest that the world is better for the quiet bird-lovers who absorb the spirit-of-fact (expressed in the live bird) than for the whole army of collectors who deal in the matter-of-fact (typified in a mummified skin).

It is the oversight of such obvious truths as these that gives me to fear that Mr. Ashby has lost something of his sense of perspective. That is the trouble with most private collectors. They may commence with the best of intentions, but it is only a matter of time before that "acquisitive quality" enslaves them. They become what the Americans term "go-getters." If a bird is rare, or a clutch of eggs is rare, and cannot be secured by personal effort—well, it must be got just the same. Think of the pride of the small boy who has more marbles, and bigger and brighter ones, than the other fellow! Think also of the unholy joy of the collector who has a bird-mummy or egg that few others can boast of! Verily, the acquisitive quality is a gripping thing! It is this that caused a collector (as a recent number of the English *Spectator* tells us) to make a gallant effort to

wipe out a race of rare butterflies. It is this that persuaded a collector in Borneo (as Professor Skertchly assures us) to burn a jungle in the noble attempt to create a monopoly of a certain rare orchid.

What more need be said to indicate that the acquisitive disease of the average private collector—in so far as it affects a people or a country—is the same unlovely thing that it was in the days of Dives and Shylock? The quality of mercy, we are told, is twice blest; if that be so, its antithesis (the acquisitive quality that blasts and kills) must be doubly cursed.

It is doubtful whether space is available to discuss Mr. Ashby's opinions of protective legislation. Shortly, I agree that this is not always effective, but I know from personal experience that it has been productive of much good, and this particularly in a direction championed by the South Australian veteran, to wit, the setting apart of sanctuaries. But education remains still the primary and most weighty factor in the work of conserving and studying birds. Such education, I submit, is beyond the province of the private collector.

That there are able and sincere men among collectors is obvious enough; and I would not go so far as to say (as has been suggested more than once) that these should be judged by the company they keep. I say only that such men are warping their finer sensibilities, and that their best efforts are, nearly always, rendered negative by the force of a bad example. To protest against the taking of new birds or eggs would be foolish. It would also be absurd to object to enriching the collection of the R.A.O.U. or the semi-national collection at "Belltrees." (So far from doing this, I have repeatedly been instrumental in securing material for these collections). But the average private collector is a relic of barbarism and a perversion of civilisation. He is more; he is a relic of sin, masquerading under the honoured name of Science. He gives no "thanks to the human heart by which we live"; he lives for himself alone, on the lore of the dead and the petrified.

I say, again, that the R.A.O.U. must recognise that the bad element, ever present, among private collectors makes it utterly unwise to encourage the study of dead birds or egg shells outside the legitimate limits of scientific institutions.

Correspondence

To the Editors of "The Emu."

Sirs,—I have read with interest Mr. Edwin Ashby's paper on "Private Collections and Permits," and without criticism of the paper itself, I wish to make certain comments in relation to private collecting and bird-protection.

In the interior of our continent there is undoubtedly still a limited amount of research work to be done in Ornithology, but how many "promising *bona fide* workers" will be in a position to visit these places to collect specimens. The majority of ornithologists have their homes in the cities.

In museums and in private collections already in existence, there is, for reference purposes and study, a vast quantity of skins and eggs. The issue of further permits to young students would be a menace to our rarer birds, and, in public opinion, a set-back to the cause of bird-protection. Most of the work of these men would be confined to an area within a "week-end" radius of the city in which they lived, and like collectors of the present day, in an effort to enlarge their collections, they would concentrate their attention on rare birds and their eggs. In such cases when the collection reaches a certain number of species, it is possible to add rare species from other States only by an exchange of rare species.

A permit is supposed to restrict the holder to a limited number of bird skins or sets of eggs, but with the majority of collectors the limit is reached only when the last set of rare eggs that is found for the season, is—to use a favourite collecting phrase—"lifted." The public are becoming aware of this, and it doesn't forward the cause of genuine bird protection.

There is plenty of research work for the student without his becoming a general collector. In Economic Ornithology alone there is a large field for study, but that need embrace only common species whose usefulness to the farmer is in doubt. There is no occasion to shoot, say, a Lyre-Bird or a Helmeted Honeyeater to discover what food they eat. I contend that the methods adopted by the old school of ornithologists, where a bird had to be shot to be studied, have, in so far as the settled portions of Australia are concerned, outlived their utility. The main objective of Ornithological Clubs for the future should be the preservation of bird-life. The education of the public, particularly the agricultural community, by propaganda and illustrated lectures, should be a strong plank of the R.A.O.U.

As Mr. Ashby points out, sanctuaries must be an important factor in the preservation of wild birds, but a sanctuary without a warden is almost useless. The enthusiastic "egg-lifter" does not stop short of a sanctuary if he requires a set of eggs. The public, knowing this, look on with suspicion when sanctuaries are mentioned. If the R.A.O.U. discourages the formation of further private collections except in special restricted cases, it will soon have the weight of public opinion behind it in its efforts to protect birds.

In conclusion, Sirs, in reference to the resolutions which were passed at the Adelaide session, I wish to protest against the

power that is held by the fortunate few who attend the Annual Congress. Anything affecting the policy of the R.A.O.U. should be decided by a postal vote of all members. Yours, etc.,

L. G. CHANDLER.

Redcliffs, 28/1/22.

To the Editors of "The Emu."

Sirs,—At the Congress in Adelaide, Mr. Ashby read a paper, which was printed in the January issue. Personally I am against the formation of further collections, especially with material from the vicinity of large cities and towns, and I hasten to disassociate myself from the policy outlined in Mr. Ashby's motion. I hope that many other members will voice their opinions in the *Emu*, else the views expressed by Mr. Ashby are likely to be accepted as the views of the Union generally. But neither Mr. Ashby's personal opinion, nor mine, nor even of those fortunate enough to be able to attend the Congress, should direct the policy of the Union on such an important matter.

I would suggest, then, that a vote of the whole of the members on the question be taken at the next Congress along with the election of office-bearers.—Yours, etc.,

R. T. LITTLEJOHNS.

Melbourne, 19/12/22.

Collecting and Killing Birds.—When the R.A.O.U. was formed, one of the chief planks in its platform was stated to be "the protection of our native birds." If we are going to protect them, let us do it wholeheartedly, and not allow their ranks to be thinned year after year by an army of egg and skin collectors. I have it on good authority that from 30 to 40 clutches of *Acanthornis magna* eggs are taken every season in the south of our island, for exchange with mainland and foreign collectors. As this interesting little species is found only in our limited Tasmanian bush, why should it be exterminated—lost to the world—to satisfy the rapacity of a small section of the community?

Another point which should receive attention from protectionist members is the closing for the whole year of Black Swan (*Chenopsis atrata*) shooting. The Launceston *Examiner* of 28th February, recorded the massacre of 303 birds at Swansea by a sporting party. This wholesale slaughter of a characteristic Australian species—the original "*rara avis in terris*"—is nothing less than a disgrace to a civilised community.—H. STUART DOVE, F.Z.S., R.A.O.U., W. Devonport, Tasmania.

Camera Craft

The Yellow-tufted Honeyeater.—On October 1st, 1922, I found the nest of a pair of Yellow-tufted Honeyeaters (*Meliphaga melanops*), containing three eggs, one of which was that of a Pallid Cuckoo (*Cuculus pallidus*). By October 7th there were three young birds in the nest, but on the next day the young Cuckoo reigned supreme. I secured six photos, only one being a failure. The accompanying photo is the best of the five. The Honeyeaters, which were very tame, visited the nest in turn, and supplied the gluttonous Cuckoo with food. The nest was situated in a small shrub alongside a gum sapling. By bending the sapling out of the way, I obtained a good light, had the nest free from shadows, and avoided the risk of a too dark background. There were several pairs of Honeyeaters chasing a Cuckoo, which had evidently made the paddock her nursery. On several occasions I visited this place, intending to attempt a picture of the Cuckoo laying in a Honeyeater's nest, but although I spent many afternoons watching, as far as possible, both the Cuckoo and Honeyeaters, I was unsuccessful in finding a nest. That there were several nests, and that the Cuckoo used them, I feel quite sure.—MARC COHN, R.A.O.U., Bendigo.

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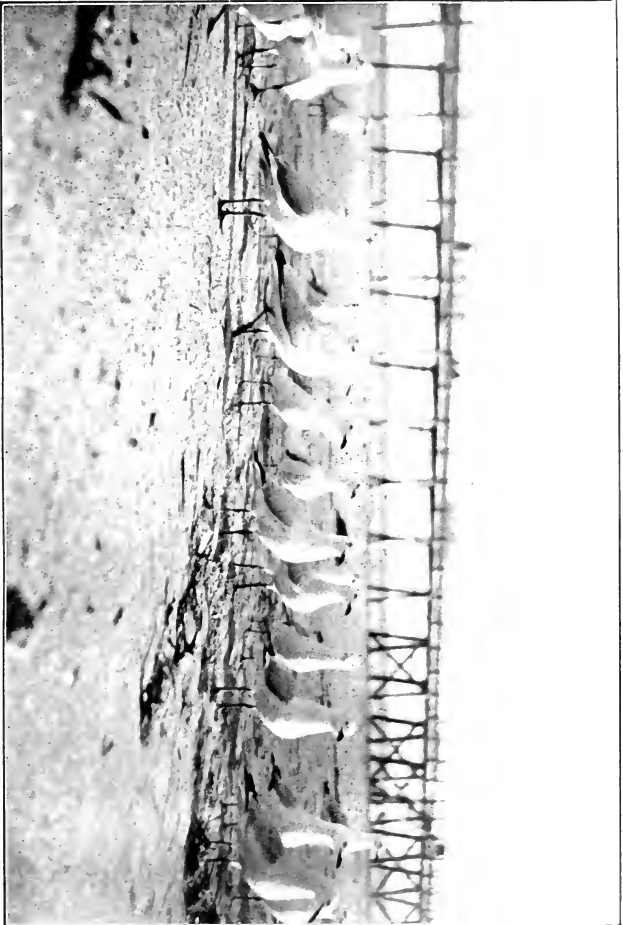
Silver Gulls—While in South Australia last year, Mr. H. O. Fletcher, from the Australian Museum, Sydney, and I visited one of the Adelaide beaches, and noticing a fairly large flock of Silver Gulls on the sand decided to try and obtain a picture of them. They appeared tame, so we purchased some sponge cake at a neighbouring tea-shop, and sitting down on the beach distributed it over the sand in view of the birds. Presently they realised it was food, and the whole flock commenced gobbling it up as fast as they could. We remained quite still, and overcoming their shyness, the birds came very close to us, ate up the crumbs close by, and literally asked for more. When they were about four feet away a couple of exposures were made. The picture depicts them waiting for more cake to be thrown. M. S. R. SHARLAND, R.A.O.U., Hobart.

* * *

The Red-kneed Dotterel (*Erythrogonys cinctus*).—During September, 1922, I spent a week-end at Bendigo as the guest of Mr. Marc Cohn, a new member of the Union and an enthusiastic photographer. The previous year I obtained pictures of the Black-fronted Dotterel (*Charadrius melanops*), and in the hope of further observing these interesting birds we walked along the pebbly margin of the Bendigo Creek at Golden Square. Not more than two hundred yards from the tram-line we found several Dotterels feeding along the creek, but Mr. Cohn was first to notice that there were three or four pairs of birds of a different



The Yellow-tufted Honeyeater (*Meliphaga melanops*) at nest



Silver Gulls (*Larus norvegicus-hollandicus*) on the beach

Photo. by M. S. R. Sharland, R.A.O.F.



Red-kneed Dotterel (*Erythronyx cinchus*) nest and eggs

Photo by R. T. Littlejohns, R.A.O.U.

species amongst them. Not long afterwards a nest was discovered among the pebbles, and between two dry weed-stems. One could not fail to notice how these weeds were chosen with due regard to the protection of the eggs. In colour and form the dry stems harmonised with the marking of the eggs, and the shadow thrown by the stems across the nest heightened the effect.

The cameras were focussed at a distance of twenty-four inches from the eggs, and fifty feet of thread was used to release the shutter. The presence of the camera appeared to cause the female bird little concern from the beginning, but, if either of us showed his head in order to note the progress of the subject, she departed hastily.

At this stage the male bird would usually forsake his friends further along the creek, and walking directly behind his mate appeared to drive her back to duty. A few large stones placed near the nest served as a screen, and the sitting bird became more confident. But the stones also prevented us from seeing when the subject was in a satisfactory position. So that it was small wonder that the pictures obtained on this day were not good.

The next day, however, matters had improved considerably, and the bird showed little fear. So the stone screens were dispensed with, and pictures were easily obtained. It was then that a curious habit of the Dotterel became apparent. As she approached the eggs she paused a couple of feet away, then carefully and deliberately shook her feet, first one and then the other. I came to the conclusion that the idea was to dry her feet after walking in the mud and water before she sat upon the eggs.

Like the black-fronted species, the Red-kneed Dotterel makes a great pretence of being injured in order to lead the intruder away from the nest. But the acting of this pair was most elaborate. They placed the head almost on the ground and raised the wings and tail until one almost expected the birds to overbalance. This action was probably intended to counteract the protective colouring of the plumage and so draw attention more effectively to the apparent injury.—R. T. LITTLEJOHNS, R.A.O.U., Melbourne, 27/1/23.

* * *

Wood Swallow Notes.—On several occasions I have had good opportunities for observing and photographing the female White-browed Wood Swallow at close quarters. Until recently, however, I never could induce a male of the species to pose before the camera. The birds are naturally shy and suspicious, and a really tame pair are difficult to find.

The bird reproduced was one of a pair whose nest I located in the Moorabbin (Vic.) district. The male, much to my satis-

faction, was a most attentive parent, and gave good opportunities for photography. During the last season three species of Wood Swallows were nesting in close proximity to each other in this district. It was noticed with most of the nests found that small clutches were the general rule. The nests of the White-browed and Masked species contained in most cases one egg only. This unusual occurrence was attributed to a scarcity of food.

The birds were feeding the young on a large species of beetle which were greatly affecting the green trees in the locality, in many cases nearly stripping them of their foliage.—S. A. LAWRENCE, Caulfield, Vic., 16.3.23.

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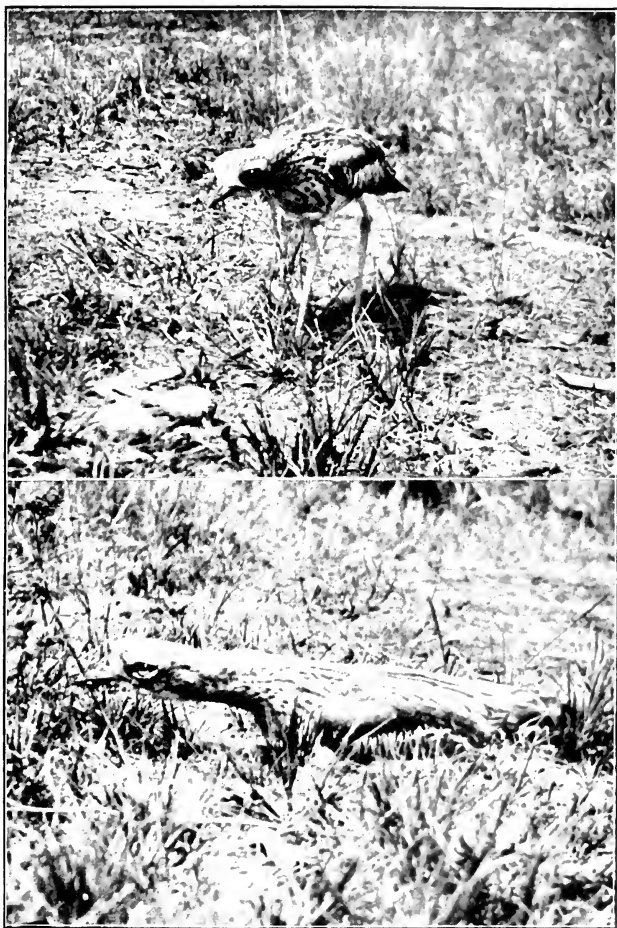
A Southern Stone - Plover (*Burhinus magirostris*), lived at Wahroonga, on the North Shore Line at the home of Mr. Doyle. The bird has the run of a large grass paddock, and nests among the grass and stones. Two eggs were laid, but as there is no male bird, the eggs were, of course, addled. In one photo the bird is cautiously sneaking up to the nest, and in the other, is using its protective powers.—ARTHUR F. D'OMBRAIN, R.A.O.U.

Stray Feathers

Notes from Stanthorpe (S.Q.)—The Turquoise or Red-shouldered Grass Parrakeet, *Neophema pulchella*, has lately been the subject of certain discussions in the *Emu*. And in view of the fact that it was for long thought to be extinct, and that it has been recorded on one or two occasions only of recent years, it is interesting to note that a stray male paid us a visit in the winter. It was not a resident bird, so far as I can gather, in the past. Due west of our Granite Belt, and at a distance of about fifty miles lies Texas, at the foot hill of our range and on the threshold of the great Western Plateau; from here lately I have had a specimen of the Swift Parrot, *Lathamus discolor*. Mr. Morse, of Moree, at a similar distance west, again, listed the birds of his district in the *Emu* of July, 1922. He did not include this bird, but on inquiry of him he informed me that it was noted by him for the first time about the date my specimen was obtained, but too late for inclusion in his list. It seems likely, therefore, that it was making a northerly move in search of its food. In this connection it is interesting to confirm Batey's note (*Emu*, vol. 7, page 13, 1907): "Seems to diet extensively on the white waxy scales that abound on the leaves of the yellow box. These scales have a sugary taste; a small soft insect is concealed under them." Mr. H. Jarvis, Government entomologist, has kindly examined the stomach contents, and reports: "*Insects*. Group Homoptera: Fam. Psyllidae: numerous scales of the "sugar-lerp" Psyllid (*Spondylaspis*, sp.); *Veg. Matter*: Large quantity of the



The White-browed Wood-Swallow (male) feeding young in nest



Female Southern Stone-Plover (*Burhinus magnirostris*)

Upper—Approaching nest and eggs.

Lower— On nest

seed of Eucalyptus (sp.?). It may not be unprofitable to give a short review of the Parrots, other than the ubiquitous Honey-eaters, which bear relation to, or inhabit this district, the geography of which was referred to in detail in the *Emu*, vol. 21, page 242; 1922. It is the home of the Black Cockatoos, both the Yellow-tailed (*Calyptorhynchus funereus*), and the Red-tailed Cockatoo (*C. banksi*), but the White Cockatoo is a rare visitor. From the south we get many Red-headed Rosellas (*Platycercus eximius*), but this species does not go far north, west, or east, being known on the Darling Downs as the Stanthorpe Rosella. There its place is taken by the Pale-headed Rosella (*P. adscitus*). From the east, following the Dividing Range, which bounds the Downs on the south, we get the King Parrot (*Aprosmictus scapularis*), and the Crimson Rosella (*P. elegans*). The former is found on the north and east boundaries only, and does not penetrate our belt proper, whereas *P. elegans* is very abundant, but does not go further west. Neither are at all plentiful on the Downs to our north, and really skirt that district, following the Bunya Mountains and the scrub-clad ranges which fringe it on the south. The common Parrot on the Downs is *P. adscitus*, with a sprinkling of Red-wings (*A. erythropterus*), Quarriors, or Cockatoo Parrots (*Leptolophus hollandicus*), and to a much less degree, of Budgerygabs (*Melopsittacus undulatus*). In former years here, too, was found that gem of the Psephotus group, the Paradise Parrot (*P. pulcherrimus*), long thought to be extinct, but recently re-discovered. This, mark well, to our north; but, as one goes west the Psephotus group becomes strongly evident, and the Red-backed Parrot (*P. hamatonotus*) is very common, and in a lesser degree the Blue-bonnet (*P. hamatogaster*) round Texas. It is from this latter district, if any, lying at the foothills, and yet in the western country, that one will expect further news, if it ever comes, of those rare species—the afore-mentioned Turquoise Parrot (*Neophema pulchella*) and the Paradise Parrot (*P. pulcherrimus*).

The following conclusions can therefore be arrived at so far as Stanthorpe and its Granite Belt is concerned, whether it is regarded simply as a given point on the New South Wales-Queensland border, or as the north-west passage from the interior into Eastern New South Wales:—It is the point of contact of the Red-headed and Pale-headed Rosellas. The King Parrot and Red Lory do not go past it after reaching it from the east; it is therefore their western limit on this particular line. The Psephotus group stops short on its western limits after reaching it from the west. It is the bar on which the surge of Galahs, Cockatoo Parrots, Budgerygabs, Red-wings, breaks from the west and north, and fails almost to wet with spray. The wash goes north and south, but never over, and these, like the voyageurs of old, find the North-west Passage impassable.—Dr. SPENCER ROBERTS, R.A.O.U.

Some Birds of the Kosciusko District—A great wealth of bird life is to be seen on the foothills of the mountains that surround Kosciusko. The valley of the Thredbo, and the beautiful terrain leading back into the ranges up the valley of the Snowy River is alive with bird life.

The actual forest that so thickly clothes the steep mountains that rise on all sides, contains comparatively few birds, but an interesting exception is the Satin Flycatcher (*Myiagra cyanoleuca*), which inhabits the quiet valleys at an elevation of about 5000



Young Dusky Wood-Swallows (*Artamus cyanopterus*) in nest

Photo. by A. S. Le Souef, C.M.Z.S.

feet. Several pairs were noted, which were very local, their varied and distinctive call notes making beautiful music through the silent glades. The peculiar habit of shaking the tail laterally is very characteristic of this species.

In the open forest, apparently feeding on grass seeds, were noted several Blue-winged Grass Parrots (*Neophema chrysotoma*). These little birds are very quiet, and when disturbed flew up into the low bushes, where, sitting quite still, with their backs toward one, they were exceedingly difficult to pick out from the foliage. A pair that were disturbed on the river bank rose quickly to a fair height before making off to the feeding ground. I saw no indication of their nesting, and they had probably finished for the season. Their note was the sharp little "tink" that is characteristic of this genus. On the mountain

proper the only birds that were noted above the tree line were an undetermined species of Quail and the Pipit (*Anthus australis*). The Friar Bird, a small *Acanthiza*, and the Flame-breasted Robin ventured up as far as the trees went, but the open grass and heather, although filled with an amazing amount of insect life, was not attractive to the birds, probably on account of sudden snow storms that occasionally sweep down, even in midsummer, and the very low temperature after sundown.—A. S. LE SOUFF, C.M.Z.S., Taronga Park, Sydney.

* * *

The Moulting of the Blue Wren.—The idea that the Blue Wren (*Malurus*) throws off his coloured plumage in autumn and goes all the winter in plain brown and grey, except for a bluish-tinted tail, must, I think, have been originally put forth by the early settlers in New South Wales and Tasmania. These men, going about their daily work on the land, and noticing parties of long-tailed wrens, nearly all in plain plumage, hopping about them to pick up the insects from logs recently split or from earth freshly turned, would naturally conclude that a considerable percentage of each party must be males in winter dress, an odd blue one here or there being put down as a freak. The notion, however it originated, became very widely disseminated, and was imbibed by myself, both from books and *vice voce*, on first coming to live in the Tasmanian bush. It was, therefore, a puzzle to account for an adult male in most brilliant plumage, accompanied by a party of "browns," which always used to turn up and come hopping about my feet, when I was working amid the timber in June and July, the coldest months of the year. On visiting other selections, similar parties were noticed, each accompanied by its bright, particular star, and I was at length forced to the conclusion that paterfamilias kept his uniform all through the cold months, and that his party of "browns" consisted of his spouse and the two broods of the previous spring. In my paper giving details of the life history of the Tasmanian Blue Wren (called in Mathews' Hand-list, 1908, *Malurus cyaneus*, Ellis—now usually known as *M. cyaneus longicaudus*), in *Emu*, vol. ix., pp. 151-155, it is stated "that in my opinion the reported change of plumage in the adult male from blue to brown in autumn, and *vice versa*, in spring, requires a great deal more proof before being accepted as a fact, with regard to the Tasmanian species, at any rate" (p. 154).

During the past ten years I have given a good deal of attention to the matter, and am now satisfied that the facts are as follow:—The moulting takes place, not in autumn, but in summer, usually commencing about the middle of February, our warmest, driest month, going on through March, equally dry, and almost equally warm, and by the end of April (in which month the atmosphere is still quite mild, but moister) the change is usually complete, and the Superb Warbler henceforth merits his "proud"

title (*Superbus*—proud), and remains in brilliant colour through May, June, July, August, through spring and early summer, until nesting is over, and the moulting season comes round once more. The time may vary somewhat in individuals; certain ones, for instance, may not complete the moult until towards the end of May; but this is only to be expected, as there is no hard and fast line in Nature. Some observers have spoken of a moult towards the end of June; this has never been observed by me in the adult, but the idea probably originated in seeing the first coloured feathers of the immature male coming through the neutral-tinted plumage.

The summer-change described above is a true moult, not merely a loss of colour by abrasion, as I have frequently found the blue-tipped feathers in the bathing-tin which is put out for the refreshment of the small birds during the exceedingly arid months of February and March. While the moult is taking place, the male is very shy, "skulks" a lot behind shrubs or bushy plants, and makes a dash for his bath when he thinks no one is looking, while his wife and family come out quite boldly and chase each other in and out of the tin with prodigious splashing.—H. STUART DOVE, F.Z.S., R.A.O.U., W. Devenport, Tasmania.

* * *

The Yellow-throated Scrub-Wren as a mimic.—Among Australian birds there are many that imitate the call notes of species other than their own. The male Lyre Bird (*Menura nova-hollandica*) is pre-eminent as an imitator, and may be justly called the king of mimics, his mimetic ability going beyond the notes of his own class. The bird, however, that is to be specially mentioned now is the Yellow-throated Scrub-Wren (*Sericornis lathamii*). The male of this species is a charmingly sweet warbler, but he, too, is also an exact mimicker. A few years ago, at Ourimbah, N.S.W., the writer was first attracted by his melodious notes. A nest with young had been found, and, while waiting to make observations, to listen more intently to his song, the notes of other birds were discerned. When moving about damp gullies overgrown with dense and luxuriant subtropical trees, or proceeding along the banks of creeks fringed with Lillipilly, Callicoma, Coachwood, and the like, the call notes may be usually heard trilling from beneath their sombre shade. "Pit-pit-pit" the male and female call to one another, as they hop along side by side, or within easy distance of each other. Ever and anon he will pause to give his varied and tremulous song, while his companion joins in with a subdued warble. If they are nesting, or if they are about to commence that operation, and a pedestrian is approaching their appointed site, the male changes his usual song, interpolating it with notes of other birds. The song of the Eastern Spinebill (*Acanthorhynchus tenuirostris*) is one he regards with favour, then he will change to the notes of the Silvereye (*Zosterops lateralis*)

with perfection; very often a few notes of the Golden-breasted Whistler (*Pachycephala pectoralis*) are inserted, while sometimes the call of the Brown Warbler (*Gerygone fusca*) is easily recognisable. These are birds with which he is associated throughout the year. After the intruder has withdrawn from the precincts of the nesting site, the male resumes his customary song, with renewed vigour. Since the mimetic capability of the Yellow-throated Scrub-Wren was first noticed, it has been amply detected in other parts. Investigation may reveal that quite a number of our scrub birds interpolate their song with the notes of other birds with which they associate.—P. A. GILBERT, R.A.O.U., Lakemba, N.S.W.

* * *

White-shouldered Caterpillar-eaters—I was watching the other day, the stages in the construction of the White-shouldered Caterpillar-Eater's nest. The first nest I found was robbed by some boys, but immediately the birds started another nest in the next tree. All the material of the first nest was used on the second, and sometimes the male, after placing some material in position, would rest for half-an-hour or so on the nest. This, however, was not so with the female. She rarely appeared, and if she had some material she would give it to the male to place in position. She did the greater part of the sitting, however, and was fed by the male while on the nest. Both birds would fly swiftly past any intruder, snapping their beaks; but although they came very close they never hit one.—Master C. AUSTIN.

* * *

Cockatoo Hybrids.—Two hybrids of a Galah and Pink Cockatoo (Major Mitchell) were noted by me this year, and some years ago a Little Corella (*C. gymnopsis*, or rather *C. sanguinea*) and Galah (*C. roseicapilla*) hybrid. These all happened in a state of nature, and in good seasons, when food was abundant and all available nesting holes occupied. The Galah (*C. sanguinea*) was in a Galah's Nest with two young Galahs. The other two were trapped birds.—W. MACGILLIVRAY, R.A.O.U., Broken Hill.

* * *

Note on the Frogmouth and Apostle Bird.—I acquired a Podargus recently; he is becoming quite sociable already, and makes no bones about gulping down a whole mouse, dead or alive; he does not wait to kill it, like the Kookaburra. This is about the fifth that I have kept, and none of them ever "mopoked" their note, and the note of all the other species of Podargus in my experience is totally unlike that of the "Boobook Owl." My Apostle Birds (*Struthidea*) are nest building; the female does all the graft, and the male is clerk of works.—Dr. W. MACGILLIVRAY, R.A.O.U., Broken Hill.

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Notes

"Type Descriptions and the International Code."—At the end of the article by A. J. and A. G. Campbell (*Emu*, *ante*, p. 192), it should be explained that the three-fold resolution there mentioned was carried unanimously at the Adelaide Session, and referred to the Council for further action.

* * *

Habits of Cuckoos.—In his recent book "The Cuckoo's Secret," Mr. Edgar Chance describes and illustrates in most complete manner the egg-laying methods of the Cuckoo familiar in Great Britain (*Cuculus canorus*). With the object of stimulating further interest in the habits of Cuckoos generally, Mr. Chance offers to wager any amount up to £500 that any parasitic bird in any part of the world lays its eggs direct into the nests of its victims, and never inserts the egg with its beak.

Now, Mr. Chance has made such a close study of the Cuckoo that there may be little likelihood of anyone qualifying for the £500. But the interest of the subject is such that Australian observers should endeavor to solve the mystery as regards our own Cuckoos as conclusively as Mr. Chance has done with the European bird. Notes on the habits of Cuckoos will be welcomed by the Editor of this journal.

Members will be pleased to learn that our old Western Australian friend Mr. Tom Carter, now of Surrey, England; Dr. W. MacGillivray, of Broken Hill, a Past President of the R.A.O.U.; and Mr. A. H. Chisholm, formerly the successful State Secretary for Queensland, but now of the "Daily Telegraph," Sydney, have been awarded the honour of Corresponding Fellow of the American Ornithologists' Union. We congratulate them on their well-deserved recognition by the ornithologists of America.

* * *

Members will be pleased to learn that the African section of the long-expected *Systema Avium* has been completed, though not yet published. Mr. Mathews has now submitted proposals to the Check-list Committee that will probably enable unanimity to be reached on all points. It is hoped that the Australian list will soon take its place as a section of the great *Systema Avium*.

* * *

A proclamation has been issued by the Minister for Customs prohibiting the export of any birds except those named in the proclamation. The Minister retains power to allow export for educational purposes. The request of nature-lovers that no export for private profit should be permitted was well received, and seems likely to be adopted.

* * *

Suggestions for the Annual Congress and Camp-out in Tasmania next spring are now being considered by the Council. Many enquiries have been received in connection with the proposed visit of the R.A.O.U. to Macquarie Island next January.

* * *

Members whose subscriptions are outstanding are earnestly requested to send same promptly to the Hon. Secretary, Z. Gray, 2 Temple Court, Melbourne.

* * *

The Subjects of the Monthly Meeting of the R.A.O.U. are:

May 2nd, at 8 p.m., at National Museum.—"Albatrosses and Petrels."

June 6th, at 8 p.m., at R.A.O.U. Rooms.—"Cockatoos."

July 4th, at 8 p.m., at R. .O.U. Rooms.—"Finches."

* * *

The sale of the Valuable Index to the first 20 Volumes of *The Emu*, kindly donated by H. L. White, C.F.A.O.U., is proceeding steadily. Members who require the same should communicate at once with the Honorary Secretary.

* * *

The date of publication of this part of *The Emu* was April 5th, 1923



UPPER THE RUFIOUS GRASS-WREN
Diaphorillas whitei

LOWER THE DARK GRASS-WREN
D. purnelli

The Emu

Official Organ of the Royal Australasian Ornithologists' Union

"Birds of a feather."

VOL. XXII.]

1ST JANUARY, 1923.

[PART 3.

Two Australian Grass-Wrens, *Diaphorillas purnelli* and *D. whitei*

By A. J. CAMPBELL, C.M.B.O.U., F.A.O.U.,
Sometime President, R.A.O.U.
Box Hill, Vic.

At the recent Adelaide Conference of the R.A.O.U., a workable amount of material was examined, including specimens at the local Museum kindly placed by the authorities at the disposal of the Check-List Committee. The Committee was also fortunate in having the advice of the Hon. Ornithologist, Dr. A. M. Morgan, R.A.O.U. After inspecting the material available, including that in the collection of Capt. S. A. White, C.M.B.O.U., the Committee accepted ten species and the genus *Magnamytis* for *D. housei* and *D. woodwardi*.

It appeared that the fine dark variety of the "*textilis*" series, named *D. purnelli* by G. M. Mathews (*A.A.R.* II., p. 99), and found in the interior of the continent, was sufficiently differentiated to stand as a full species. Fig. (lower) pl. I. For former remarks by H. L. White, C.F.A.O.U., see *Emu*, vol. xx., p. 190, pl. xx.

Of the "*striata*" series, another interior bird, *D. whitei*, Mathews (*Bull. B.O. Club*, xxv., p. 34), also appeared a good species, of which *D. osweni*, Mathews, and *D. rufa*, Campbell and Kershaw, are synonyms. Fig. (upper) pl. I. Former remarks on these birds will be found in *Emu*, xviii., p. 81, pl. xv., and the description of the nest and eggs of *D. whitei*, by H. L. White, Esq., of "Belltrees," N.S.W., in *Emu*, vol. xiv., p. 157.

The photographs are from specimens in the "H. L. White Collection," National Museum, Melbourne. The birds were mounted by kind direction of the Curator, Mr. J. A. Kershaw, F.E.S.

The Nesting of the Australian Pelican (*Pelicanus conspicillatus*)

By DR. W. MACGILLIVRAY, Broken Hill, Sometime
President, R.A.O.U.

Owing to the gradual dessication of the interior the Darling River does not receive any water on its western side from the 30th degree of latitude, where the Warrego River enters it, near Bourke, until it joins the Murray River at about the 34th parallel.

The waters of the Paroo find their way to the Darling only in years of exceptional rainfall, usually losing themselves in vast flats and lignum (*Muehlenbeckia Cunninghami*) swamps before reaching it. The Bulloo waters only find their way over the Queensland border for a short distance to be sopped up in similar areas, and most of the creeks that take their origin from the eastern side of the Barrier Range share the same fate.

It follows, then, that the Darling depends for its periodic floodings, which vary greatly in extent, on the rains which fall in South-eastern Queensland, and North-eastern New South Wales. The river itself has a broad and deep channel, with its banks bordered by fine old red gums (*Eucalyptus rostrata*), an area of varying extent on either side subject to inundation and supporting an arboretum of box (*E. bicolor* mostly) and *Acacia stenophylla*. Connected with this are old channels of the river, and a system of lakes. One of these old channels, known as the Talyawalka, courses down on the eastern side at distances of from 5 to 40 miles out from the river itself. Passing Wilcannia at about 10 miles out, it soon increases this distance, filling a series of lakes in succession, such as Teryawynia, Victoria, Brommeys, Ratcatchers and Boolaboolka Lakes, and then finding its way by one or more channels into the river again.

On the western side a channel runs out just below the town of Menindie, and immediately fills a large depressed area of about 76,000 acres, known to the aboriginal inhabitants as Minandichi, but now called Lake Menindie. This is connected by a tortuous channel, the Wooriarara Creek, about 12 miles in length, with Cawndilla Lake, which has an area of about 160,000 acres. Both lakes and creek are enclosed by sandhills, from which they are separated by box flats. The centre portion bordering the creek and more depressed than the rest, is known as Mortonboolka Swamp, as it is more often under water than the rest of the flats, only high floods covering these and reaching to the foot of the sandhills. When the river falls, most of this water runs out again, and serves to keep up the level of the river for several months below where the creek enters it.



A portion of the nesting island of the Australian Pelican, Cawndilla Lake,

Darling River, N.S.W.

Photo. by Dr. W. MacGillivray, R.A.O.U.

The Darling is usually a running stream, but may in very dry times be reduced to a series of waterholes. Small floods, which do not rise to the top of the channel, usually occur every two or three years. Floods which overflow the banks and fill the lower flats to a greater or less extent occur at longer intervals. Exceptional floods which cover all the flats and run the outlying channels to the filling of the larger lakes only happen once or twice in an ordinary lifetime. Such large floods took place in 1864, 1870, 1890 and in 1921, and it is of the nesting of the Pelican (*Pelicanus conspicillatus*) during the last big flood that these notes are mostly concerned.

Boolaboolka Lake, the terminal one of the series of lakes filled by the Talyawalka, has not been filled since 1890. Last year water poured into it for three months, but did not fill it, in spite of the fact that most of the others had been filled twelve months before.

Whenever a flood of sufficient extent to overflow the banks and to isolate numbers of trees and lignum bushes occurs, waterfowl of many kinds start to nest, Swans, Ducks, Coots, and Waterhens being the earliest, with wading birds, such as Herons, Spoonbills, and Ibises. Pelicans, Darters, and Cormorants do not nest unless other special conditions obtain, and these have relation to food supply and protection.

When the river is low or reduced to a series of holes, the smaller and naturally more prolific of its fish fauna have their numbers kept in check by the Cod, from which dominant species they have little or no chance of escape. Their ova and small fry are also more easily preyed upon by crayfish, birds and turtle.

When, however, the waters spread out over large flats and lake areas, these adverse conditions are removed, and these species increase enormously, and one finds that Pelicans, Darters and Cormorants do not attempt to nest until these areas have been filled for twelve months or more, and the fish have been given time to multiply.

The Cormorants and Darters choose trees standing in water, on which to place their nests; the bulkier Pelican, however, requires an island where its eggs may be incubated and its young reared free from molestation by marauding animals for a period of from 5 to 6 months or more. At Boolaboolka these conditions have not obtained since 1894, when the last breeding took place. Last year it was the last lake to receive the flood waters and then not in sufficient amount to form the required island.

The last nesting of Pelicans in this district was at Cawndilla in 1904.

At Teryawynia Black Swans (*Chenopsis atrata*) nested freely on some of the islands during the winter and early spring of 1921, but the Pelicans took charge of several islands isolated by the flood waters at the end of the year, and have had possession ever since.

Four species of Cormorant—*Phalacrocorax carbo*, *P. ater*, *P. varius*, and *Microcarbo melanoleucus*—have also nested freely on Menindie, Cawndilla, and Teryawynia Lakes right through the spring, summer and autumn months.

I have been able to make frequent excursions on to the Menindie and Cawndilla Lake areas, owing to the courtesy shown and assistance rendered me by Mr. Allison, the manager of the Kinchega holding, on which the lakes are situated. The management is centred at Kars Station, about 40 miles out from Broken Hill on the way to Menindie.

An account of a visit to these lakes in January last, supplemented by observations made on previous visits in the spring and summer and on several occasions since will serve to give an idea of the bird life to be met with.

On the 28th January last, accompanied by Dr. Finlayson and my son, Ian, I started out for Kars station at 5.30 a.m. At about twenty miles out the road descends from the Barrier Range, and runs through open saltbush plains to cross Stephens Creek, a few miles below where Sturt first camped on it on his memorable expedition into the interior in 1844.

Near the turn-off to the station we flushed three fine Bustards from a tract of country where a little green herbage has resulted from an errant summer thunderstorm.

These birds are only odd ones, this species not having appeared here in numbers since 1911, when the interior and Western Queensland were devastated by a drought and better conditions obtained hereabouts.

Arriving at Kars in time for breakfast, we found the manager, overseer and a boy as cook ready to accompany us to the lakes.

Another thirty miles, at first through scrub consisting principally of Mulga (*Acacia aneura*) and Neelia (*Acacia loderi*), amongst which are interspersed "Dead finish" (*Acacia tetragonophylla*), Bullock Bush (*Heterodendron oleofolium*), Sandalwood (*Myoporum platycarpum*), Leopard Trees (*Flindersia maculata*), a few Quandongs (*Fusanpis acuminatus*), and Black Oaks (*Casuarina lepidophloia*) out on to spear-grass country, through a few dry cane-grass swamps, and over the sand rises on to the box flats bordering the lake area and from which the flood waters have recently receded to the level of the creek banks, we pulled up near where the creek comes out from Menindie Lake.

Here we leave our car; the station Ford trolley loads all our gear, and in charge of Mr. O'Halloran, the overseer, and the cook goes on to make a camp near to where the creek connects with Cawndilla Lake.

The rest of us take to the station boat, which is kept at a boundary rider's hut on the creek, and row up towards Cawndilla. Keeping to the stream for half a mile, we enter Mortonboolka Swamp to cut off a large bend of the creek and to investigate the bird life of the swamp. A few Ducks are on the water,



Nest and Young of Darter, Cawndilla Lake, Darling River, N.S.W.

Photo. by Dr. W. MacGillivray, R.A.O.U.

mostly Pink Ears (*Malacorhynchus membranaceus*), with broods of young of various stages of growth; this species has been nesting since early spring. Here the nests were mostly in hollows of trees usually at a low elevation from 1 to 6 feet from the water, occasionally as much as 20 feet. The clutches are always moderate, from five to eight, and the eggs well enveloped in down. Teal (*Tringa gibberifrons*) are next in point of numbers, and have also young of all ages. Their nests range to a greater elevation than those of the Pink Ears, and the clutches are slightly larger, rarely more than ten or twelve.

A few Grey Ducks (*Anas superciliosa*) and Australian White-eyes (*Nyroca australis*) were also noted. Maned Geese were more plentiful than earlier in the summer, and in flocks the loud "Gnaroo" call of the female more frequently heard than the subdued tones of the ganders.

Early in the spring, Dr. Chenery and I met with a number of Freckled Ducks (*Stictonetta necosa*) paired for breeding purposes on Menindie Lake. These birds were wonderfully tame, swimming round about our boat without showing any fear and allowing a close inspection. The male is larger than the female, and further distinguished by a crimson patch across the base of the mandible. Both sexes have a small top-knot or knob on the head. They prefer to nest in lignum or cane grass, and left Menindie Lake to nest elsewhere when the rising waters submerged all the lignum.

The White-eyed Duck also prefers lignum or cane grass to nest in, and usually lays larger clutches than any other Duck. Dr. Chenery and I found them nesting in the flood waters of Cooper's Creek in 1920 with large clutches of 15 to 18 eggs; we saw one young brood of 25, and several of 15 to 18 with their parents. Since then Dr. Chenery has verified this observation on some swamps on the Darling.

Continuing through the swamp we flush at intervals White-necked Herons (*Notophoxa pacifica*) and White-faced Herons (Blue) (*N. nova-hollandia*) from nests containing either eggs or young birds. All through the swamp and along the creek Darters (*Anhinga nova-hollandia*) have their bulky stick nests draped with overhanging gum leaves placed on horizontal green or dead limbs. Most of these nests contain from three to five young birds. Naked when hatched, they soon acquire a covering of creamy white down. Older birds sitting bolt upright in their nest with wing and tail feathers sprouting are still clothed in creamy down with head and neck fawn-coloured. These larger young are suspicious of us, and flop out of their nests into the water, where they disappear to put up head and neck only, about 30 yards away, and disappear again immediately. When all danger is passed, they climb out on some sloping tree trunk or snag, where their wants are attended to by the parents; several young birds were seen by us in such situations. The old birds are on every dead tree or snag sunning themselves with out-

stretched wings or curiously eyeing us, and readily take to flight. They leave their perch rocking behind them from the impetus of their jump-off. The sexes share in the task of incubation, as we flushed both repeatedly from nests.

Wending our way through the swamp, we espy a Great Crested Grebe (*Podiceps cristatus*) swimming off in its stately way. Its nest is floating, and anchored to a clump of lignum; no eggs are visible till we remove the ample covering of water weeds for photographic purposes. The nest was about a foot in diameter, with an egg-cavity of 6 inches, and the highest part of the nest 4 inches above water level. It contained four eggs.

Numbers of Nankeen Night Herons (*Nycticorax caldonicus*), mostly adult birds, with a few dark ruddy-brown or spotted immature ones were disturbed from their camping places in the denser foliated trees. White Egrets (*Egretta alba*) were perched on trees or searching the shallower spots.

The nests of all these water birds that build in trees, conspicuous when first constructed of dark-coloured twigs and green or dry branchlets and leaves, are soon so whitewashed by the excreta of the birds as to become almost invisible in the bright sunlight.

Pelicans begin now to pass overhead in larger numbers, the bigger flocks flying in the V-shaped formation common to so many water birds, the apex of the letter being in advance, and the limbs altering in length with changes in the direction of flight of the flock. The bird at the apex is in this way frequently changed.

The Pied Cormorant (*P. varius*), the Little Pied (*Microcarbo melanoleucus*), and the Little Black (*P. ater*) were quite numerous, either in the water, perched on some point of vantage, or flying overhead; the last-named being in point of numbers far ahead of the other two. The large black Cormorant (*P. carbo*) was more numerous in Menindie Lake, where it was nesting.

Along the shallow margin and on the numerous small islets formed by the falling waters are Red-Kneed Dotterel (*Erythrogonys cinctus*) and fewer numbers of the Black-fronted species (*Choradrius melanops*).

Near our destination for the day, we came across a small rookery of the Little Black Cormorant (*P. ater*) occupying two or three trees on the margin of an island in the creek; most of these nests contained young birds.

After our eight-mile pull, we welcomed the camp, where a meal awaited our arrival. We are soon in bed, and go off to sleep listening to the churring calls of the Owlet Nightjars (*Egotheles cristata*) as they hawk for insects amongst the trees, and the harsher notes of the Night-Herons fishing along the creek.

We are all astir at daylight, and disturb a flotilla of Pelicans that had been busy cornering a shoal of fish in the creek by the camp. Numbers of Water Hens (*Microtribonyx ventralis*) were



Nesting Pelicans. Upper—Nests with eggs. Lower Young and old birds on land and in the water.

along the shore or feeding out from it on the green herbage. When thus engaged the tail is carried in a horizontal position, but when alarmed and on the alert or running, it is held erect, giving the bird the appearance of a bantam hen.

A White Ibis (*Threskiornis molucca*) was busily engaged stirring the shallow water with open bill, going back and forward and from side to side fossicking amongst decaying branches or under logs and making occasional rushes when something which his efforts had disturbed tried to escape.

Coots (*Fulica atra*) are plentiful on the water where they are thoroughly at home or walking along the edge in their clumsily erect fashion in marked contrast with the more active and graceful Water Hen (*Microtribonyx ventralis*). Galahs (*Cacatua roseicapilla*) are numerous, and there are odd pairs of Sulphur-Crested Cockatoos (*C. galerita*) in the trees. Greenies (*Meliphaga penicillata*) busily searching the leaves and branchlets for food are in numbers. On the previous day we had seen a pair feeding young in an almost invisible nest pendent in a gum branchlet near the hut on the creek. Brown Tree-Creepers (*Climacteris picumna*) run up and round the trunks of the box trees, the rough bark making their progress easy and supplying a meal from the insects and other creatures hidden in its crevices.

After breakfast all but the cook take to the boat and proceed upstream towards Cawndilla Lake. We soon come to a small heronry of Egrets (*Egretta alba*) that we had examined a month previously. Most of the nests now contain young birds. The old birds fly anxiously around, uttering their harsh croakings as we proceed to a closer view. The nests are built wholly of sticks, and average about 1 foot in diameter with a depth of 6 inches, some being more compactly and substantially built than others. Further on we again disturb Night-Herons from the trees in numbers, and every few yards either Blue (White-faced) Herons, Spoonbills or Darters from their nests, and flocks or broods of Ducks from the water. We come to where the creek blends with the water of Cawndilla Lake. A fair wind is blowing, and we can see and hear the waves breaking on the shores and surface of the lake. The trees bordering the creek thin out, and we land on a small island off the right bank, Mr. Allison remaining to bale the boat, whilst the rest of the party wade out in the shallow water to examine some scattered box trees. Two Darters' nests are first met with, one containing five large downy young standing bolt upright on the nest, the other silhouetted against the sky shows the old bird sitting on it. Our efforts to photograph these are frustrated by the large young birds flopping into the water, and the old bird flying off before we are near enough for our purpose. The second nest contained newly hatched young as yet naked. Several other trees of this group support nests of the Little Black Cormorant.

On our return to the boat, we are informed that many of these birds have been flying on along the creek carrying sticks in their bills.

We soon come to their nesting trees, several large red gums being covered with nests. Many birds are busily constructing their nests; other nests contain eggs at all stages of incubation or young from the newly hatched to fully feathered birds. In this colony were a few nests of the Pied and of the Little Pied Cormorant.

About 100 yards further on a group of trees is occupied by nesting Egrets, mostly *Egretta alba*, with a few *E. garzetta*. The larger nests of *E. alba* contain three to four eggs, occasional ones five; some only one or two, and many nests are incomplete. The nests of the Little Egret were higher up in the trees, and were not examined. The birds returned to the trees whilst we were underneath or flew round above, or made uneasy short flights from tree to tree uttering their harsh croakings.

By our binoculars we made out a host of Pelicans about a mile and a half out towards the other shore, where an island was gradually being formed by the subsidence of the waters. We start over as the wind has fallen, and the surface of the lake moderating. We pass more Cormorant trees, the three last being covered with the nests of the Pied Cormorant, with a fewer number of those of the Little Black. These nests contained eggs and young at all stages. The egg clutches for both species consisted of from three to five eggs, the three clutches being mostly incomplete or broken. The water to our left and right was occupied by Ducks, Coots and Swans. Over in the shallow water near the shore are hundreds of Avocets (*Recurvirostra nova-hollandica*). Along the water line Red-capped and Black-fronted Dottrels are feeding, and on the shore are hundreds of Water-Hens (*Microtribonyx centralis*).

On nearing the Pelican island, we see that it is thickly covered with these great birds, whilst the water on either side is occupied by large flotillas of them. A long narrow bank running out from the centre of the island towards the centre of the lake for about quarter of a mile was also closely packed with them.

The island itself was narrow and roughly crescentic in shape, about 30 yards in width, and nearly one-third of a mile in length. The nesting birds did not attempt to leave the island till we were quite near, and then only those occupying the end near our landing place left. When, however, we advanced along the island, the air was soon full of birds, but those on the water in several large flocks were swimming backwards and forwards or making out from the islands, the flocks passing one another, but the individuals of each flock all acting in unison.

When we examined the nests we found that they were placed about one yard apart, and occupied the whole island from shore to shore, the more recent being near the margin on ground from which the water had only recently receded. Many of the new



A Pelican's Nest with a clutch of three eggs, Cawndilla Lake, Darling River, N.S.W.
Photo. by Dr. W. MacGillivray, R.A.O.U.

nests contained only the first egg, and were merely depressions scraped in the sandy soil; a number contained no egg at all. These scraped-out depressions were about 12 inches in diameter, and 4 to 6 inches in depth in the centre. The first egg was laid in this, and the nesting material was gathered as incubation proceeded (usually from whatever material was close at hand).

This consisted merely of sticks of dead tobacco bush (*Nicotiana glauca*); the hairy rhizomes of the rushes that grow on the island, water-weed dragged up from the water, feathers and even an occasional dead and dried Water-Hen were commandeered for the purpose. Some of the birds had plucked and carried green branchlets from the three or four red gums (*Eucalyptus rosirata*) that graced the island.

Some of the nests were quite imposing structures, and others showed that they were owned by careless and slovenly individuals; a few sticks only sufficing to encircle the original scraping. The larger nests when complete were from 18 to 20 inches in diameter with an egg-cavity 12 inches in diameter.

By far the greater number of nests contained two eggs, from 5 per cent. to 7 per cent. contained clutches of three, and occasional ones four. Most of the eggs were at this time fresh, or at an early stage of incubation. Only on the highest part of the island, which had been uncovered about six weeks previously, were there any hatching eggs, and none of these had been hatched for more than a day.

These newly hatched young were naked except for an indication of whitish down across the lower dorsal and femoral regions. The skin is of a fleshy-pink colour, with a salmon-pink gape, with legs and beak fleshy-pink. They had their eyes open before they were free from the shell. The irides were either brown or silvery white, and the pouch was well developed. These small young uttered a little barking chirp.

Alongside many of the nests were small heaps of disgorged fish, mostly Murray or Macquarie perch, varying in length from one to six inches. Some of the heaps contained as many as 75 fishes, and others any number between that and a dozen. Some consisted of fish in size and appearance like Whitebait, and partly digested; these were evidently intended for the newly hatched chicks. Some of these latter were capable of helping themselves from the heaps, and were constantly making attempts to swallow their nest mate's beak or stumpy wings.

I visited this island again on the 12th February, on the 4th March, and the 9th of April, and another nesting place on Teryawynia Lake on the 11th June. On my second visit fourteen days later, the island had enlarged considerably, and the nesting Pelicans had kept pace with it; many new nests on the damp sand were either being just scraped out or contained one egg only.

Many more eggs had hatched out; several of the three clutches had brought out all three, and the earlier nests had been built up with more material. There was little or no disparity in size

between the young in the same nest, leading one to infer that the eggs of a clutch were laid on successive days.

The young birds hatched on the 29th January had now, a fortnight later, grown to the size of large domestic fowls, and had the whole of the upper surface covered with very short white down up to the occiput, and their skin had become whitish in colour.

These birds were beginning to leave their nests and to huddle together in small lots of six or seven, and to waddle away on their tarso-metatarsus when approached, uttering protesting harsh barking or grunting cries.

The adult birds rarely call at all; only on rare occasions does one hear a flying bird give out a hoarse grunt.

The young were now in sufficient numbers to show a good deal of variation in colour of the bill, face and irides. Typical young have the soft parts of the face like the rest of the body, a fairly bright fleshy-pink becoming dull white as they grow older, the iris is dark brown, but occasional birds of this type have silvery-white irides. A number have the face, bill and space round the eye more or less black or blackish brown, and with these the irides may be either brown or silvery-white also.

The masses of disgorged fish have increased greatly in number and some larger ones up to 8 or 10 inches in length are amongst them.

The adult birds do not carry fish in the pouch, which is only used for purposes of capture. All fish is brought from the fishing ground in the crop. When the adult bird is flying or walking or swimming, the pouch is always tucked up; only when standing idly on the land is it relaxed; it may be seen in young of all ages and adults flapping with the respiratory movements.

The young feed by putting head and neck down the parent's throat by the angle of the bill, and helping themselves from the contents of the crop, which are regularly regurgitated up to them by the parent. They are, however, even at earliest age capable of helping themselves from the heaps of small fish left on the nest. In stretching up their necks and heads as though soliciting food or protesting at our intrusion, they dilate the rami of the mandible and so widen the opening of the pouch. They have also the habit common to the young of many water birds of disgorging their stomach contents by way of a peace offering.

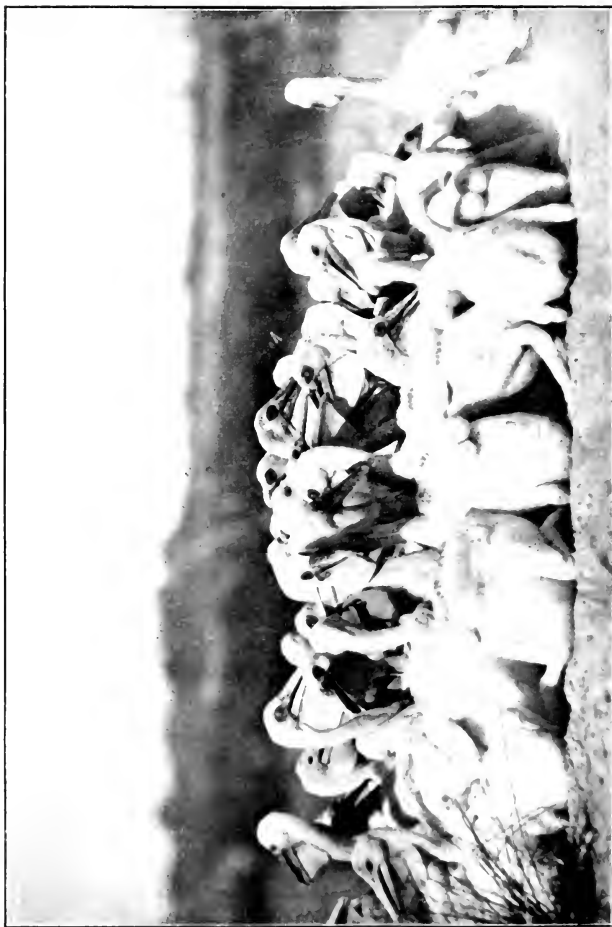
Several Silver Gulls (*Larus nova-hollandic*) were about the island on the look-out for a broken egg or a weakly or unprotected young one, and a few Ravens (*Corvus coronoides*) had found their way over from the adjacent mainland.

Many Gull-billed Terns (*Gelochelidon nilotica*) and Marsh or Whiskered Terns (*Chlidonias leucoparvia*) were hawking over the water or perched on a small bank out from the island. Caspian Terns (*Hydroprogne caspia*) frequent these inland waters in odd pairs, as I have identified them at close quarters and handled shot specimens.



Young Pelicans and food, Camrdilla Lake, Darling River, N.S.W.

Photo by Dr. W. MacGillivray, R.A.O.U.



Young Pelicans massing together. Cawndilla Lake, Darling River, N.S.W.

Leaving the island we row back past the Cormorant colonies, and find the heronry of Egrets had been extended since our last visit, as also that of the Little Black Cormorants. Numbers of the nests of the latter species were on small saplings bordering the creek, and the birds themselves were perched all over several dry trees.

It was soon after this that a White-breasted Sea Eagle (*Haliaeetus leucogaster*) flew across the stream in front of our boat. This is my first record of this species hereabouts, though Dr. Chenery has recorded it from the Murray River not far from Wentworth.

Three weeks later, I again visited the Pelicans. After camping on the creek, Mr. Allison and I were ferried across and walked along the margin of the lake, whilst the rest of our party proceeded by boat.

When opposite the island we sat down and listened to the continuous groaning noise coming from it, caused by the multitude of young birds calling in their harsh tones for food. The island was a scene of busy and ceaseless activity, old birds constantly arriving and departing from the mass of birds on the island, where there seemed to be little or no standing room left. The water on either side and for a distance out from the island swarmed with the birds. The sandbank extending out at right angles to the island had dried off, and was fully occupied. Several of the birds were perched on the red-gum trees.

The odours wafted to us by the breeze had heightened since our earlier visits, and the increased number of young birds here made the place a noisy one.

The older chicks, from four to five weeks old, were covered with short down, and showed dark sprouting feathers on the scapular tracts and over the humerus with the primaries just indicated.

These young were now massed in mobs of anything from 10 to 40 or 50. On being approached they waddled off together with unsteady gait, balancing themselves with their featherless wings, and tumbling over all obstacles in their efforts to escape in droves, or crowded together in a closely packed mass, in which each bird was making frantic efforts to get to the centre of the mass, as in a Rugby football scrum, or they are huddled all together at the water's edge, afraid as yet to take to the water, although they seem to recognise it as their safest refuge. Many have overcome this, and are swimming out either singly or in small and compact companies. The gregarious instinct seems to assert itself so soon as the chicks leave the nest. Many nests were still being found, and numbers of old nests that had been vacated by the earlier hatched young were reoccupied, and contained fresh clutches.

The long, narrow bank before mentioned had several commencing nests on it, and also two nests of the Black Swan, each containing six eggs.

When I visited the island again on the 9th April, it had dried off and enlarged considerably. It was thickly occupied by birds, with a few Ravens and Whistling Eagles (*Haliastur sphenurus*) prospecting it for tit-bits. The groaning of the young could be heard half a mile away, like the continuous murmur of surf breaking on a reef.

The old birds rose in a vast flock when we waded out. Many young birds were huddled together; the flocks larger than on our previous visits consisting of any number up to one hundred and more. The oldest young are now about two months old, with feathers sprouting all over their bodies with the dark scapulars and primaries showing well.

There were young at all stages, and all the old nests contained eggs again. These are not second clutches, but the nesting of birds that could not find room earlier. The old birds are fairly nervous, and do not allow of our approaching nearer than 10 yards without taking to flight, which is preceded by a short run and some vigorous flapping. They do not as a rule rise high, flying out and settling on the nearest water; they soon return to their nests.

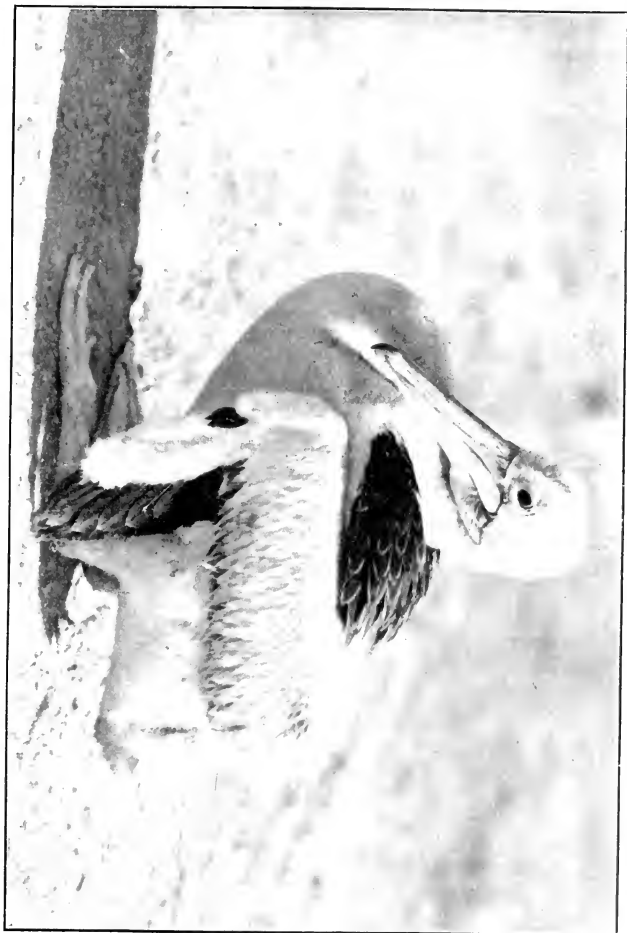
There are, however, always a number in the air, some sailing round at a great height and others lower. Occasionally one half closes its wings and planes down to the water, but more often they come down gradually. Occasionally the old birds on the water would take alarm, and all rise together, filling the air with a rushing sound; they rarely rise high and soon settle again. There are many young birds with the old ones out on the water.

On the 10th June, being anxious to compare the breeding places established by the Pelicans on Teryawynia Lake with the one on Cawndilla, I set out *per motor* with three companions. We crossed the Darling at Menindie, being ferried over on a punt; took the up-river track to Henley Station, where the manager, Mr. MacDonald, put us on the road to Teryawynia, which is an out-station on a lake filled by the flood waters that come down the Talyawalka, and about 40 miles out from the Darling.

Our road took us through box flats, open grass lands and a little scrub; skirted a fine tree-bordered lake, whose surface was covered with Duck, Swan and other water birds.

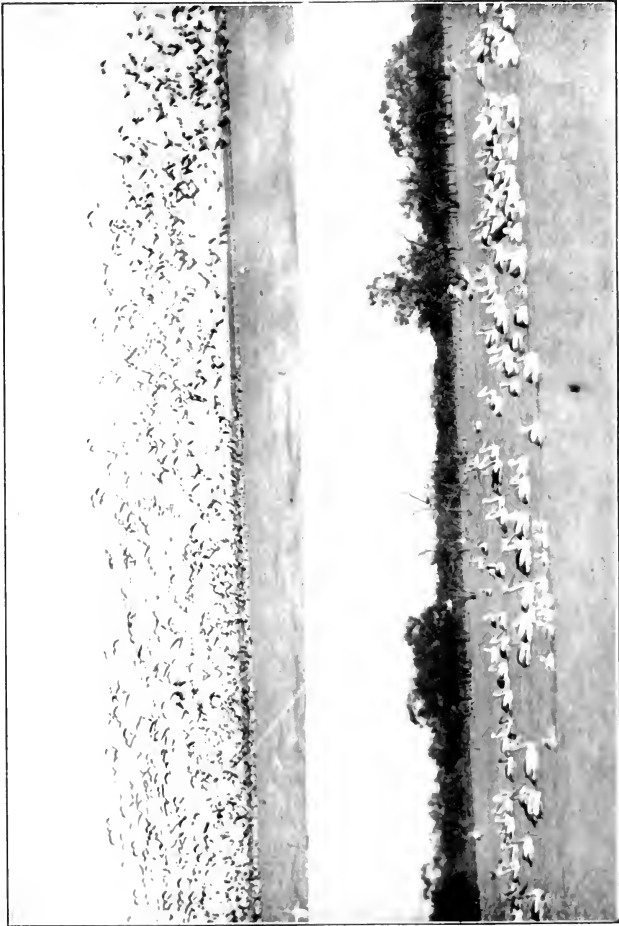
Several Kangaroos (*Macropus rufus*) were seen, and a few mobs of Emus, mostly last year's broods. We disturbed two flocks of Black Cockatoos (*Calyptorhynchus banksii*) that were feeding on the plains. These birds seem capable of picking up the smallest seeds from the ground, as I have found their crops full of seed no larger than the smallest grains of gunpowder.

Red-backed Parrots (*Psephotus hamatonotus*) were numerous, and in flocks; these birds keep to the river country, and are never seen out back where their place is taken by the Many-colored Parrots (*P. varius*). A few White Cockatoos (*Cacatua galerita*) in small flocks were seen, and numerous large flocks of



Young Pelican about four months old, Teryawynia Lake.

Photo. by Dr. W. MacGillivray, R.A.O.U.



Upper—Rising from rookery. Lower—Swimming out with young birds.

Pelicans.

Photo. by Dr. W. MacGillivray, R.A.O.U.

Galahs (*C. roseicapillus*) rise from their feeding places on the ground. Blue-bonnets (*Psephotus haemastogaster*) and Ring-necks (*Barnardius barnardi*) are occasionally seen in small lots.

We arrived by dark at the station, which is picturesquely situated on a peninsula with the lake in front and on two sides of it. During the summer when the flood waters were at their height, the house was completely isolated.

On the following morning we set out for the Pelican's breeding ground, which consisted of several islands at the southern end of the lake, about eight miles by road from the house. On our way round we noted many waterfowl along the margin and on the lake. Cormorants of four species were numerous, and nesting had finished, but many trees were seen that bore evidence of having been utilised for that purpose. White-faced Herons (*Notophox noræ-hollandiæ*), Royal Spoonbills (*Platalea flavipes*), and White Egrets (*Egretta alba*) were in fair numbers in the shallow water. We disturbed a flock of about 100 Crested Pigeons (*Ocyphaps lophotes*) from the ground to light upon a dead tree, but they were too timid to allow of a close enough approach for photographic purposes.

We leave our motors and walk on to the first of the islands occupied by a number of old and young Pelicans. This has been made possible by the subsidence of the water, two of the principal islands having dried off to the mainland. All the birds old and young move off into the water as we near them. We, however, note great numbers on adjacent islands and on the water, but there are no small young left on the land. We make a detour to arrive dry-shod on the second of the islands. Here we find a number of young birds still in their nests, and other older birds huddled together in masses or waddling off to the water in droves. Numbers of young of from 3 to 4 months of age are on the water. Mr. Ker, the overseer, informed us that more than half of the birds had left.

We noticed the same variation in colouring of the face and irides as at Cawndilla. One young one attracted our attention particularly on account of the head and neck being wholly dark brown in colour. Our time was limited, so that we had to make our way back to the homestead for an early lunch, and make a start back. On our return journey a belated Song-Lark (*Cinchorhamphus cruralis*) was disturbed from the roadside, all its mates having left long since for northern parts. A pair of Stubble-Quail (*Coturnix pectoralis*) were sunning themselves on a bare patch, and crouched as the motor whizzed by. Three half-grown Emus ran up for a close view of the motor, and we pulled up and waited for them to come quite near enough to have their portraits taken. A few hundred yards on a flock of ten Emus evince a like curiosity, and a piece of bright tinfoil slowly waved in the sunlight serves to bring them within range of our cameras.

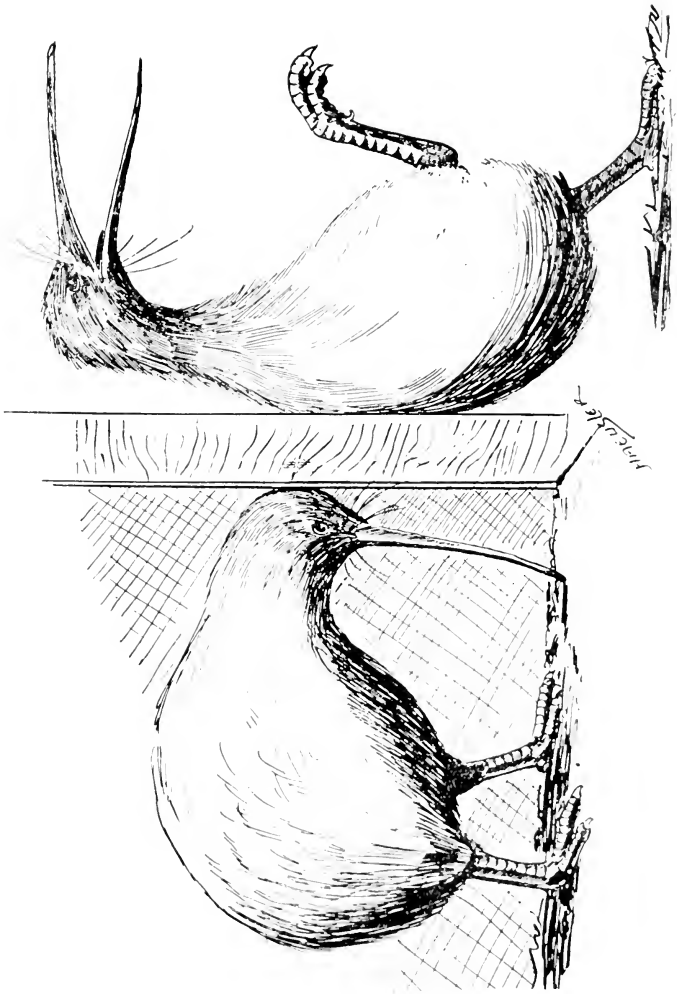
We again disturb the Red-tailed Black Cockatoo and numerous Galahs from their feeding grounds, halt at Pisant Lake, with its numerous Ducks and Swans, and arrive at Henly for afternoon tea. A thunderstorm had crossed our track back from Henly, making it heavy, but we make Menindie for tea and arrive home by midnight.

Late in May, there were still many young of all stages of development on the island in Cawndilla. All the earlier hatches of young being fully feathered on the 12th August, I paid a visit to this breeding place, and found that there was no longer an island, the lake having fallen considerably, so that one could walk dry-shod out to it. A few thousand birds, mostly fully developed young with their parents, were still on the island, but all could fly, and did not admit of a close approach, flying off or walking into the water and swimming out on to the lake.

Up till May very few young birds seemed to have died; it was remarked by all who had visited the place before that time. Now, however, the island showed a remarkable mortality of fully matured young birds, which had evidently occurred at about the one time, as all were at about the same stage of decomposition. Although there were many dead lying about singly all over the island, the greater number were heaped together in masses, giving one the idea that the severe frosts experienced early in July had killed numbers as they huddled together for warmth. As an alternative explanation, there is the possibility that the supply of food had given out, as the consumption of fish by anything from fifty to one hundred thousand birds for a period of about nine months would be a big drain on the resources of the lake.

These lakes have been draining back into the Darling ever since last December, and many fish are still passing into the river. At the outlet into the river a remarkable scene presents itself every day; numbers of Cormorants and Pelicans are congregated waiting for the fish that come down. The Cormorants dive and capture the fish, but have to come to the surface to turn and swallow the fish head first, and the Pelican, who cannot dive, awaits this moment, and makes a grab for the fish. It often gets it, and sometimes includes the Cormorant's head or beak, which is naturally resented, and leads to a struggle and squabble. These incidents are going on all day long. The banks are here also lined with Egrets, Blue Herons, Yellow- and Black-billed Spoonbills, whilst the trees shelter numbers of Night Herons, mostly in immature dress, waiting their turn when nightfall sends the others to roost.

The vast majority of the Pelican host have now scattered far and wide to seek other feeding grounds inland in waterholes, lakes and open swamps or all round the sea coast, in estuaries or sheltered bays or amongst the islands within the Barrier Reef, there to live and wait other opportunities to reproduce their kind.



The Kiwi at bay—Snapping the beak and ready to do damage with a Kangaroo-like kick.

The Kiwi when disturbed assumed a perfectly motionless position.

Notes on the Habits of the North Island Kiwi (*Apteryx mantelli*)

By H. R. HAEUSLER, R.A.O.C., Opouriao, Bay of Plenty,
New Zealand.

My more intimate knowledge of the strange ways of the Kiwi began at Kinpaka (North Auckland), when a neighbor's dog caught a young bird in the bush adjoining the settlement. It was unfortunately very badly hurt as a result of the dog's rough treatment, but as there seemed to be a possibility of saving its life, I decided to take it home and attend to its injuries.

Already at this, our first meeting, the little fellow showed an unusually savage disposition, for, although weak and evidently in great pain, it fought like a little demon, with legs and bill. I managed, however, to pick it up and carry it home, but all my attempts to administer first aid failed. My young patient proved to be so unmanageable, and so vigorously resisted all attempts to treat its injured parts, that I had to give up the idea of doing any amateur doctoring for the time. Hoping that it would become more tractable with better acquaintance and complete rest, and that freedom from worry would help it on the road to recovery, I placed the little Kiwi in a yard fenced in with wire netting, and with a good-sized box for a house. Here it made itself quite at home, but it, nevertheless, rejected all my offers of friendship, and showed its vicious temper at every opportunity.

In these decidedly unpleasant circumstances an event happened which promised to bring about a much more satisfactory state of things. Another Kiwi appeared on the scene. It was a very old and remarkably quiet bird a dog had caught in the locality, which had been the home of the young bird. There was every reason, therefore, to expect that the newcomer would receive a most cordial welcome, but to my great surprise and disappointment this was not the case.

No sooner did it notice the new arrival in the yard than the young bird made a furious rush at it and began to strike and pick at it in a most extraordinarily vicious manner, accompanying its blows with deep growls like those of an angry dog. The old bird, curiously enough, did not show the least sign of surprise or resentment. It took, in fact, absolutely no notice of its madly excited aggressor, although some of its kicks must have been sufficiently hard to cause considerable pain, as I could judge from personal experience in a tussle with my young captive. Instead of doing so, and of teaching the youngster better manners, it calmly began to explore its new quarters, walking round and round, and carefully examining the wire netting with its bill.

The two birds never became friends, the younger persisting in its hostile attitude, the other completely ignoring the other occupant of the yard. Only once did I notice the old bird knock the smaller one head over heels with a mighty kick.

It was curious to notice that although the old bird was so unsociable where one of its own species was concerned, it very soon made friends with me. It became, indeed, so tame that it let me stroke its head or neck and back, and lit it up and carry it about in my arms without showing the least sign of fear.

The question of food-supply presented far less difficulty than I had anticipated. Earth-worms were, of course, their favourite food, but raw meat and also cooked meat, and all sorts of scraps from the table formed a considerable part of their diet.

Owing to their unwillingness to leave their dark hiding place before dusk, it was at first very difficult to observe their food habits. After a while the younger bird, although as a rule so shy and wild, ventured out into the yard in broad daylight to look for something to eat. At last, also, its companion made its appearance, but always very reluctantly as long as the light was bright, whenever I whistled or rattled the wire-netting as a signal for feeding time.

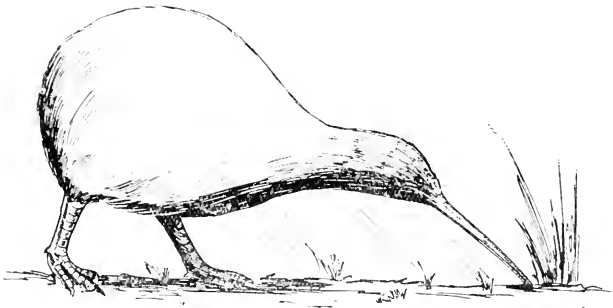
Their manner of feeding was very curious. The most noticeable feature was that they did not seem to make much use of their eyes when in search of food. They did not, indeed, notice the food when it was placed in the ground right in front of them, and even allowed the earthworms to crawl away without making any attempt to pick them up. Their sense of smell also seemed to play a very unimportant part, although the far-forward position of their nostrils and the manner in which the birds used their bills seemed to indicate that they were to a considerable extent guided by it. It could, however, often be noticed that the tips of their bills came almost within touching distance of some good-sized morsel without the birds becoming aware of it.

When hunting for their food both birds invariably began tapping the ground in all directions with the tip of their bills, as a blind man does with his walking stick to find his way. It seemed quite clear that in these operations the bill acted as a highly sensitive organ of touch, for as soon as the tip came in contact with something edible, the birds would invariably seize it. Considering the sensitiveness of their bills, it was certainly remarkable that other parts of their bodies were almost insensible to any kind of impressions. Earth-worms could often be seen crawling over or under their toes without attracting attention.

After a good deal of coaxing the old bird learned to take its food from a plate held in my hand. Even in this case, when it seemed impossible not to see what was offered, it did not pick up anything except what it found by tapping in the manner indicated. In time it could be taught to feed from the outstretched hand. Its first attempts were quite amusing. As usual it began by tapping. When by so doing it touched the skin of the hand, it immediately withdrew its head, uttering angry grunts of displeasure, and remained for some time perfectly motionless in that uncomfortable position. Quite suddenly it became, as it were, alive again, and with quite a "pleasant expression" resumed its

search by tapping. The young bird could never be tempted to take its food in this manner.

In searching for earth-worms they showed a considerable degree of ingenuity. The hunt opened with the usual tapping. When by this means the bird discovered the burrow of one of these worms it set to work at once enlarging the opening, using its bill as a workman uses his crowbar. When it had formed a funnel-like depression, it inserted its bill and took a good hold of the worm. With a steady pull it often succeeded in bringing its victim to the surface. When it was not able to do so, it ceased pulling, as continuing to do so would have resulted in tearing the worm and losing the greater part, and leaning well back remained in the same position, waiting, without the faintest movement of any part of its body, until the worm, tired out by its



A Kiwi taking a steady pull at a Worm

exertion, momentarily relaxed its hold. Then with another steady pull generally drew it out of its burrow. When this second attempt failed, it would repeat the same performance until the worm was finally dislodged.

It was only when searching for food under the thick clumps of grass or under heaps of dead leaves that the process of tapping was modified or altogether dispensed with. In this case the birds followed the more familiar habits of Ducks.

Kiwis are blessed with a remarkably healthy appetite. The quantity of food which they could dispose of at one meal was truly astonishing, yet after a short time they were ready for another feast. Once firmly held the food was conveyed to the alimentary apparatus by means of a succession of peculiar jerks, neck and bill being held almost horizontally during the process. Even very large pieces of meat were easily and quickly despatched in this manner.

As the old bird showed a great dislike for the wire netting, I

tried the experiment of tethering it with a fishing line outside the enclosure, giving it an old barrel for a house. The bird was evidently pleased with the change. It was in fact so quiet and contented that I soon let it go quite free in the vegetable garden. Here it spent most of its life sleeping under some shady bushes or amongst the French beans. Towards evening it left its hiding place, and could be seen strolling about as if lost in deep thought or looking for food in likely places.

When the birds were startled by a sudden noise or in any other way they instantly assumed a perfectly motionless position, becoming in fact as rigid as stuffed specimens, however awkward and difficult the position in which they were at the moment of surprise may have been. In this state, in which they remained for a surprisingly long time, they seemed to be quite dead to most impressions from outside. Neither loud whistling or shouting, nor pushing or poking had any effect upon them. Only when violently shaken or when lifted from the ground did they begin to show life again. After a short time they walked away looking for a dark corner, where, with their heads turned to the corner and their bills touching the ground, they remained standing perfectly still for a very long time. It is in this state that the birds show in the most striking manner their perfect adaptation to the nature of their immediate surroundings, for in size and shape of body, colour and texture of plumage, even colour, size and shape of legs they are so perfectly in harmony with the varied masses of living and dead vegetation, that even in daylight it is not easy to distinguish their outlines. Towards dusk they become altogether invisible.

The same remarks apply to some extent also to the position in which the birds go to rest. When they have selected a suitable dark and well-hidden place they settled down after the manner of a broody hen going back to her eggs. Having settled comfortably, they stretched out their necks, turned their heads round, and thrust their bills into their feathery coats at a place where in a former stage of their evolution their wings used to be. For some reason or other this is evidently a most important matter, for it was only after several attempts that they found a position which they considered satisfactory. Having decided on this point the birds went at once to sleep. They now appeared as fluffy, greyish balls, which were almost indistinguishable from parts of their surroundings. Amongst the moss covered stumps of trees, ferns, or boulders, clumps of native grass, etc., they would have been invisible even to a practised eye.

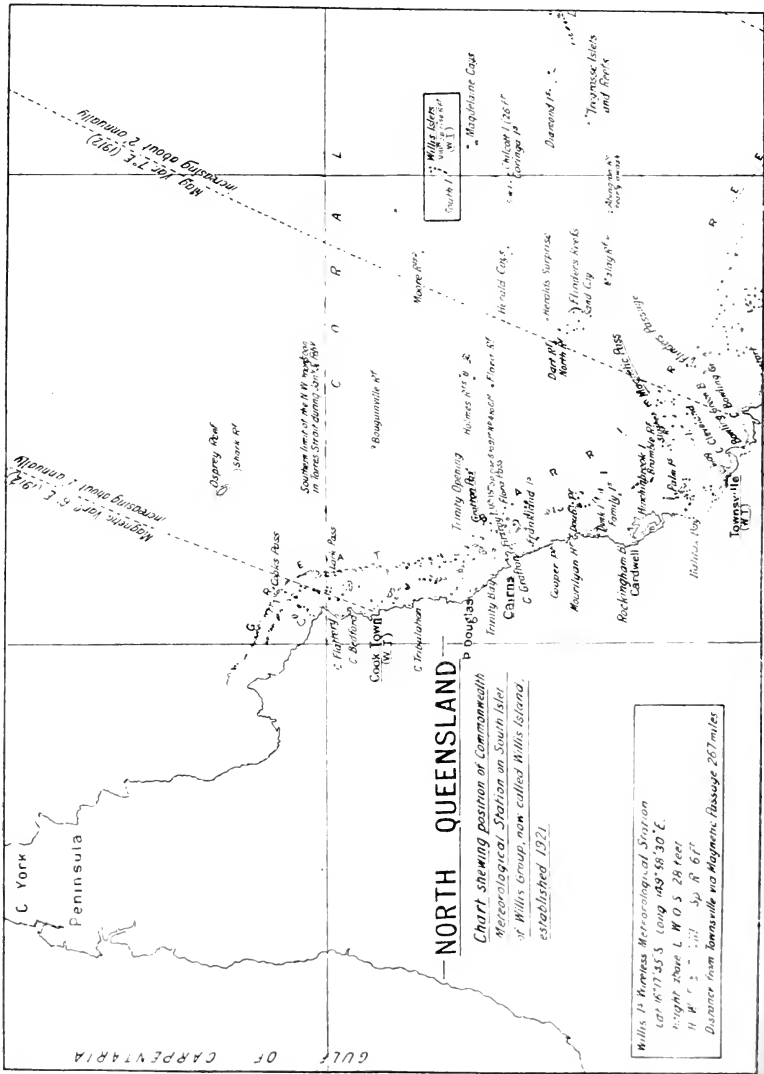
Kiwis are remarkably sound sleepers. No ordinary noise awakens them. When awakened, my birds would quietly march off and look for other sleeping quarters. Strange to say, they did not immediately settle down to sleep in the usual way, but took up a position similar to the one already described, standing quite

motionless, legs apart, head turned towards a dark corner and bills touching the ground.

There can be no doubt that some of the peculiar habits of Kiwis are means of protection from natural enemies.

New Zealand possessing no indigenous mammals or birds which could possibly do harm to birds the size of the Apteryx, these habits, as well as the protective colouring, must be looked upon as survivals from a long distant past, probably from the time when these islands formed a part of a vast continental mass of land. Nothing very definite is yet known on this subject, but some conclusions may perhaps be drawn from the unusual behaviour of the birds in presence of domesticated animals, the cat and the dog. Of my cat, the two birds which form the subject of this paper took no notice whatever. Of this fact the cat was soon so well aware that he often invited himself to dinner, taking for his share the best pieces of meat within easy reach of their bills, without being in the least interfered with. Neither did the birds take any notice of my dog, a full-grown Collie, while he on his part seemed greatly interested in their strange doings. When they were both in their yard he would often sit near the wire and watch them as they passed and repassed him in their usual tour round their yard. Although they often passed almost near enough to touch him, they did not show any sign of alarm. This utter absence of instinctive fear may be an indication that the natural enemies, which preyed upon the ancestors of the Kiwis, were not representatives of the order of carnivorous mammals.

An Ascent of the Blue Wren.—When near the River Mersey on the morning of 28th July, I noticed a male Wren (*Malurus cyaneus*) in full plumage sitting upon a gum stump. When I was within a few yards he suddenly rose vertically into the air to the height of 16 or 18 feet, singing the while, like a miniature Skylark. He then descended in a slanting line to a near-by fence, from which he rose in a minute or two to repeat the performance. This trait in our bird was new to me, although it is, of course, an almost everyday sight to see one singing on top of a spray of tea-tree or other scrub in early spring. Sometimes the female will suddenly mount to a similar point of vantage and sing a hurried strain. The morning when the ascent occurred was very fine, with brisk south-east breeze, and this no doubt contributed to the Wren's unusual winter display. The same day, about noon, near Latrobe I noticed another *Malurus* in brown and grey, but with a mottled appearance about the cheeks and mantle, as if the colour was just breaking through; this I took to be a young male just coming into his tints.—H. STUART DOVE, W. Devonport, Tasmania, 23/8/1922.



Bird Notes from Willis Island

By CAPTAIN J. K. DAVIS, Commonwealth Director of Navigation, Melbourne.

Communicated by A. H. Chisholm, State Secretary, Queensland.

Willis Island, in the Coral Sea, is 250 miles N., 81 deg. E. of Cairns. It is the southern of a group of three islets, being larger and higher than either Mid Islet or North Cay, which lie N.N.E. four and ten miles respectively. The group was surveyed in 1860 by H.M.S. *Herald*, Captain H. M. Denham, R.N., F.R.S., but very little information was obtainable, up to 1921, as to its climate or the nature of the reefs surrounding the central land mass. The necessity for a cyclone-warning station on an island in the Coral Sea had been urged for years by meteorologists and by the inhabitants of Queensland. Recently the Navigation Act, of 1920, requiring all ships over 1600 tons to be equipped with wireless, had come into operation. The question to be answered was, "Is it safe for a party to remain on the island during the hurricane season, considering its size and the height above the sea."

"The information required to answer such a question," writes Captain Davis, in a report recently presented to the Commonwealth Parliament, "could only be obtained by an observer remaining on the island during the season of bad weather. Considerable doubt had been expressed as to the island being *safe* during the season of bad weather. I had formed the opinion that such apprehension was not well founded; still, it did not appear right to recommend that others should go and reside there during the cyclone season until an attempt had been made to obtain definite information. As I was aware of the great value it would be to shipping, I strongly recommended the establishment of an experimental station for the season 1921-1922. I offered to undertake the work, and to remain on the island (for the first season) as meteorological observer. Approval was given for the establishment of a wireless station on Willis Island, and I was instructed to make all necessary arrangements to ensure that it should be in operation as soon as possible."

Captain Davis arrived in Brisbane, *en route* to Townsville and Willis Island, during October of 1921. While he was in Brisbane, the attention of Captain Davis was drawn to the ornithological possibilities of the lonely little outpost in the Coral Sea, and he was asked if he would make observations and collect specimens. While diffident about his ability to carry out this work, Captain Davis readily agreed to do what he could. He was then furnished with a text book and brief directions regarding skins and eggs. How well the Director of Navigation carried out the additional obligation which he took upon himself is to become apparent. It should be remarked that the devotion of Captain Davis to this work was no more than was expected of

a man holding his fine record of exploratory service with Shackleton in the great Antarctic. Moreover, he simply lived up to the traditions of his great calling—to the examples of sympathy with science and natural history displayed in Australian waters by such other notable naval officers as Captain Blackwood, of the *Fly*, Captain Wickham and Captain Stokes, of the *Beagle*, and Captain Owen Stanley, of the *Rattlesnake*.

On little Willis Island, a "speck" only 583 yards in length and 212 yards at its greatest width, Captain Davis and his assistants remained from 15th October, 1921, until 16th April, 1922. Returning to Brisbane, the Director left here a large box of bird-skins and many specimens of eggs, together with an informative diary compiled from day to day on the island. After examination, the specimens were sent on to Mr. A. J. Campbell, C.M.B.O.U., who was courteously granted permission by the authorities of the National Museum to compare them with the skins in the collections there.

The notes which follow are from Captain Davis's diary. Scientific names have been added according to the R.A.O.U. Check-list, second edition.

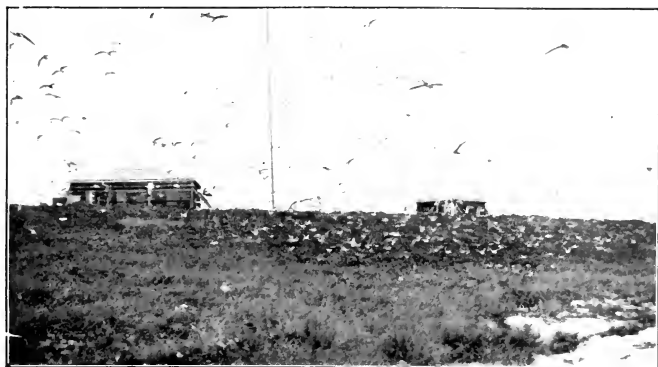
***Sula dactylatra*.** Masked Gannet (called by Davis "White Gannet").—Nesting-time, October and November. They nest on the beach, and lay one egg. Specimen No. 1 picked up on coral beach. Gannet sitting at time. No nest apparent. Taken from north side of island; fresh when blown. The birds number about 75. Forty were counted in a rookery on the eastern beach. The White Gannet is all white except wing and tail feathers, the beak yellowish stone colour, eyes yellow. The only difference observed between male and female is that the male has blue-grey feet, while the female has stone-yellow feet and also a brighter yellow beak. The Gannets do not leave the beach, but having selected a portion for a rookery, always return to it. The young are covered with down at birth, and have a grey or black beak. They gradually fledge, becoming covered with bluish grey feathers, which eventually turn white. The young are about four months getting this grey plumage, and by this time are able to fly, although they are still fed by the parent, and do not stray very far from the particular spot where they were born. The White Gannets appear to live chiefly on flying fish. One of them, while being pursued by a Frigate Bird, vomited up a flying fish, which I afterwards measured, and found to be 13 in. from head to tip of tail.

March 26th, 1922.—The young Gannets born in December are now fully fledged and just able to fly. They are still fed by the parent birds.

April 6th, 1922.—The White Gannets have been separating from the rookery in pairs during the last fortnight, and selecting positions on the beach. To-day I found a couple with an egg. There was no nest. The egg is just laid on the coral beach sand about high-water mark. This is the first Gannet's egg I have seen this year.

April 13th, 1922.—I observed a White Gannet sitting on two eggs to-day. This is the first time I have seen more than a single egg, which appears to be the usual number.

***Sula leucogaster*.** Brown Gannet.—Nesting time, October and November. Nest on the grassed portion of the island, and on its upper slopes. Nest consists of pieces of coral, and twigs laid loosely on the grass. Lays one or two eggs. Specimens obtained on March 26th,



Wallis Island Wireless Station.



Wallis Island anchorage and steamer.

1922. Number about 50. They have no settled rookery like the White Gannet. The Brown Gannet is of a rich brown plumage, with a stone-coloured beak; breast and abdomen are white; feet whitish yellow, same colour as beak. On the beach they are to be seen sometimes in company with the other birds at the north-west end of the island, at sunset, or on top of the island with their chicks. The young when born are covered with white down, which gradually gives place to feathers. When about four months old they are covered with brown plumage, except the breast and abdomen, which are of a rusty white colour, a yellowish grey bill and yellow feet. They are able to fly at this stage, but do not leave the spot where they were born, being fed by the parent birds on an average twice a day. At this stage they evidently possess a healthy appetite, and thrust nearly the entire head down the parent birds' throat in an endeavour to satisfy it. They live on fish caught at sea in the same way as the White Gannet. The beak of the male is of a darker colour than that of the female, which is light stone colour, the male slate. They are not as numerous or as tame as the White Gannet, being difficult to approach closely.

March 26th, 1922.—A chick born in December is now fully fledged and able to fly, although still fed by parent bird. The colour of the breast is a dirty brown, instead of white as in the adult bird.

April 4th, 1922.—Brown Gannets are arriving at the island in numbers, and nesting on the lower slopes of the island. They lay one or two eggs. Several nests contain two.

Sula sula. Red-legged Gannet.—One of these birds was seen on December 17th, and since then they have at intervals been seen. There are generally a couple of them to be seen after north-west winds.

Puffinus pacificus. Wedge-tailed Petrel.—There is a considerable number of "Mutton Birds" on the island, and they have riddled it with burrows. The birds are more like moles than birds. The nest or burrow is easily found, as there is always a small heap of sand on the grass at the entrance, which has been excavated by the bird. The young are covered with a grey fluff, and are only seen when dead. Several were noticed half eaten by the hermit crabs, which are often seen in the Mutton Bird's burrows. I have never seen a young Mutton Bird about in the daytime, although the old birds are often in the burrow all day. These birds are either very tame or very stupid, as it is difficult to avoid walking on them at night-time. An egg was taken from a burrow that had fallen in, the bird flying away at the time. Apparently only one egg is laid. Egg moderately fresh. Taken at north-west end of island. There are probably 100 to 150 of these birds.

March 23rd, 1922.—These birds leave the island during March. There are only a few to be seen at night time now.

March 25th, 1922.—Observed a young Mutton Bird, half fledged, in one of the burrows at the south-east end of island. They are covered with black fluff, and the beak is black.

Sterna fuscata. Sooty Tern.—Probably the most numerous variety on the island. They alight on any sandy patch within the grassed area, but do not frequent the beach. They apparently lay in September, as on our arrival here the young were partially fledged (October 15th), and they leave the island, or at least the rookery where they are born, about December 15th. On our arrival the young were just beginning to fly, and appeared very helpless. The old and young birds keep up an incessant screaming noise at night time, which can be heard from the anchorage half a mile off. There is a heavy mortality among the young birds, but from what cause could not be determined by us. Eggs were not obtained during 1921. As soon as the young birds were able to fly, about December 15th, the

sand patches on the higher parts of the island were suddenly deserted, and the Terns apparently migrated. On February 8th they were back again at night time, flying over the island and making the shrill, screaming noise which distinguishes them. Shortly after, one of these birds broke a wing flying at night time against the living quarters. Since the nesting season none of these birds has been observed on the island, although they have been seen flying over it. Number impossible to estimate. There are more of them than any other kind.

March 12th.—The Terns when they do come to rest at about midnight settle down on the beach. I observed a great number of them asleep there on a moonlight night, although at the same time a number were still screaming overhead.

March 25th, 1922.—These birds are to be seen in greater numbers in the daytime. To-day, for the first time, they are perched on the beach in a big flock.

April 4th, 1922.—Terns observed on top of island for the first time. They are apparently going to nest immediately.

April 8th, 1922.—First egg obtained to-day.

April 13th, 1922.—The Sooty Terns are now nesting all over the island; they keep an incessant chatter, and settle down in flocks of a hundred or so, fighting and screaming like a mob of angry bees. Several eggs, I notice, have been broken, and the contents gone; this is probably the work of the Rails, which are seen darting about in the long grass close to the Terns' nesting places.

Anous stolidus. Noddy Tern.—Resembles a pigeon. All brown plumage with black on wing and tail coverts and a little white on forehead. Has black legs, feet and beak. These birds are similar in size and appearance to the Mutton Bird, but closer observation reveals many differences. They are more graceful, and I consider them the prettiest birds on the island. They assemble in large flocks on the edge of the beach, just above the level of the sea, and apparently live on small food they obtain on the shore. They are always seen together in flocks, and form a black mark on the coral beach like a thunder cloud. They nest on the grass some distance from the beach, but on the lower ground. Their nests are built of a few bits of coral and seaweed grass, merely a litter laid on the grass. Specimen egg No. 2 was taken from the nest, the bird sitting only one egg. Egg fresh when taken, November 25th, 1921, north side. On December 10, 1921, a chick of this bird was observed, which had apparently just been born, covered with feathers rather than down. On January 31st, 1922, the young bird was fully fledged and just able to fly, although at the same time there are other birds still sitting on eggs.

February 19th.—The bushes on the island have grown to a height of 2 ft. 6 in. These birds during the day time frequently perch on the branches of the bushes in preference to congregating on the beach at the water's edge.

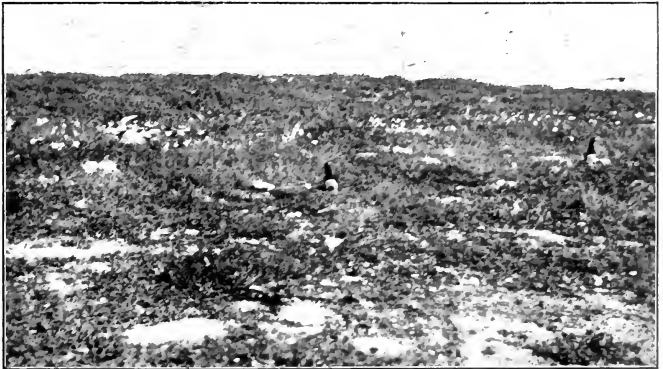
March 7th.—There appear to be more of these birds about lately. In the morning many of them are to be seen perched, sometimes singly, other times in groups on the bushes. I have also observed them flying with loose pieces of grass in their beaks, but what object this serves I do not know. Possibly it is the mating season at present.

March 12th.—Number varies. At present there are at least 150 of these birds on the island.

March 17th, 1922.—The birds are now nesting, the nest being built on top of the dwarf bushes about 2½ in. high, which are scattered all over the higher parts of the island. The nest is of grass and pieces of dry coral (*Montipora*). I obtained an egg from one of these nests to-day quite fresh. There are more of these birds on the island at



Beach scene, Wallis Island.



Wallis Island Sea-birds nesting.

present than have been seen previously. The previous egg specimen was taken on November 25th, 1921. Only a very few of these birds were nesting at that time, possibly a dozen; now there are considerably over 100.

March 26th, 1922.—Further observation makes it necessary to modify above. Some of the nests are built on the tops of bushes, but the majority are on top of the grass on the lower ground at the two ends of the island. During the last week I had an opportunity of observing these birds closely. They are a light fawn coloured brown, with white markings on the upper part of head and neck, which blend into the brown—no sharp line. The bird has a white eyelid (lower) and a small white round mark on the upper lid. The tail feathers are a very dark brown or black. The only difference I notice between sexes is that the male bird has a bigger head than the female and apparently does not work. The female works very hard transporting material for the nest, which I have observed to consist of bits of grass, wood, shell, coral and brown paper. It is remarkable how much material may be transported from the beach to other parts of the island in this way. The male bird sits on the bushes during the morning, but apparently goes fishing in the afternoon. He is not seen then, although the nest-builders are still at work. I noted that the birds readily steal material from an unwatched nest, and was much impressed by the soldier-like attitude of a female, which, having completed a fine nest on the bushes, mounted guard close to it and made a terrific din when any other bird came near it.

March 27th, 1922.—A small egg was taken from a Noddy Tern's nest at the N.W. end of the island. There was nothing in the appearance of the nest or bird to attract notice or to account for the curious, apparently malformed egg. When blown, the egg had not a yolk. These birds are all laying at present, eggs being visible all over the island. 30/3/22.—An ordinary egg is now seen in this nest.

March 29th, 1922.—There is a wonderful variety of nest common with this bird; some are most elaborately built with great care on top of a bush, others are just a few straws laid on the grass; others again noted for the first time yesterday on the coral beach, the bird just sitting on the egg surrounded with coral rubble.

Fregata ariel. Lesser Frigate-Bird.—The Frigate-Birds do not apparently nest on this island, but are generally to be seen about in pairs, flying at a considerable height, watching the White Gannets upon which they prey, swooping down on them and pecking at them until the Gannets disgorge the contents of their stomachs. The Frigate-Bird often catches the fish vomited up before it reaches the sea or ground, as the case may be. They are very swift on the wing. Waiting until a Gannet is observed returning home, they swoop down on this unlucky bird with incredible swiftness. They only attack birds on the wing, and apparently the only chance of escape the Gannets have is to land, which for some reason they seem very reluctant to do anywhere but at the rookery, although they are often chased down into the sea. In this case the Frigate hovers around until the Gannet rises. Very few escape surrendering their fish, and several have been observed with nasty wounds, apparently caused by the beak of the Frigate-Bird.

The Frigate-Birds never land on the ground, but perch on poles, wireless masts, or wind vanes. They do not apparently catch fish for themselves, but live entirely by preying on the Gannets. There are as many as 15 of them to be seen at times, but usually about four.

Hypotaenidia philippensis. Buff-banded Land-Rail.—A few Rails are to be seen on the island. They are apparently unable to fly, but dart about in the long grass, and have been observed coming out of the Mutton Birds' burrows. The Rails apparently nest in holes in the sand, but a nest has not been seen. Two young Rails were born in December; the nest being situated under a water tank, was ungettable. These birds have become much tamer during our residence amongst them, and frequently come into the hut and pick crumbs from the floor. Number about twelve.

March 20th:—One of the small Rails found drowned in water cask, which is kept outside as a precaution in case of fire.

March 22nd.—Another Rail found drowned in water cask. We have been without rain for six days. Skin preserved as far as possible for specimen.

"STRANGERS" AT THE ISLAND.

In addition to what Captain Davis has had to say in the foregoing notes, he made less detailed observations upon various other birds which he describes as strangers that visited the island during his stay. Where these have been identified the names are given in brackets. The notes are as follow:—

No. 1.—Several birds resembling Gulls observed during February, flying in flocks of a dozen or so, and keeping up a shrill, screaming noise. They have grey wings, yellowish beaks, and white necks, above which is a curious black or topknot. April 4.—Six seen to-day. They lay the egg on a bare sand patch on top of the island. There is no nest other than a scooped-out hollow. (Crested Tern, *Sterna bergi*).

No. 2.—Small bird found dead on beach on February 8th. (Roseate Tern, *Sterna dougalli*, immature bird.)

No. 3.—Body of bird with a long bill, like a Snipe, found dead on beach, December 2nd. It had been dead for some time. (Bar-tailed Godwit, *Limosa lapponica*).

No. 4.—Body of strange bird, with yellow legs, found on beach. This bird had been seen flying about the island since early in January, after the north-east winds began. (Oriental Cuckoo, *Cuculus optatus*).

No. 5.—Two very small birds, with greenish-sheeny wings, reddish under throat, and light greyish breast and body. April 11th. Silvereye (*Zosterops*).

No. 6.—Brown and grey bird, with long legs, something like picture of Banded Stilt, observed standing on old tree on beach. It flew off when I approached. March 27th. (Query.)

No. 7.—Several small birds flying about beach; very difficult to get near. The lower half of the body is white, and the wings and tail black, with white markings like a bar across wings and down back. Legs in one case seen closely, about the size of those of a Sparrow, were red. March 4th. (Query.)

No. 8.—A new kind of Gannet, resembling a Red-legged Gannet but with brown plumage, blackish beak, whitish brown head, chest and abdomen; wings and tail feathers light brown, and feet a brown stone colour. This bird is alone, and evidently is accustomed to perch on trees; it perches on the stays, etc., like the Red Gannets, not frequenting the beach. February. (Query.)

No. 9.—Small bird, with large bill; white under neck and about throat; otherwise black and about same size as a Rail. Bright yellow mark on top of head. There are two of them at present (February 28) on the Island. March 20: Four of these birds seen. (Sacred Kingfisher, *Halcyon sanctus*).

No. 10.—About twenty small birds, resembling the description of Wood-Sandpipers, live on the island. The species has black bill, yellowish-brown on face, mottled wings (black, brown and gold), brownish-yellow breast, and black legs. These birds fly about the beach, and apparently live on small shrimps. They were very shy, but latterly have become quite tame. They now hop into the house, and pick up crumbs. (Query.)

Type Descriptions and the International Code

By A. J. and A. G. CAMPBELL, Melbourne.

(Read at the Annual Session, R.A.O.U., Adelaide, 17th October, 1922.)

Ornithology like many other sciences is undergoing evolution. As the years roll by it gains in material and in outlook from observations and researches of men in one field or another, so that as a science it should grow into a more complete and orderly whole. Not the smallest preliminary feature is correct nomenclature, without which everything would be chaotic.

The Strickland Rules of Nomenclature have been the authority in Britain for many years. H. E. Strickland first published his Rules in 1842, a second edition appearing in 1863. These were so practical and workable that the British Association for the Advancement of Science in 1878 instructed a committee to republish the Strickland Rules at the Association's expense.

The International Code of Zoological Nomenclature, after years of preparation by a European committee of prominent men, was finally adopted at Berne in 1904, and is now commonly accepted as the law upon the subject of nomenclature. The Code consists of thirty-six articles intelligently framed, and intended to be complementary one to the other, besides which, for guidance in the interpretation of certain of these articles, many rules and recommendations have been given for its practical application. A standard copy of the Code, English translation, with its original in French and German, should be in the R.A.O.U. Library. It is the Pentateuch of ornithological science and together with it should be filed copies of any pertinent writings or observations thereon that appear from time to time in various parts of the world.

The main object of the Code may be stated in the words of the introduction which were the words of Strickland: "We hope they (the rules) may lead to uniformity of method in future

to rescue science from becoming a mere chaos of words." Undoubtedly the Code is intended to be:—

- (a) A consolidation of the various methods of nomenclature hitherto in use.
- (b) The "rule of conduct" for the future.

In connection with the former the Code is credited with many decisions which are neither logical nor justifiable. Several of the articles (21-25-26-27) pointedly refer to the past, at the same time presume to offer a rule for judgment of the work of earlier authors.

This is a weak point, since *no enactment of any body should be made retrospective*. The committee had, of course, no legislative powers, but assuming that it fully represented the scientific world at the time, then its deliberations in regard to past work can be taken only as strong recommendations to future workers. As such the Code can be accepted with confidence, for it sets a very high standard, which, if followed, will lead to stability in the much vexed question of nomenclature.

As a "rule of conduct" from that date onward the Code exercises an important influence. It may or may not be possible to rescue nomenclature from chaos, but it certainly is possible to prevent subsequent additions to that chaos. The chaos which sometimes exists in the work of early authors, due no doubt, largely to the inefficiencies of the times, might conceivably be straightened out by applying different methods from those set forth in the Code. It might be *necessary to judge each case on its merits only*.

The faults of the Code, if faults they can properly be called, are errors of omission largely. No arrangement now exists to carry on the work of the committee in conformity with its own appointed plan. The need is for adjustment and provision of interpretation clauses to keep pace with the general advancement of science, besides the all-important comment and recommendation upon the validity of earlier names.

One of the oversights is the all-important question of Type. If the Law of Priority (art. 25) is the "keystone of nomenclature," surely the type on which the name itself rests has an important place in the arch and pillar of the structure. What is type? Article 4 states: "The name of a family is formed by adding an affix to the name of its type genus."

Article 30 opens with the words: "If the original type of a genus."

Article 29, second paragraph: "If a type were originally established for the said genus." These certainly infer, if they do not affirm, something definite. But the Code does not define What is type genus? or, What is original type?

Perhaps we can gather what was in the mind of the committee framing the Code by perusing some of the articles.

Art. 25. "The valid name of a genus or species can be only that name under which it was first designated on the condition:—

- (a) That this name was published and accompanied by an indication, or a definition, or a description;
- (b) That the author has applied the principles of binary nomenclature."

Art. 21 "The author of a scientific name is that person who first publishes the name in connection with an indication, a definition, or a description . . ."

As a sidelight there are four recommendations published under Article 30—in reference to selecting a type.

These excerpts make it reasonably clear that the Code assumes or intends an original type specimen should be associated with every scientific genus and species (including sub-species), and that the type shall be that specimen (or part of a specimen) first described by the author of its valid name.

We can proceed to the type descriptions and the types themselves, on which obviously the whole structure of nomenclature exists.

Some of the earliest naturalists were navigators or explorers, possibly more intent on discovery of new lands and peoples than they were upon natural history collections, certainly often taken up with attention to food and water and their own daily cares. Their descriptions of bird life were often casual and not at all descriptive unless the author launched into an appreciative sentence of some striking colour or habit. Such descriptions* were not always taken from a particular individual specimen, in fact, there is no evidence that the author ever did more than see the bird in the bush. This is no type description in the modern sense, but nevertheless such description is accepted by the Code on the basis of being an "indication" of type ("indication," according to the dictionary, being "an act of pointing out").

Then came another chapter in Australian ornithology, when men like Quoy and Gaimard, Vigors and Horsfield (1830), left their mark in bequeathing to us descriptions of sterling scientific worth. They did science and themselves the honour of describ-

*Narrative Voy. Capt. Cook, Ellis, 1782, p. 22. "The birds are various though not numerous and some of them very beautiful, particularly a species of parraquet and a small bird of the *motacilla* genus with a bright blue head which we on that account called *motacilla cyanea*." (Adventure Bay, Van Diemen's Land.) This is the familiar "Blue Wren." Journ. Voy. N.S.W., White 1790, p. 257 (Type description of *Acanthiza pusilla*) *Motacilla fusca subtus pallida, cauda prope apicem fascia fusca* (Brown Warbler underneath pale, tail near tip with brown band).

ing their specimens well with colour drawings and types for use of students for all time. True, they made mistakes, but no one can say their type descriptions were not reasonably descriptive, and the species recognisable therefrom.

The pinnacle of perfection was almost reached by John Gould, who, in "Birds of Australia," 1840, set a fine standard of excellence in hand-coloured, often life-size, drawings, and complete descriptions of specimens.

None of these authorities, however, attaches to the type description a number or other sign to identify it with an individual bird-skin, the specimen which should be known to science as the type specimen. Most, but not all, of Gould's types of Australian birds are in U.S.A.

Indication, definition, description: good, better, best are stages of comparative worth. Evidently an "*indication*" was accepted in the Code to include the ancient authors back to Linné (1758), the accepted starting point of scientific nomenclature.

A *definition*, according to the dictionary—"a description of a thing by its characters"—is a better standard which can and should come well within the requirements of the case of being reasonable and recognisable.

A *description* as used in the Code, is something better still. Probably *diagnosis* is the proper word in translation of the original. The word *diagnosis* is used twice in the Code (English version), and then only in some recommendations coming under Art. 28, but in each case it is used as an interchangeable term with *description*, indicating that a *description* is intended to be something more than a *definition*.

Gould's work was of that complete nature representing the full meaning of the word *diagnosis*:—

A complete description or specification to a standard accompanied by measurements and drawing of the type specimen, all of which must be identified together in unmistakable manner.

There is further light thrown upon the matter by some of the recommendations in the Code under Article 28, where the rule is formulated to deal with the union of genera (or species and sub-species), then

(a) "A generic name accompanied by specification of a type has precedence of a name without such specification. If all or none of the genera have types specified, that generic name takes precedence, the *diagnosis** of which is most pertinent."

(b) "A specific name accompanied by both description and figure stands in preference to one accompanied only by a *diagnosis* or only by a figure."

**Diagnosis* according to Murray is a distinctive characterisation in precise terms.

It should be clear from this that in such circumstances a "diagnosis" takes precedence over a "definition," and both take precedence over an "indication" †with no reference to priority.

If this precedent were in the minds of the framers of the Code applied under Art. 28, why could it not be applied with equal justice under Art. 21? Such a rule would not rob old authorities of any name, and it would obviously force some present-day systematists to bring their work up to, at least, the standard of a "definition."

That there is need for an accurate standard for students is a point that should not require proving. The very object of nomenclature as an introduction to ornithology would be defeated were no standards set to provide reasonable grounds to recognise species and sub-species.

So recently as 1912 in *Noxitates Zoologicae*, vol. xviii, p 350, the following purport to be type descriptions of sub-species of certain Australian birds:—

"*Acanthiza uropygialis ruthergheni* subsp. n. differs from *A. u. uropygialis* in its paler rump and basal half of tail, and darker on the flanks and breast. Type: Victoria (Rutherghlen)."

"*Acanthiza uropygialis mellori* subsp. n. differs from *A. u. ruthergheni* in its greyer upper coloration, only the head and lower back being greenish. Type: Eyre's Pen., South Australia."

"*Acanthiza uropygialis augusta* subsp. n. differs from *A. u. mellori* in having a lighter back and under tail-coverts. Type: Port Augusta."

"*Acanthiza uropygialis nea* subsp. n. differs from *A. u. mellori* in lacking the green on the head and lower back. Type: West Australia (Burracoppin)."

Numerous other similar instances can be quoted.*

In such so-called type descriptions it appears as if the author has been operating to the lowest standard, an "indication"—if standard it can be called. Not only are such indications confusing, not to say misleading, but they lack the reasonable completeness and the thoroughness of a scientific type description. To be practical, if a ruling were obtained that the Code never intended "an indication" to apply to modern nomenclature, it would possibly prevent further unscientific work, and be of greatest assistance to students.

†For further remarks on "indication" see "Science," 5th July, 1907.

*Take, for example, *Geobasileus hedleyi* Mathews, Austral Avian Record, I., p. 78, the type description of which reads:—"Differs from *Acanthiza iredalei morgani* in having a much lighter rump and darker upper surface."

Lastly the value of type specimens cannot be over-estimated, and they should be deposited in national collections.†

"That the R.A.O.U., recognising the value of the International Code of Zoological Nomenclature, Berne, 1904, is of opinion that:

- (a) For new Type Descriptions (see Article 21), the use of a mere "indication" is not the intention of the Code.
- (b) Nothing but a good description of any new genus, species, or sub-species of Australian birds will be acceptable to Australian students.
- (c) That for such Type Descriptions a standard be set to a specified schedule based on descriptions, such as are used in British Museum Catalogues of Birds."

Acanthizae or Thornbills

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(Read before R.A.O.U. Annual Congress, Adelaide,
18th October, 1922.)

In tropical regions of Australia with over 40 inches rainfall per annum *Acanthizae* are not generally found, their place being taken by *Gerygone*, which are closely allied in structure and habit. From 40 to 30 inches mark the most favoured portions of the Continent, many of the highlands and most of the heavily timbered coastal areas of the east being in that position. From 30 to 20 inches represent approximately the temperate portions and more open forest regions of the south-east and south-west as well as the elevated pastoral regions of the east beyond the coastal fringe. While from 20 to 10 inches include the lightly timbered lowlands, most of them extremely flat, and all the wheat belts, subject to periodic drought.

Below 10 inches per annum, rainfall is erratic, and conditions are undoubtedly eremian or desert. The stronghold of *Acanthizae* is in the normal region of 30 to 20 inches, with strong tendency toward the regions of lower rainfall.

This distribution in the main also represents the true range of the *Eucalyptus* forest from heavy to light timber and dwarf varieties.

The close affinity between the fauna and flora of south-eastern and south western Australia leads to the belief that they were once connected by a direct land belt of somewhat similar conditions; that is, the continent once extended a considerable distance

†See Chapman, "What are Type Specimens," *Vic. Nat.*, vol. xxix, p. 59.

south of Cape Leeuwin and that portion was joined to the eastern extremity of Australia, which then included Tasmania as part of the mainland.

In the study of geology the vast changes that may occur are an impressive lesson, and time only was required for the Great Australian Bight to appear and work its way, assisted, no doubt, by various earth movements, across the timbered belt of good conditions.

In the south-west there was no indigenous Kookaburra or Lyrebird, to name two well-known species. They must have arrived in the south-east after the appearance of the barrier. On the other hand there are certain passerine birds which show an intimate connection, east with west, namely, *Pachycephala* and *Atrichornis*, and in particular *Acanthizæ*. It is reasonable to assume that these were well established in east and west before the break occurred. *Pachycephala* shows little or no alteration western to eastern form. *Atrichornis*, from its strictly limited habits, shows a very marked difference both in size and coloration, while the *Acanthizæ* are at a very interesting stage of evolution; eastern and western forms have become sufficiently differentiated to warrant specific rank, while new races or subspecies are developing in conditions that are considerably drier than those in which the original stock lived.

Another geological fact we must notice at the outset. In Tertiary times a great portion of southern Australia was submerged, namely, a great basin extending from about Portland in Victoria, eastward to near Corowa on the Murray, round in a great semi-circle to Broken Hill and down near Adelaide. Another great area extended from Spencer Gulf well inland around the head of the Australian Bight and back to the coast near Esperance Bay.

This subsidence must have had a most marked effect on the distribution of bird-life generally, and it will be noticed as we proceed with examination of the *Acanthizæ* that it is an important factor in the distribution of that genus. All the eastern and southern highlands, the Mt. Lofty Ranges, the country north from Tarcoola to McDonnell Ranges, and most of West Australia, stood out around those Tertiary seas and probably the forests of those parts and their bird inhabitants were not very different from each other. They were the immediate ancestors of all our present species, and perhaps more which have passed out of existence.

When the Tertiary seas retreated and left exposed those boundless plains, what a wealth of new country awaited population! On account of a low rainfall the central area at the head of the Bight is now a "desert," and a very substantial barrier to further east-west movement of bird-life. That part between the coast-line and Musgrave Ranges is the most desert-like tract inhabited by *Acanthizæ*.

Geological change has been more violently retrograde in this portion of Australia than in any other part. This is the cause, which, in effect, produced the pallid and desert forms of the genus. Possibly the region became dry gradually, and birds steadily adapted themselves to the harder conditions.

The other Tertiary area, embracing, as it does, the whole of the Murray basin, consisting of more than two-thirds of New South Wales and about half of Victoria, though extremely flat, is a land of plenty, well covered with light to medium forests, well watered, and in the southern half, with a good rainfall—real "Australia Felix" harbouring a great variety of birds of all classes. The hypothesis is that on the higher lands in Eastern, South, and Western Australia the direct descendants of the original stock of *Acanthisac* will be found, while on the flat intervening country the sub-species, or later varieties, occur.

WHAT IS A SPECIES ?

This is the next question.* If intergradations can be found between west and east forms, these intergradations occurring in intervening localities, then it is obvious that the species is one and the same throughout. If intergradations are found in one and the same locality, this fact should be still more obvious. But if complete intergradations cannot be found (or have not yet been found), or, if two species, even though grading toward one another, are yet separated by a reasonable gap, we must conclude they are worthy of separate specific rank.

A species in scientific classification is a group of individuals of similar nature and constitution. A species may vary within reasonable limits. Reasonable limits being—

(a) One species must not intergrade with another species, connecting links may have existed in the past, but have all died out.

(b) The gap between two closely allied species must be consistent and wide enough to be easily recognisable.

Two or more species of a genus may occur in any one locality.

A species may collectively be formed by two or more sub-species.

A sub-species is a local race which, owing to change in environment or geographical location, differs consistently from the race first discovered.

Sub-species may grade into one another.

Sub-species should exhibit some recognisable and consistent characters in the normal average, though a much narrower margin of demarcation be allowed than with species.

*See The Auk, vol. xxxix., p. 147.

Only one sub-species of a species can normally occur in any one locality.

Sub-specific characters are more variable than specific characters, owing to the fact that the inter-variations are now in progress between sub-species which have passed out of existence between species. For the same reason, specific characters are more variable than generic, intergradation of the latter being lost in antiquity.

VARIATION.

It is remarked by even a casual observer that birds of one species may vary in tone of colour according to their surroundings. There is the influence of heat and cold, light and shade, humidity and dryness, the matter of food supply being correlated. It is plain that under such external stimuli the living bird reacts or adjusts itself to the requirements of the case. This gives rise to variation, and under the influence of its environment a bird may become brighter or duller, lighter or darker, larger or smaller than the type.*

A.—INDIVIDUAL VARIATION.

It is a fundamental fact that no two individuals of any one species from one locality are identically alike. Little individual variations occur within certain limits, however small they be, that make it necessary for the observer to have several specimens before him in order to obtain the average or typical characteristics.

This, the first step in variation, does not necessarily constitute a specific difference because it may not be sufficiently fixed to stand the experience of a movement in the reverse direction, when it finds itself in alternating conditions of drought and plenty—essentially phases of the Australian climate in the interior.

B.—REGIONAL VARIATION.

This is a further stage, with an important bearing upon the question of sub-species. Where variation has been in progress for a long period of time in two localities that have some marked difference in geographical environment, then the two branches of original stock each take on some character or characters that apparently apply, or belong to that particular region. And, if two such regions become separated from one another by some natural feature, such as sea or desert, preventing an interchange of stock, then regional variation may exhibit marked and permanent differences worthy of being classed as sub-specific. Many

*Type is the first specimen of that species to be described and named. A typical specimen is different, being one of average appearance.

instances will be quoted in their proper place throughout these notes. What that difference is which will be considered worthy of separating sub-species is a point to decide. If ornithologists cannot agree upon common rules of working and accept them as foundation principles, then the whole study must remain in a state of chaos, each worker a law unto himself. These suggestions arise from a desire to start from something known, and therefore definite, which should be the basis of ornithology at all events.

C.—SPECIFIC VARIATION.

Specific variation is the next stage in adaptation to environment, when sub-specific differences have become so far established, probably in opposite directions from a common starting point, that complete intergradation cannot be found. A gap exists where some have died out and two more or less closely allied species are the result. A clinching argument in favour of fixation of a species is when two allied species are found in the same locality due probably to some subsequent movement of one species overlapping the range of its ally.

What constitutes a specific difference* in *Acanthiza* is another point to decide. Will a difference of tone in the same colour or system of colours be acceptable? I think colour tone is a good and serviceable means of fixing a standard, that is, if it can be agreed what variation of tone† constitutes a difference.

I am prepared to suggest that a difference of at least three tones (Ridgway) be accepted as a standard of variation in *Acanthiza* sufficient to warrant specific rank when a change of tone is noted in any particular part of the plumage, provided this variation is supported by at least one other noticeably different feature in the bird's plumage, or in its life-history, and provided always that no intergradation is found in the parts selected.

Acanthiza are notoriously "small fry," and for that reason are both difficult to handle and liable to escape observation; nevertheless they have their colour schemes, in a small way, just as important as colour arrangement in larger birds. Our observations and systematic research so far are confined to outward and visible characters chiefly of plumage, and do not extend to anatomy, where obviously there is a wide field for research.

*Example.—*Acanthiza inornata* can be looked upon as the western form of *A. nana* from which all traces of citrine on the upper surface and of yellow on the under surface have disappeared. Both are now distinct species. The same applies as between *Geobasiliscus tenuirostris* and *G. reguloides*, the former having almost lost the buff base to the tail, which is well developed in the latter.

†See "Color Standards and Nomenclature," Ridgway.

D.—SPORT OR CASUAL VARIATION.

Independent of A, B, and C, which are ordinary common types of variation, there is this sportive variation not arising from any obvious natural reason, and often right across the track of ordinary variation. I refer to such variation as a red rose appearing casually upon a white-flowered bush; many similar cases in the animal world can be called to mind. Whether this is a throwing back, or variation due to the appearance of characters belonging to some distant progenitor, or whether it is entirely casual and without reason, is a question with which we are not now concerned. But it is affirmed that this kind of variation is not sufficiently taken into account when dealing with the distribution of birds. I believe that *Acanthiza ewingi*, for instance, of Tasmania, is a sport, and proof will be offered in the notes dealing with that species.

* * * *

To further illustrate: *Geobasileus chrysorrhous* has yellow upper tail-coverts. *G. uropygialis* has coverts and base of tail tawny. *G. reguloides* exhibits a colour (buff) which may be said to lie between these two extremes.

Can we honestly consider this a link, or intergradation, and say that all three must be lumped into one species? The idea is absurd. Though they may not show much difference otherwise, yet the contrast in colour between yellow, buff and tawny is obviously distinct and specific.

Again, *Geobasileus squamatus*, from North Queensland, has upper tail-coverts yellow, like *G. chrysorrhous*, and base of tail buff like *G. reguloides*. Is this an intergradation? We are narrowing down to finer points, but when we see that *squamatus* has under surface citron yellow, which neither of the others has, its specific difference is maintained.

Take another example, *A. pusilla* and *A. pyrrhopygia* (Gould). The former may be termed the coastal species of browner mantle and duller rump, the latter the interior species of greyer mantle and brighter rump. Is *A. apicalis* of W.A. a link between the two, with its brown mantle and bright rump? To casual observers all three may seem alike, but close examination is required to bring out the facts. Since Gould's day much material has been procured across the whole width of Australia. Many interior, far interior and desert races have been brought to light. I confidently assert that these three species stand distinct and separate, as do the *Geobasileus* already referred to, but proof is too lengthy to be offered here.

What constitutes reasonable sub-specific difference may be illustrated with *Geobasileus chrysorrhous*, a very common bird, whose range extends over nearly the whole continent. Taking the colour of the under tail-coverts as a guide, we find yellow, buff, or white. This is a small feature, but not unimportant. Yellow under-coverts are found in birds of the northern half of

New South Wales and in Queensland, go directly west through Central Australia, and are found near the coast in W.A., 150 miles north of Perth. Buff under-coverts are found largely in southern New South Wales, Victoria, and Tasmania. White under-coverts appear in South Australia, and are found exclusively in south-western Australia. These points, together with two essential differences in the markings of the crown, give the key to at least six races. Intergradations, however, existing between them, they rank as sub-species, not species.

Only a tyro in ornithology would think there are no races or sub-species among *Acanthiza*. The study of sub-species, the defining of their main characters and their geographical limitations is just as important as the study of species. This branch of ornithology has not yet been seriously attempted. The material in existing collections, both public and private, requires tabulating and co-ordinating, and it is scientific research of this kind that now awaits students.

Of these small birds there are at least two genera. Gould followed Cabanis in separating them into *Geobasileus* and *Acanthiza*. Present day observations support this. They resemble each other only in size and in having brightly coloured upper tail-coverts. They differ appreciably in wing formula, and in the arrangement of colour pattern, especially in the tail.

The following table compares the main features:—

	<i>Acanthiza</i>	<i>Geobasileus</i>
Habit	Lives in trees and thickets	Feeds largely upon the ground
Wing formula	Second primary less than twice length of first: fourth longer than third by about $2\frac{1}{2}$ mm.	Second primary more than twice length of first: fourth longer than third by about 1 mm.
Shape of tail	Rounded: outer feathers about 5 mm. shorter than central	Squarer: outer feathers about 2 mm. shorter than central
Dark band on tail . .	Narrow and sub-terminal	Wide and covering about half the tail
Base of tail	Dark in colour and not like upper tail-coverts	Light or brightly coloured like upper tail-coverts
Throat	Usually striated with black	Plain or minutely fringed with brown
Upper tail coverts . .	Dark tones of brown	Light tones yellow to tawny



Some of the Delegates, R.A.O.U. Congress Adelaide, 1922.
Sitting (left to right) A. Ashby (S.A.), E. R. Waite (S.A.), C. A. Barnard (Q.), Dr. J. A. Leach (President, V.), A. J. Campbell (V.),
Capt. S. A. White (S.A.) and Neville W. Cayley (N.S.W.).
Standing S. Saunders (S.A.), W. Ham (S.A.), E. Cantwill (S.A.), J. Sutton (S.A.), C. Lord (Tas.), J. F. Bailey (S.A.), Neil McGrip (S.A.),
A. L. Butler (Tas.) and J. W. Mellor (S.A.).

Photo. by Smith, Adelaide.

The throat striations of *Acanthiza* are unique. Each feather has two edges black but not the tip. As the feathers overlie one another the effect produced is a series of bold black striations. These, however, are movable and rearrange themselves as the feathers are moved from side to side. The markings are entirely different from those of *Hylacola pyrrhopygia* (first called *Acanthiza pyrrhopygia* by Vigors and Horsfield), which consist of a black central stripe on each feather. A marked peculiarity of *Geobasileus* is that the two outermost tail feathers have a white, or buff edging on the outer web, distally, for at least half an inch.

There have been listed ten species and no less than 73 subspecies*—total 83. I submit there are 17 species and 43 subspecies—total 60.

My notes and criticisms where they touch upon the work of others are intended to be constructive, building upon the foundations already laid, or at most a rearrangement of certain parts of the material already in hand.

For the examination of the bird-skins and literature I am chiefly indebted to the trustees of the National Museum, Melbourne (per favour of Mr. J. A. Kershaw, Curator), in which is the "H. L. White Collection" of skins. I am also indebted for material and assistance to the R.A.O.U., to Mr. Edwin Ashby, Adelaide, and to Mr. A. J. Campbell, Melbourne.

The Annual Congress and Camp-out of the R.A.O.U.

The twenty-first annual congress was held at the Royal Society's rooms, Adelaide, on October 16th, 17th, and 18th (three sessions daily), and the camp-out was held at Mt. Remarkable from October 19th—24th. Lectures illustrated by lantern slides were given in the Royal Society's rooms and at Melrose, Mt. Remarkable, by Dr. MacGillivray, Captain White, Messrs. Cayley and Bellchambers. The proceedings terminated with committee meetings to clean up the check-list on Wednesday, October 25. This "majority" congress ranks amongst the most important in the history of the Union. Delegates were present from all the States except Western Australia. South Australia, the home State, of course, had the largest representation. Tasmania and Victoria had four delegates each; New South Wales had two,

*See "List of The Birds of Australia," 1913, G. M. Mathews, and additions thereto.

and Queensland one—the President, C. A. Barnard, who started from half a day west of Rockhampton, and travelled far to discharge his duty as president and show his interest in the R.A.O.U. and ornithology generally.

The minutes of the previous congress were read and confirmed.

Apologies and greetings were received from Messrs. Barker, Chisholm and Cornwall, and Dr. Spencer Roberts (Q.); Messrs. Kinghorn, A. S. Le Souef and H. L. White (N.S.W.); R. Hall (Tas.), and Mr. D. Le Souef and Dr. Brooke Nicholls (Vic.).

Mr. Ashby reported an interesting visit to the B.O.U., and regrets that members were unable to make it convenient to attend. Mr. Elves, F.R.S., Pres. B.O.U., sent warm greetings direct.

As the R.A.O.U. had now reached its majority it was decided that the President should send loyal greetings to their Majesties the King and Queen, who have been royal co-patrons since the inception of the Union. A satisfactory acknowledgment was received later. The text of the cable and reply are as follow:—

CABLEGRAM

[copy]

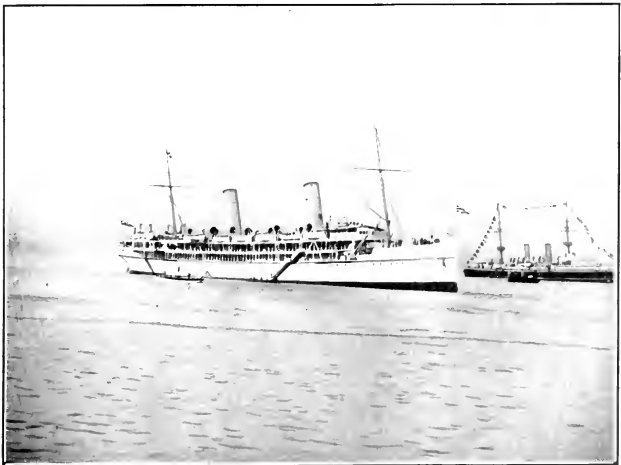
16/10/22

The King, London. — Royal Australasian Ornithologists' "majority meeting," Adelaide, sends loyal greetings Their Majesties.—Leach, President.

Reply received through Governor-General.—"Please convey to the President of the Royal Australasian Ornithologists' Union Their Majesties' thanks for loyal message sent on the occasion of the celebrations in Adelaide."

The annual report and balance-sheet, both of a highly satisfactory nature, were received and adopted without amendment. The librarian's and editor's reports were received and adopted. Substantial progress with the Union's library and quarterly journal *The Emu* were revealed. The sum of £508 had been absorbed in the publication of *The Emu*. Members expressed themselves as well satisfied with the journal, which was well worth the money it cost. It was decided to recommend the Council to widen the influence and increase the circulation of *The Emu* as much as possible.

In honour of two noted ornithologists, Messrs. F. R. Zeitz, Ornithologist, Adelaide Museum, and Frank M. Littler, F.E.S., Launceston, author of "The Birds of Tasmania," members stood in silence after ordering that letters of condolence should be sent to the relatives.



Upper.—Queen Mary (then the Duchess of York) at Fernshaw, (Vic.) 1901.
Lower.—Royal Steamship "Ophir" off Port Melbourne. This vessel brought the Duke and Duchess of York (now King and Queen) to Australia, 1901.

Photos. communicated by A. J. Campbell, C.M.B O.U.



Chas. A. Barnard Esq.
Retiring President, R.A.O.U.

The election of officers resulted as follows:-

Co-Patrons: Their Majesties the King and Queen.

President: Dr. J. A. Leach, C.M.B.O.U., C.F.A.O.U. (Victoria).

Vice-Presidents: Major E. A. Le Souef, B.V.Sc. (Zool. Gardens, Perth), Mr. E. Ashby, M.B.O.U., C.F.A.O.U. (S.A.).

Hon. General Secretary: Mr. Z. Gray, L.C.A., 2 Temple Court, Collins Street, Melbourne.

Hon. Assistant Secretary: Mr. H. F. Clinton.

Hon. Treasurer: Dr. Brooke Nicholls, 2 Temple Court, Melbourne.

Hon. Editor of "The Emu": Dr. J. A. Leach, C.M.B.O.U., 2 Temple Court, Collins Street, Melbourne.

Hon. Assistant Editor: Mr. R. T. Littlejohns, R.A.O.U.

Hon. Librarian: Mr. F. E. Wilson.

Hon. Press Correspondent: Mr. A. H. Chisholm, "Daily Telegraph" Office, Sydney.

Curators: (a) Skins: Mr. D. F. F. Thomson. (b) Eggs: Mr. J. A. Ross. (c) Photos, slides, etc.: Mr. S. A. Lawrence.

Hon. Auditors: Mr. Jas. Barr, F.C.P.A., 42 Temple Court, Melbourne; Mr. J. Hedding, Monomeith Avenue, Canterbury.

State Secretaries:

Mr. N. Cayley, R.A.O.U., Pitt Street, Sydney.

Mr. G. H. Barker, Albert Street, Brisbane.

Capt. S. A. White, C.M.B.O.U., Wetunga, Fulham, South Australia.

Mr. B. W. Leake, Woolundra, Western Australia.

Mr. C. E. Lord, Mt. Nelson Road, Sandy Bay, Hobart, Tasmania.

Mr. W. R. B. Oliver, F.L.S., R.A.O.U., Dominion Museum, Wellington, N.Z.

Council:

Victoria.—Mr. C. L. Barrett and Dr. G. Horne.

New South Wales.—Dr. E. A. D'Ombraïn and Mr. A. S. Le Souef.

Queensland.—Messrs. W. B. Alexander, M.A., and A. H. Longman.

South Australia.—Mr. E. Ashby, M.B.O.U., and Prof. J. B. Cleland.

West Australia.—Mr. Justice T. P. Draper, M.B.E., and Mr. P. T. Sandland.

Tasmania.—Mr. H. Stuart Dove, F.Z.S., and Col. T. M. Evans.

New Zealand.—Mr. R. H. D. Stidolph, 28 Makora Road, Masterton, Wairarapa, New Zealand, and A. G. Smith, N.Z.

Ex-Presidents (ex officio members).—Sur-Gen. Sir C. S. Ryan, Messrs. Chas. A. Barnard, R.A.O.U., A. J. Campbell, F.A.O.U., A. H. Mattingley, C.F.A.O.U., D. Le Souef, C.M.Z.S., R. Hall, C.M.B.O.U., J. W. Mellor, R.A.O.U., A. B. Hull, C.F.A.O.U., and Dr. W. Macgillivray, R.A.O.U.

Check-List Committee (not subject to re-election).

Mr. W. B. Alexander, M.A., C.F.A.O.U., Mr. C. L. Barrett, C.M.Z.S., Mr. A. J. Campbell, C.M.B.O.U., Mr. A. H. Chisholm, R.A.O.U., Mr. R. Hall, C.M.B.O.U., Mr. A. F. Basset Hull, C.F.A.O.U., Dr. J. A. Leach, C.M.B.O.U., C.F.A.O.U., Mr. W. H. D. Le Souef, C.M.Z.S., etc., Dr. Macgillivray, R.A.O.U., Mr. G. M. Mathews, F.R.S.E., Mr. A. H. E. Mattingley, C.M.Z.S., Mr. H. L. White, C.F.A.O.U., Captain S. A. White, C.M.B.O.U., C.F.A.O.U.

The presidential address was well received.

The burning question of the export of live Australian birds produced a vigorous discussion, which resulted in the carrying of the following resolutions:—

- (1) That no export of Australian birds be allowed for profit;
- (2) That no export of any bird in danger of extinction be permitted;
- (3) That no export without adequate inspection be allowed;
- (4) That a board be constituted to control the necessary export and exchange of birds for scientific and educational purposes; the board to consist of two representatives of the R.A.O.U. and (a) one representative of the University and learned societies in each State; (b) one representative of State natural history and animal protection societies; (c) one representative of the Zoological Society in each State; and (d) one representative of the Museum in each State.

The Congress ordered the following telegram to be despatched to the Minister for Customs, Hon. Rodgers: "Request prohibit totally export Australian fauna pending receipt scheme adopted by Conference."

It was decided to co-operate with the Australian Veterinary Association in securing adequate inspection and control of export of Australian birds "owing to the important role played by insects in the transmission and causation of disease in live stock."

Mr. Cayley submitted a fine report of the establishment and activities of the N.S.W. State branch of the R.A.O.U., in affiliation with the Royal Zoological Society.

Mr. Edgar R. Waite referred to the death of Mr. F. R. Zeitz, late Ornithologist to the S.A. Museum, and to the loss that had been sustained thereby. The Board of Governors had decided not to fill the vacancy for the present, but had appointed Dr. A. M. Morgan, hon. curator in ornithology. Dr. Morgan would be in attendance daily, during the session, from 4 to 5 p.m., when the reference collection of bird skins and eggs would be available for inspection by members. Mr. Waite said that Dr. Morgan had associated with him in an unofficial capacity, Mr. Sutton, and he was quite sure that when the next annual report was submitted to the Board the value of Mr. Sutton's services would be duly recorded.

The late Mr. F. S. Smith, who also was a member of the R.A.O.U. for many years, died at a comparatively early age on the 4th February last. His work for the *Argus* was of the greatest value indirectly to the Union. He helped to develop that interested public opinion and appreciation which have placed the Union in the strong position it now occupies.

The report was received, and it was resolved to ask each State secretary to submit a report on State activities for publication in each issue of *The Emu*.

In pursuance of notice of motion Mr. Ashby moved, and Mr. Campbell seconded, that the seven clauses dealing with permits and collection agreed to at the previous conference be rescinded. After a free discussion, in which many took part, the adjournment for lunch took place. After lunch Mr. Ashby, with the consent of his seconder, withdrew his motion, and the following was inserted instead of clause 2:—That real students be encouraged and that the granting of permits to promising *bona fide* workers under reasonable restrictions be recommended.

On the motion of Messrs. A. J. Campbell and C. A. Barnard, the seven clauses were then adopted as the official platform of the R.A.O.U., as regards permits and private collections.

1. That recognised ornithologists, pursuing some definite course of research, should be allowed to continue to collect specimens under statutory permit, with a view to the ultimate donation of such specimens to a public institution.

2. That real students be encouraged and that the granting of permits to promising *bona fide* workers under reasonable restrictions be recommended.

3. That promiscuous collecting, or the formation of any new collection, be discountenanced, and that any collectors, other than those coming under recommendation No. 1, be advised to donate their collections to some recognised public institution.

4. That any member found guilty of collecting without a permit or in a sanctuary, or of any other breach of the Statutes relating to Bird Protection, shall be dealt with under the Articles.

5. That the State authorities be asked to consult the Union before granting any permit to collect birds or eggs.

6. That foreign collectors be required to describe any new species in an Australian scientific publication, and that the type specimen shall be deposited in a museum of the State in which it is taken.

7. That the Customs Department be urged to prohibit the exportation of the plumage and eggs of any Australasian bird.

On the motion of Mr. E. Ashby and Captain S. A. White, it was decided to request each State Government to set apart in all future surveys of townships a reserve of not less than 300 acres, and request that this area should be left in a state of nature, and that all farmers be urged to save some natural shelter for insectivorous birds.

The scheme for distinctions for members submitted by Mr. A. H. Chisholm was referred to a sub-committee consisting of Messrs. Alexander and Chisholm (Q.), Butler (Tas.), Hull (N.S.W.), and J. A. Ross (Vic.), for early consideration and report to the Council.

It was decided, on the suggestion of Mr. A. S. Le Souef (Director Sydney Zoological Gardens), to recommend to the State Government that the forest reserves of each State should be declared sanctuaries, and that if possible special sanctuaries should be declared for species in danger of extermination. It was decided that enquiries be made into the truth of a report that seabird eggs are being taken by Japanese from the Barrier Reef area.

Mr. A. J. Campbell, C.M.B.O.U., F.A.O.U., read a valuable paper on "Naming Birds, Type Descriptions, Etc., According to the International Code of Zoological Nomenclature." It was well received, and all agreed on the desirability of full and adequate description according to the recognized code.

Mr. A. G. Campbell, J.P., R.A.O.U., sent a valuable paper, summing up the results of several years' study of the Acanthize—a difficult Australian group. Mr. Campbell advocated 2 genera, 17 species, and 63 sub-species, as against 6 genera, 10 species, and 80 sub-species recommended by Mr. Mathews. The paper was considered opportune and valuable to the Check-list Committee.

Mr. Neville Cayley, author of the forthcoming work on The Birds of Australia, explained a colour chart embracing the 200 colours needed to describe Australian animals. It was expected that copies would be available at a moderate price. This is a modification of Professor Ridgway's well-known colour chart.

The chief item of business—the Official Check-list, second edition—was reserved for last place on the business paper, so as to permit inspection by the committee of material in the Adelaide Museum. Dr. Morgan, Hon. Ornithologist, S.A. Museum, assisted the committee to a decision on several knotty points with his well-kept and well-arranged specimens. The report of the committee showing that finality was being approached was adopted. A sub-committee consisting of Messrs. W. B. Alexander and A. J. Campbell, and the convener (Dr. J. A. Leach) was authorised to complete the list and to arrange for publication as soon as convenient.

Two scientific names, *Dacelo gigas* and *Gerygone albogularis*, whose priority was not certain, were made the subject of a reference to the International Commission on Scientific Nomenclature with a request that these names be retained on the Australian list.

Many vernacular names were discussed and popular favourites like Jacky Winter for the Australian Brown Flycatcher, Chowchilla for the so-called Logrunners and Sittella for the Nuthatches or Tree-runners were accepted. The recommendation was made to the committee that wherever possible vernacular names applying to more than one species should all be qualified. Thus *Irtamus cyanopterus* would be known as the Dusky Wood Swallow, not the Wood Swallow, and *Platycercus eximius* as the Common Rosella. A resolution was ordered to be entered in the minutes expressing satisfaction with the work of the committee, with special mention of the work of Mr. A. J. Campbell and Dr. J. A. Leach.

Captain White exhibited a series of skins of the Adelaide Rosella, showing that it was a form of *Platycercus elegans*, the Crimson Rosella, and not of *P. flaveolus*, the Yellow Rosella. It had green young, like those of *P. elegans*, while there was no green stage in the life history of *P. flaveolus*.

It was decided that the Congress of 1923 should be held at Hobart.

Votes of thanks to all who had contributed to the success of the congress, and the retiring office-bearers were carried.

One incident indicating the good public feeling developed in the community and the good work done by the Education Department in its schools, under the direction of Mr. A. G. Edquist, nature study organiser, in the formation of Bird Clubs, must be recorded. At Booleroo Centre, a few miles from Mt. Remarkable, the lively strains of "Australia Will be There" reached the delegates as the train drew up. The school Bird Club, led by the school band, with big drum, side drum, fifes and tin whistles, presented an address of welcome to the ornithologists. The President, Dr. J. A. Leach, Capt. White (S.A.), C. A. Barnard (Q.), and Neville Cayley (N.S.W.), acknowledged the address, and wished the Bird Club and the head teacher (Mr. D. D. Smith) success. The band gave several selections in a creditable manner.

HONORARY SECRETARY'S REPORT FOR YEAR
ENDED 30/6/1922.

2 Temple Court,
Melbourne, 14/10/22.

Ladies and Gentlemen,—

I am pleased to report that the affairs of the Union have continued to progress during the last year.

ROYAL AUSTRALASIAN ORNITHOLOGISTS' UNION, Year ended 30th June, 1922

RECEIPTS.

To Balance, General Fund . . .	£109 8 10
Color Fund	6 16 9
Trust Fund	3 19 6
<hr/>	
Subscriptions, arrears, 1919 ..	£0 15 0
" " 1920 ..	2 5 0
" " 1921 (56)	59 1 6
<hr/>	
Subscriptions, current in advance—	£62 1 6
<hr/>	
1922 (376)	£394 11 0
1923 (45)	47 5 0
Life (1)	5 5 0
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Sales, £25/8/5; Donations, £52/2/-; Interest, £2/10/-; Covers, £2/0/4; Reprints, £10/8/-; Blocks, £13/17/10 . . .	106 6 7
Exchange, £4/6/3; "Emu" Indexes, £2/5/-	6 11 3
Color Fund—Donations £26 17 4	
Advertisements, etc.	4 3 0
<hr/>	
Trust Fund, Interest	60 0 0

EXPENDITURE.

"Emu," Vol. 21—Printing . . .	£355 5 0
Posting	13 15 9
Blocks	79 5 3
Color Plates	14 0 0
Reprints	43 19 6
Posting	1 1 5
<hr/>	
Vol. 21, Patrons	£507 6 11
Copyright, etc.	0 4 6
Color Plates	0 16 0
<hr/>	
Vol. 22—Blocks	£24 4 4
Color Plate	9 3 2
<hr/>	
Postage £17/19/8; Stationery £12/11/-; Exchange £4/10/1; Commission £1/12/-; Covers £2/16/7	33 7 6
Reserve Account	39 9 4
Room Rent £32/10/-; Cleaning £5/4/-; Light £1/4/-; Insurance £3/10/3; Cabinet £31 5/-; Specimen 5/-; Bookcase £16/5/-; Library Books £4 3/-; Binding 9/6	99 3 9
<hr/>	
Royal Bank—Cr. Balance—General Fund	£84 4 4
Color Fund	4 13 11
<hr/>	
Less Trust Fund, Dr.	£88 18 3
	30 16 3
<hr/>	
	58 2 0
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	£833 5 9

ROYAL AUSTRALASIAN ORNITHOLOGISTS' UNION, Year ended 30th June, 1922

Vol. XXII.]
1923

R.A.O.U. Congress

207

ASSETS.		LIABILITIES.
To Royal Bank, Credit Balance	£58 2 0	Nil.
Subscription Arrears, Estimated good	£50 0 0	Balance
Less prepaid	48 0 0	£1,824 4 6
	<hr/>	
Library	2 0 0	
Furniture Specimens	325 0 0	
Blocks, estimated at	243 5 0	
"Emus" on hand, estimated at	10 0 0	
Tent, Material, Punch and Register	100 0 0	
Reserve Fund—Commonwealth 5% Bonds, due 15/9/23	3 17 6	
Trust Account—Commonwealth 6% Bonds, due 15/12/1930	100 0 0	
	<hr/>	
	£1,824 4 6	£1,824 4 6

Audited and certified correct.

Z. GRAY, L.C.A., Hon. Sec.

BROOKE NICHOLLS, Hon. Treasurer.

Melbourne, 1st July, 1922.

JAMES BARR, F.C.P.A., Hon. Auditors.
JAMES HEDDING

15/9/1922.

The members on roll now number 485, made up as follow :
Life, 6; ordinary, 469; honorary, 10, distributed over—

Victoria	176	Tasmania	24
New South Wales . .	112	New Zealand	15
Queensland	50	England	30
South Australia . . .	27	Foreign	23
Western Australia . .	18	Honorary	10

and with exchanges 19, making a circulation of 504. We print 550 copies of *Emu*, the balance being on hand for sales.

Sixty-three new members and 2 life members have joined during the year; 10 have been removed by death, and 40 have dropped out through resignations, etc.

The heavy cost of printing *The Emu* is still a matter of serious concern, and last year amounted to £508, including £43/19/6 for reprints.

The following generous donations have been very helpful, and our sincere thanks are due to the donors:—

Purple Cross Service	£50	0	0
Late Dr. Geo. Hurst	2	2	0
"Anonymous," for blocks	13	17	10
Executors late T. Tindale . . <i>The Emu</i> , vols. 1 to 20			

A good result has already followed the steps taken at the New South Wales Congress last year to secure affiliation of the New South Wales branch of the R.A.O.U. with the Royal Zoological Society of New South Wales. Regular meetings are held, and a good stimulus has been given to the field study of birds.

The Council records with satisfaction a healthy development of public opinion in favour of a much better protection for our Australian birds. With the demand from learned societies that no species should be allowed to become extinct, the Council is in full agreement. A recent deputation to the Minister for Customs asked that control of export should be secured. The deputation was very sympathetically received. The Council takes the view that no export for private profit should be allowed, and that there should be no export whatever of rare species in danger of extermination.

In conclusion, may I again ask for the loyal help and earnest co-operation of all members and well-wishers to further our aims and objects.

Yours faithfully,

Z. GRAY, Hon. Secretary, R.A.O.U.

Some Impressions

By A. J. CAMPBELL, R.A.O.U.

The Adelaide meetings of the R.A.O.U. were conspicuous for the number of mature-aged members who attended. What has become of the younger members?

The agenda paper was splendidly cleared up under the firm, but just, rulings of the President (Dr. J. A. Leach)—there was no unseemly rushing off to picnics to the neglect of important business.

The former Adelaide meetings were:—Foundation, 1901, President, Col. W. V. Legge; 1905, President, Sir Charles Ryan; 1909, President, Mr. A. J. Campbell; 1913, President, Mr. A. H. E. Mattingley; and "Majority Meeting," President, Dr. J. A. Leach.

Those visiting members who did not go into camp at Mt. Remarkable were hospitably entertained in town, notably by motor-car drives by Dr. A. M. Morgan, Dr. H. R. Pulleine, Mr. Edwin Ashby and Mr. N. McGilp. Capt. and Mrs. S. A. White, in addition to giving a pleasant garden party, led an outing into a romantic glen in the "Holiday Hills" of Adelaide.

Individual members visited the Zoological Gardens, and were received by the Director, Mr. A. C. Minchin. The birds observed in captivity, with ideal surroundings, were all in fine feather, notably a handsome pair of Red-tailed Black Cockatoos, which thrive admirably on sunflower seeds. Interest was attached to a pair of Eyre Peninsula Bell Magpies—dusky birds, probably *Strepera intermedia* (Sharpe)—the easterly representatives of *S. plumbea*. Mallee-Fowl were at home in a scrubby corner. Stone-Plovers had nested, but a Frogmouth (*Podargus*) had constructed a nest upon the ground at the foot of a tree, instead of in the branches thereof.

The South Australian Museum (Director, Mr. E. R. Waite) has steadily increased its valuable reference bird-skin collection. The institution is fortunate in obtaining the services of Dr. A. M. Morgan as honorary ornithologist. Assisted by Mr. J. Sutton, Dr. Morgan is cataloguing the skin collection under an approved card system.

The private collections of Capt. White, Mr. J. W. Mellor, and Mr. E. Ashby were also inspected, in part. One will not readily forget a sight of Mr. Ashby's Humming-Birds, which will, no doubt, eventually become the property of his State—212 species, long tails or short tails, tails square or tails forked all incomparably beautiful with iridescent colours that put the rainbow to shame—rose doree, or begonia rose crowns, amber yellow or amethyst or violet throats, peacock blue or mineral (yellow) green backs, shining chrysoprase, green tails, etc. One specimen for the splendour of its "fire" is said to rival that of a famous opal gem valued at many pounds sterling.

Private Collections and Permits

By EDWIN ASHBY, M.B.O.U., C.F.A.O.U., F.L.S.,
Wittunga, Blackwood, S.A.

In opening a discussion on the seven resolutions recommended by the sub-committee and published in the *Emu*, vol. xxi, pp. 214-215, a little preliminary explanation seems necessary.

For reasons known to many members of the Union, I was not only unable to attend the session in Sydney, where these proposals were first brought forward, but have similarly been prevented from attending most of the annual conferences of the Union. Although one of the oldest workers in Australian ornithology, I have not come into personal touch with many of the younger members of the Union, and have therefore been unable to take part in the discussions or to impress on my fellow-members some points of view that I feel are of the gravest importance to the future of Australian ornithology.

At a meeting of the Council held in Melbourne in November last the neat and final copy of the said resolutions was read, and I voiced a strong protest against either their adoption or their being put into practice until the whole of the issues involved had received more general consideration and been much more fully discussed. The chairman at the meeting, on behalf of the Council, asked me whether I would be willing to open a discussion on the whole question of "Private Collections and Permits," at the next session of the R.A.O.U. This I agreed to do, and this paper is in fulfilment of the promise then made.

THE SEVEN RESOLUTIONS.

The difficulty of attempting to handle the issues involved by these resolutions within the compass of one paper is seemingly insurmountable. To take clause by clause and fully discuss same requires a separate paper under each clause, or nearly so; but before going further it will be well to glance at their main provisions.

The resolutions appear to me as revolutionary in character. No. I states that "recognised ornithologists" to whom permits are to be granted must be those "pursuing some definite course of research." Not general workers, but specialised workers, confining their work within more or less narrow limits. No. II., in referring to students, states, "Permits to special research students" only, are to be granted, and their work confined within apparently still narrower limits and to known species. Under No. III., "promiscuous collecting, or the formation of any new collection (is to) be discountenanced," and existing collectors, except the favoured few that come under Clause I, are to be advised to donate their collections to public institutions.

If these revolutionary resolutions* were less serious in their effects the humour of them would appeal to us all. By "promiscuous collecting," the framers evidently intended to refer to the study and collecting of Australian bird life as a whole. It apparently precludes the making of new discoveries, for the favored few are to be limited in their research to definite species.

Those of us that have been long, and the writer has been one of the longest, in the field, can rest on their laurels, for if the apparent intentions of these resolutions are carried out, no new all-round workers are to be bred and trained.

The astounding absurdity of it all, if these resolutions are carried out to the letter, is still more emphasised when one realises that the resolutions are not intended to take effect only within a limited area, but are intended to have sway over a vast unpeopled continent.

Clause IV. is obviously superfluous. Clause V. recommends the Governments to consult the Union before granting permits.

I hope all will at once realise that although I have expressed myself strongly, in no sense do I wish to be personal. It is no pleasure to me to hurt another's feelings; should my remarks appear of this character to any, I ask them to absolve me of any such intention. My years remind me that my life is nearing its setting, and I earnestly desire before I pass hence to help the rising generation into fields of study, research and service that have so brightened my own life.

I move—(1) That the seven resolutions referred to be rescinded;

(2) That an effort be made by the Union to educate first its own members, and then the public, on the educative value of private collecting.

The idea that a collection reaches its highest use when placed in a museum is largely fallacious. So much so that a Belgian specialist wrote me some time back that a museum offered him £100 for his private collection in a certain group, but he goes on to say that he preferred to give it to the writer of this paper, because, he adds: "I do not want to put it where no one will do anything about it." Collections when placed in museums are not unseldom lost as regards their educative influence on the bulk of the public. My collection, on the other hand, has been used by me as the subject matter for numberless lectures and bird talks to thousands in South Australia and Great Britain. In England in the past few months I have often shown my skins and described the habits and habitats of the birds as many as five times in one day.

*Practically all present differed from Mr. Ashby in the restricted meaning he attached to the resolutions.—Eds.

The bulk of museum collections reach only a limited number of students of the Natural Taxis or Classification of birds, which is only one side, and a comparatively small one, of ornithology.

I have yet to find a museum that properly displays to the public the wonder and glory of the coloration of the Humming Birds of America. The curators of the leading museums admit this.

I think the purposes of this discussion will be best served by outlining some of the larger issues with which the leading ornithologists both of Great Britain and America are in perfect accord. Before doing so I would state for the information of members that I have left my collection of Australian Bird Skins to the State museum, giving to my son, who is also a worker in ornithology, a life interest, and making provision for the use of the collection for educational purposes. Thirty-five years ago I was endeavouring to interest the young people of my own State in bird life by giving bird-talks illustrated with skins, and down the years one has continued this service as opportunity permitted.

Also during the same period one has consistently co-operated with others in the obtaining of legislation for the protection of our native birds, so perhaps it will be wise to ask what is our object in getting such legislation introduced?

PROTECTIVE LEGISLATION: ITS OBJECT AND EFFECT.

A learned professor asks the question, "Does education educate?" and proceeds to answer it very largely in the negative.

I ask, "Does our legislation for the protection of native bird life materially count in the attainment of that end?" I say, with possibly one or two minor exceptions, its influence from this point of view is in the majority of cases negligible. Those of us who are real bird lovers have been responsible for the arousing of a great deal of false sentiment; the real value of our work in this direction has been the inculcation in the minds of the young of a spirit of wonder and an appreciation of the value of life. And thus has done much to destroy the brute spirit which says, "It is a fine day; let us go out and kill something," with the result that many of the potential killers became to some extent bird observers.

This has been the real good we have attained down the years of constant agitation for protective legislation.

As regards the issue of the preservation of bird life other than the setting apart of sanctuaries and leaving out the commercial element, it has no influence whatever.

Nature is so prodigal in her provision for wastage, that with a few exceptions of species peculiarly isolated, the mere killing by man, except during the breeding season, which will be referred to later, has not materially counted.

We have often in Australia misled an ignorant public, who are under the false impression that "protection," or the stopping of shooting, protects. Lulled thus by a false issue, the real factor that counts is largely ignored.

The provision of suitable breeding places and the protection of breeding haunts is the only thing that really counts. If properly attended to from the point of view only of the survival of bird life, all restriction requiring the issue of permits might be withdrawn; but on the other count, already spoken to, some restriction is desirable. I have long urged that every new township opened or surveyed by our respective governments, should have a Fauna and Flora Reserve equal in area to some of the smaller farms, set apart in perpetuity for the use and instruction of future generations.

THE EDUCATIVE VALUE OF COLLECTIONS.

Most if not all of the real ornithologists of the present day, whether in Australia or elsewhere, commenced in their boyhood. This is true of most branches of Natural History. It is not that only a few children are capable of taking a real and effective interest therein, but that unless these dormant gifts are stimulated into work at a very early age, these latent possibilities atrophy.

I have been an ardent worker in one branch or another of Natural History since the age of eight years, and speak from experience of the great blessing it has been to my life, widening and broadening its outlook and thinking.

I have the strongest conviction that nine out of every ten children are up to an age varying with the individual, capable of developing a scientific interest in some branch of Natural History.

We call such studies hobbies, though we might use a bigger word. I also maintain that such interest, to be effective, should be correlated with work. The acquisitive quality of the mere collector is but one, and a necessary one, of the stimuli needed for the attainment of some measure of effective result.

To-day we are deploring the fact that such a large proportion of our Australian youth find their only relaxation in the excitement of daily entertainments or in the watching of sports.

I would that instead thereof they might become students and collectors in some branch of Natural History. As regards our particular study, it is known to all real workers that the preservation of bird skins entails so much hard work that, leaving out

the commercial issue, the only restriction required, if it could be properly enforced, is to insist that every bird killed shall be made into a skin.

Instead of the members of our Union using their powers in discouraging or preventing the Australian youth from taking up the laborious work of the making of collections of skins, it should throw its whole weight into the other scale.

Insist, if you will, that neither eggs nor skins be taken without the preservation of accurate data, but if we really love our people, and recognise any responsibility to future generations, do what we can to multiply, not restrict, real student collectors.

A TRUE SENSE OF PROPORTION.

On the 14th June last I had the privilege of addressing the leading British ornithologists as the guest of the British Ornithologists' Club. After giving them the warm invitation of this Union to send representatives to the Adelaide Congress, I referred to the seven resolutions now under discussion, and in addition quoted from our Hon. Secretary's letter, in which he referred to the proposal to declare a 30-mile radius round Melbourne as a bird sanctuary. I claimed that it was the height of folly to shut out half of the growing population of the State of Victoria from any chance of becoming real student collectors. I asked for their united opinion as to whether a much more liberalised policy was not highly desirable? To this I received the heartiest and most unanimous support.

Further, in conversation with some of England's greatest ornithologists, I explained that where possible I supported my papers in the *Emu* with reference to skins actually taken and compared, but in some cases reference to the taking of the skins was eliminated. These British ornithologists expressed the opinion that such a policy was absolutely fatal to the true scientific value of the work.

For to lay claim to being scientific is to lay claim to accuracy and truth. In such a wide and varied continent as Australia, the hard work of obtaining and preserving skins is an essential correlation to all, or nearly all, field notes.

The president of the Audubon Society followed me at the B.O. Club dinner. He stated that about five million licences to shoot are issued annually by the U.S.A., and certainly fully two million more forget to take out licences. That something over a thousand permits for student collecting are issued; in fact, that no genuine application for student collecting is refused.

The United States of America are in area a little less than the Australian Continent, and are occupied by one hundred and ten million people. To get a parallel of Australia's present position we must, I suppose, go back, or nearly so, to the days

of George Washington. Fancy introducing such restrictive regulations as is proposed in the sub-committee's seven resolutions, for the control of collecting in the wide, waste spaces of America as it then was!

I repeat the two resolutions I moved earlier, viz.:—

- (1) That the seven resolutions referred to be rescinded.
- (2) That an effort be made by the R.A.O. Union to educate first its own members and then the public on the educative value of private collecting.

And I suggest for the consideration of members—

- (a) That the Union adopt as one of the most important planks of its policy: The setting apart by the various governments of some area devoted to the preservation of the indigenous fauna and flora in connection with every new country township that is surveyed or opened.
- (b) That farmers be urged to establish small suitable breeding areas for insectivorous birds on all their properties.
- (c) That when the passing of any resolutions concerning the issuing of permits for collecting is considered desirable—
 - (1) Collecting for the purposes of trade in native bird skins be prohibited, but that the exchange of skins in the interest of science and for the advancement of knowledge be allowed.
 - (2) That all collectors to whom permits are given be recommended to arrange that after their death their collections pass into the hands of a person who will make adequate use thereof, to a museum or other suitable institution.
 - (3) That real student collecting be encouraged, and that the granting of permits to these promising, *bona fide* workers, under reasonable restrictions, be recommended.
 - (4) In the case of egg collections, the tabulation and preservation of data be insisted upon, the neglect to do this to lead to the cancellation of the permit.
 - (5) That foreign collectors be required to deposit the type of any new Australian species of bird in one of the Australian State museums.

The necessary machinery re Customs action in the exportation of skins and birds is already in existence, but may need our assistance in its carrying out.

After some discussion Mr. Ashby, with the consent of his seconder (Mr. A. J. Campbell), withdrew the two motions, of which he had given notice, and accepted six of the resolutions on condition that the following replaces No. 2 of the seven reso-

lutions on Private Collections and permits: "That real student collecting be encouraged, and that the granting of permits to these promising, *bona fide* workers, under reasonable restrictions be recommended. As this was but a re-wording of the second resolution it was accepted, and carried unanimously. Mr. Ashby then moved as resolutions two of the suggestions contained in his paper—

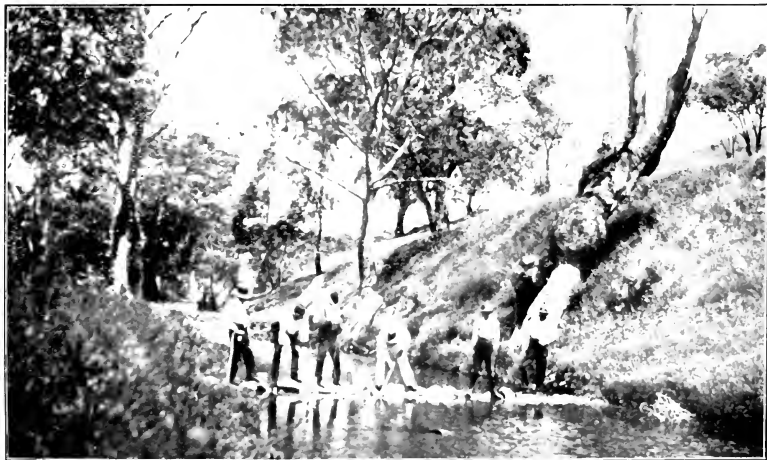
- (a) That the Union adopt as one of the most important planks of its policy, the setting apart by the various governments of some area (equal at least to a small farm of 300 or 400 acres), devoted to the preservation of the indigenous fauna and flora in connection with every new country township that is surveyed or opened for settlement;
- (b) That farmers be urged to establish small suitable breeding areas for insectivorous birds on all their properties.

These were seconded by Captain S. A. White, and carried.

Birds Observed on and around Mt. Remarkable during the R.A.O.U Visit

By S. A. WHITE, C.M.B.O.U., C.F.A.O.U.
Sometime President. R.A.O.U.

During the short visit of the R.A.O.U. members to Mt. Remarkable a fairly good number of species was observed. Very hot weather intervened, which did not facilitate bird observing, although it must be said that the whole party, ladies included, showed the greatest enthusiasm. In comparison with former visits the writer must say the birds were fewer in individuals and species, except in one locality, along the timbered creek which flows along the foot of the mount, and between it and the little town of Melrose. The banks of the creek are lined with fine old Redgums (*Eucalyptus rostrata*). The birds were numerous here, and many species were nesting. The vegetation on and around Mt. Remarkable is fairly diversified—Redgums, Peppermint, Sugar Gums, Pines, and many shrubs and plants. The country was dry, for the trip was undertaken late in the year for the northern parts of South Australia. Yet Mt. Remarkable has a heavier rainfall than most places north of Adelaide. The birds observed during several outings around the mount, and during the day the members undertook the stiff climb to the top, are as follows (the nomenclature of the new check-list is followed as far as possible):—The Emu was once plentiful in the district, but sad to say they are all gone now. Stubble Quail



Upper—Some of the party approaching the summit of Mt. Remarkable. A stiff climb.

Lower—Stepping stones in the creek at the foot of Mt. Remarkable.

(*Coturnix pectoralis*); Peaceful and Diamond Doves (*Geopelia placida* and *cuneata*); Bronzewing (*Phaps chalcoptera*); Crested Pigeon (*Ocyphaps lophotes*); Black-tailed Native Hen (*Tribonyx centralis*); Spur-winged Plover (*Lobibyx nova-hollandiae*); White-necked and White-faced Herons (*Notopteryx pacifica* and *nova-hollandiae*); Black, Little Black and White-breasted Cormorants (*Phalacrocorax carbo*, *ater*, and *fuscescens*); Spotted Harrier (*Circus assimilis*); Australian Goshawk (*Ictur fasciatus*); Collared Sparrow Hawk (*Accipiter cirrhocephalus*); Wedge-tailed Eagle (*Uroaetus audax*); Whistling Eagle (*Haliastur sphenurus*); Brown Hawk (*Ieracidea berigora*); Nankeen Kestrel (*Cerchneis cenchroides*); Boobook Owl (*Ninox boobook*); Purple-crowned Lorikeet (*Glossopsitta porphyrocephala*); White Cockatoo (*Cacatua galerita*); Galah (*C. roseicapilla*); Mallee Parrot (*Barnardius barnardi*); Adelaide Parrot (very light form), (*Platycercus adalaidensis*); Red-backed Parrot (*Psephotus haematonotus*); Tawny Frogmouth (*Podargus strigoides*); Laughing Kookaburra (*Dacelo gigas*); Rainbow Bird (*Merops ornatus*); Pallid Cuckoo (*Cuculus pallidus*); Fantailed Cuckoo (*Cacomantis flabelliformis*); Welcome Swallow (*Hirundo neoxena*); Tree Martin (*Hyolchelidon nigricans*); Fairy Martin (*H. ariel*); Brown Flycatcher (*Microeca fascians*); Scarlet Robin (*Petroica multicolor*); Red-capped Robin (*P. goodenovii*); Shrike Tit (*Falcunculus fontatus*); Rufous-breasted Whistler (*Pachycephala rufiventris*); Black and White Fantail (*Rhipidura leucophrys*), nesting; Restless Flycatcher (*Seisura inquieta*); Cuckoo Shrike (*Graucalus nova-hollandiae*); Caterpillar-eater (*Campephaga tricolor*); White-browed Babbler (*Pomatostomus superciliosus*); Black-breasted Song Lark (*Cinclorhamphus curralis*); Rufous Song Lark (*C. mathewsi*); Wrens (sp.?), all brown birds, but there is little doubt that they are *Malurus assimilis*; White-fronted Chat (*Epthianura albifrons*); Yellow-tailed Thornbill (*Acanthiza chrysorrhoa*); Masked Wood-Swallow (*Artamus personatus*); Dusky Wood-Swallow (*A. cyanopterus*), nesting; Grey Shrike Thrush (*Colluricincla harmonica*); Magpie-Lark (*Grallina cyanoleuca*), nesting; White-face (*Aphelocephala leucopsis*); Brown Tree-creeper (*Climacteris picumna*); Mistletoe-Bird (*Dicaeum hirundinaceum*); Pardalote (*Pardalotus striatus*); Black-chinned Honeyeater (*Meliphaga fulvifrons*); Spinebill (*Acanthorhynchus tenuirostris*); White-fronted Honeyeater (*Glyciphila albifrons*); Yellow-plumed Honeyeater (*Meliphaga ornata*); White-plumed Honeyeater (*M. penicillata*), nesting; Noisy Minah (*Myzantha garrula*); Yellow-throated Minah (*M. flavigula*); Red Wattle-Bird (*Anthochaera carunculata*); Australian Pipit (*Anthus australis*); Diamond Firetail (*Zonaegehinthus guttatus*); Australian Raven (*Corvus coronoides*); White-backed Magpie (*Gymnorhina hypoleuca*); and the following imported birds: Starling, House Sparrow, and Goldfinch.

The Most Extensive Ornithological Tour ever Accomplished in Australia

By S. A. WHITE, C.M.B.O.U., C.F.A.O.U., Sometime
President R.A.O.U.

An expedition to cross Australia and back by motor cars was promoted by the McCallum Brothers, of South Australia, and the writer of this paper was afforded the opportunity of joining the party. The members of the expedition, six in number, were the Hon. Thos. McCallum, M.L.C., Messrs. Donald McCallum, H. Crowder (of the S.A. Lands Department), cousin to the first-named gentleman, Murray Auger and Cecil Auger, expert motorists and mechanics, and the writer. Mr. Murray Auger had been over some of the country 14 years previously, when he, with Mr. H. H. Dutton, of South Australia, had made the attempt to reach Darwin in a car, which was overtaken by tropical rains. The party had to abandon the car and retreat over swollen water-courses on horseback. Returning the following year with another car, they took both through to Darwin.

On this expedition three "Dort" cars were used. Every inch of space and every ounce of weight was conserved. Hoods, wind-screens, mud-guards, lamps, doors, self-starters, in fact, everything that could be dispensed with without interfering with the efficiency of the cars was stripped off. As would be supposed, many spare parts and gear of many contrivances to meet contingencies over a rough and trackless country had to be carried with us. Twelve hundred (1200) feet of inch and $\frac{3}{4}$ -inch Manilla rope was wound round two drums in No. 1 car, and many other things took up much space, cutting down our personal effects to a minimum, and this sorely handicaps a naturalist. The bodies of the cars had a neat chemical-duck covering.

We wore rubber coats, which were supplied by the Barnett Glass Rubber Co., and were a great comfort in cold and wet weather; still they did not prevent great discomfort when sitting all day long in water, as sometimes happened. Cold winds were dealt with by placing paper round the body inside our vests, and the rubber coats outside of all. A great deal of organisation was required; stores and petrol had to be sent on from Oodnadatta—the head of the line in the south—by camel convoys to be placed in depots along our route for the better part of a thousand miles. From the northern end the same had to be done, and petrol and stores came out for 200 miles from Darwin by rail, then by bullock and horse teams, to link up with the chain of depots from the south; this had to be done three or four months ahead; even then the line had not been linked up, and the last camel team was over a hundred miles short of its depot when we overtook it. Stores and petrol had to be sent

out from the railheads in Queensland, where all went to the east, and then all the way down through the back country of Queensland and New South Wales the railheads had to be touched for stores and fuel for our cars and ourselves.

On the 9th of May, 1922, the three cars moved off from the Adelaide General Post Office at the stroke of ten a.m., and amidst the cheers of a great crowd we headed to the North—a course we followed for two thousand miles and more.

Stopping for a few minutes on the outskirts of the town to say good-bye to our friends, rubber coats and goggles were adjusted, and the cars settled down to their 25 to 30 miles per hour. The agricultural areas were nearly left behind by the time we pulled up in the driving rain after dark at Gladstone that night. All through the night rain continued to fall, and in the morning the country was drenched. We moved off at an early hour, and found the roads in a bad condition, but by the time we reached Quorn we were out of the wet area, and the mud guards were removed from the cars. We reached Oodnadatta after dark of Friday, 12th, and left again next morning at 9.15. From now on the trials of the big trip began. We passed out over a vast gibber plain, with its mass of broken stone, with here and there weird table-topped hills plainly showing the great erosion which has taken place over a great length of time. By 9.50 a.m. we had reached a creek known as "The Swallows," named from the locality being so frequented by the Fairy Martin, which build their retort-shaped mud nests under the rocky ledges of the bank. At 35 miles we reached the dreaded Alberga Creek—a broad shallow watercourse filled with very loose sand. We lunched, and then made the crossing, the first time a car has done this on its own power. The Stevenson River, another dry sandy watercourse, was crossed at 36 miles, and numbers of the Yellow-banded Parrot (*Barnardius zonarius*) were seen along the river in the Red Gums (*Eucalyptus rostrata*) which lined the banks. We had been ploughing through loose sand for miles, and by 4 p.m. at 46 miles we passed the ten-mile bore. Willow Well was passed by 4.30, at 52 miles, and I saw marks of my old camp of the previous year. We camped a mile east of Hamilton Bore. Reached Hamilton Bore next morning at an early hour. Boobook Owls (*Ninox boobook*) were calling loudly during the night, along the timber which lines the banks of the Stevenson, and out on the tablelands the Curlew, or Stone-Plover (*Burhinus magirostris*) was calling. Picking up stores and petrol at the bore we were off again, keeping along the eastern bank of the Stevenson, so strongly marked by the timber (Red Gums) growing along either bank. We reached Blood's Creek at 11.45, when we had our lunch. All along the dry course of the Stevenson the Yellow-banded Parrot was met with, as well as the Yellow Weebill (Tree-tit) (*Smicrornis flavescens*), an occasional Pipit (*Anthus australis*), small flocks of Chestnut-eared Finches

(*Tacniopygia castanotis*), as well as other common species. Leaving Blood's Creek at 1 p.m., we left the main track and went to the west, where we soon overtook a train of 66 camels on their way to Hermensburg Mission Station, situated on the upper waters of the Finke River in the MacDonnell Ranges. Many of the animals had huge sheets of black iron on either side, the iron being used in the construction of tanks; others had long sections of water troughing lashed up and down on their packs. We were now travelling over the open undulating tablelands or Gibber Plains. An occasional Australian Dotterel (*Peltohyas australis*) was met with, and two small parties of Gibber-Birds (*Ashbyia lovensis*) were seen. We crossed the boundary line into the Northern Territory at 4 p.m., and arrived at Charlotte Waters telegraph station soon afterwards. We were on the move again at 6.30 a.m. next day, and reached New Crown Point Station, 19 miles, at 8 a.m. Very heavy sandy track. We remained here only a few minutes to speak with the manager.

It was here that most of our party had their first sight of the Finke River. The cars were running well, and we were soon on the northern side of the deep sandy bed of the Goyder River, where the strange green flowering pea plant (*Crotalaria cunninghamii*) was found growing on the sandy country in profusion. There was a good deal of saltbush (*Atriplex*) here, as well as Mulga (*Acacia aneura*) and Broad-leaf Mulga (*A. kempeana*). We now had heavy sand and gravel ridge in between, till we reached the Finke again, and crossed at the wonderful Yellow Cliff, where the great ice-striated boulders are to be seen protruding from the river bank. Crossing the sandy river-bed again, we pulled up at Old Crown Point to have our lunch. Then we followed up the timber along the bank, when a flock of Red-breasted Babblers (*Pomatostomus rubeculus*) were noted—the furthest south that I have observed this bird. Passing the wonderful mount—"Crown Point"—the cars charged the loose sandy bed of the Finke, and a high sandbank on the far side (up which we laid matting to give the wheels a grip. Proceeding up the bed of a watercourse strewn with water-worn boulders, we passed through Cunningham's Gap at 3.30 p.m. Soon Mt. Musgrave showed out to the west, and later on we passed right under Mt. Squire—the strange sister hills being to the west.

After traversing some loose sandy country we reached Horseshoe Bend, on the Finke, and remained at this weird place for the night. Making a start next morning, Tuesday, May 16th, the cars ploughed their way up the sandy bed of the Finke to come out up the bank in a mile and a half. Having gained the top of the cliffs, we plunged into the great Depot sandhills, continuous sand ridge for 28 miles, with very narrow flats in between. The drift sand is blown up in places to the height of 70 feet. We were over these dreaded sandhills by 4 p.m., the first time any car had ever been through on its own power. We



The three cars in the long "Mitchell Grass," said to be one of the best grasses in the world; a haunt of the Pheasant Coucal (*Centropus phasianus*)



Lunch in the haunt of the Red-breasted Babbler (*Pomatostomus rubeculus*).

now crossed the Hugh River (a tributary of the Finke) eight times in 13 miles. The crossings were very difficult owing to the loose nature of the sand; reached Alice Well at dark, and camped for the night. Next morning, I counted 49 Black-backed Magpies (*Gymnorhina tibicen*), a great many Magpie-Larks (*Grallina cyanoleuca*), and Yellow-throated Miners (*Myzantha flavigula*). Heavy sand again on our track. This country was covered with Porcupine Grass (*Triodia*) erroneously called "spinifex," Cassias, Broad-leaved Mulga (*Grevillea junceifolia*) (a plant producing much food for honey-eating birds, and whose flowers are frequented by millions of ants and other insects). The Desert Oak (*Casuarina decaisneana*) is the largest tree.

Bloodwoods (*Eucalyptus terminalis*) were now met with; they have great bunches of white to cream flowers laden with much honey. We arrived at Francis Well at 11.30, had lunch, and left at 1 p.m. The vegetation here was chiefly *Eremophila*, *Kochia*, *Bassia*, all shrubs of the stony country; there was good grass in patches. Sandy country came in again, with Desert Oaks and such vegetation. The white-barked Gums, which play such a big part in the landscape for thousands of miles, were seen here for the first time. Deep Well, 23 miles from Francis Well, was reached at 2.30 p.m.; stores and petrol were taken on here. We were now approaching the Ooraminna Range, and making our way through good mulga scrub, till we struck a sandy patch with Porcupine Grass, Desert Oak, and a strange Gum or Mallee with blue, rounded leaves (*Eucalyptus gamophylla*). We were now 57 miles from Alice Well, and the country was well grassed. At 74 miles the MacDonnell Ranges came into view, their ragged peaks standing out on the skyline.

We reached the narrow pass (Heavy-tree Gap) at dark. Great numbers of natives had assembled to give us a welcome, and their strange cries echoed amongst the great overhanging crags of the range. Passing over a salt-bush plain, the cars pulled up at Alice Springs, known as the township of "Sturt." Owing to a member of the party being unwell, we remained two days here, and the writer spent the time in investigating the bird life. Birds were not numerous: Black-backed Magpies, Magpie-Larks, Yellow-throated Miners, Cloncurry Honeyeater (*Meliphaga penicillata leilavalensis*), Red Throat (*Pyrholaemus brunneus*), Bower-Bird (*Chlamydera guttata macdonnelli*). The last-named bird, like so many other members of the genus, is a great mimic; it gives other bird-calls so well that the writer has been deceived upon many occasions. Having had word that a most unusual occurrence had happened to the east of Newcastle Waters in the shape of a cloud-burst, and that water to the depth of 20 feet and 40 feet broad had swept across to the west, and that it would be impossible to think of crossing this for a month, we went on to investigate. Tyres which had left Oodnadatta over a month before us had not ar-

rived, and we had to go on without them. On Sunday, 21st of May, we left Alice Springs and called for a few minutes at the telegraph station, situated in the MacDowell Ranges. Then we made our way through the ranges. Red Gums were seen in the creeks, Bloodwoods in valleys. Amongst the granite rocks Broad-leaved Mulga, Grevillea, Cassia, Eremophila, Kangaroo Grass, White-barked Gums, and *Solanums*, were found growing, and the banks of one creek were lined with Paper-bark Tea-tree (*Melaleuca*). In 12 miles, we were out of the range on to Burt's Plain, a vast plain extending for hundreds of miles E. and W. and about 60 to 70 across in the direction in which we were travelling. At 15 miles from Alice Springs we were in dense Mulga, and came out on the Grassy Plain again. The White-face (*Aphelocphala leucopsis*) was met with in large numbers, but I was surprised not to see the Black-banded White-face (*A. nigricincta*).

Crested Bell-Birds (*Orcoica gutturalis*) were here numerous, and remarkably tame. At 68 miles we were still on the Burt Plain, with Mulga (a new species with a very long leaf), Grevillea (in blossom), Bloodwood (also in flower), Cassia, Kangaroo Grass, Cotton-bush, patches of Porcupine Grass, *Eremophila* and Bluegum. A large piece of country had been burnt, possibly by the natives. Termite mounds made their appearance as soon as we were out upon the plain. Hooded Robins (*McInodryas cucullata*) were numerous. Several Pipits were seen during the day. The Yellow-tailed Thornbills (*Geobasileus chrysorrhoa*) were in small flocks. Black-faced Wood-Swallows (*Artamus cinereus*) were met with all through the country passed that day. Whistling Eagles (*Haliastur sphenurus*) were also seen. Many Chestnut-eared Finches (*Taniopygia castanotis*) were met with. Red-capped Robins (*Petroica goodenovi*) were observed during the day.

At 80 miles broken ranges were seen on either side, and the flats were clothed in cotton bush and grass, with patches of Mulga, *Eremophila*, and native pines (*Callitris robusta*) were seen on the granite ranges. Red-capped Robins were seen here. Black and White Fantails (*Rhipidura leucophrys*) were plentiful. The Brown Song-Lark (*Cinclorhamphus cruralis*) was also seen. At 90 miles we passed through Prouse's Gap at 5.10 p.m. The vegetation changed here, many sub-tropical plants putting in an appearance. We went on four miles to more open country, and went into camp. Next morning, Monday, May 22nd, three of us left camp at 7.30 in one car, and went back to the Gap. I found the vegetation very interesting, and collected many species of plants. Numbers of Bustards (*Eupodotis australis*) rose from the long grass. Morgan Parrots were plentiful in the Red Gums. Black-faced Wood Swallows, Red-rumped Kingfishers (*Halcyon pyrrhopygius*), Black Fork-tailed Kites (*Milvus migrans*), Whistling Eagles, Chestnut-eared Finches, a very small form of the Singing Honey-Eater (*Meliphaga virescens*), Shell Parrots,

or Budgerygahs (*Melopsittacus undulatus*), Crimson Chats (*Epthianura tricolor*) were all seen at this interesting place. At noon that day we had reached Central Mount Stuart, where we halted to take some photographs. Birds were fairly numerous. Here we noted the Brown Hawk (*Ieracidea berigora*), the typical inland form (*I. b. berigora*), which takes on a ruddy coloration. Black-faced Wood-Swallow, Pipits, Red-backed Kingfishers, Spiny-cheeked Honeyeaters (*Acanthagenys rufogularis*), and numbers of Shell-Parrots were seen. A beautiful pink Hibiscus was seen during the day. The shrubs were several feet in height, and were covered in bright pink blossoms. At Central Mount Stuart, 133 miles from Alice Springs, a dwarf yellow Hibiscus put in an appearance. We had been travelling along the Woodforde Creek, and now we were on the Hanson Creek, crossing it at 148 miles at 4.15 p.m. At 5 p.m. we started over No. 1 Stirling Sandhill, and soon left No. 2 behind us. These sandhills were very high, and were composed of loose blown sand.

Birds were now numerous. There were Brown Hawks, Black-faced Wood Swallows, Bustards, Crows, Magpie-Larks, Pipits, Chestnut-eared Finches, Cloncurry Honeyeaters, and others. Next morning, May 23rd, we were away early, but in an hour got off our bearings, and found we were too far to the east of a rugged range. We altered our course, stood to the west, and found a gap through the range. The country was very good and beautiful. We had been following a creek down, with beautiful white-barked gums; the country was well grassed. Where we altered our course a very fine Bustard stood up and strode past us within a few feet, and a Black-breasted Buzzard soared over us for quite a time. Crested Pigeons (*Ocyphaps lophotes*) were plentiful. Yellow-throated miners (*Myzantha flavigula*), Black-faced Cuckoo-Shrikes (*Graucalus nova-hollandia*), Black-faced Wood-Swallows, Little Quail (*Turnix velox*), and Shell Parrots were all numerous. The vegetation was also very interesting; a fine pink-flowering Grevillea lit up the landscape.

White-barked gums, and on the stony edges, a small-fruited Mallee. There were also tall Kangaroo Grass and bushes of Deadfinish (*Acacia rigens*). At 180 miles from Alice Springs we made Barrow Creek Telegraph Station, and received a warm welcome. This was a good bird locality, and amidst the broken ranges were many rock holes containing water. Southern Stone-Plover (*Burhinus magirostris*), were both seen and heard. Square-tailed Kite (*Lophoictinia isura*) was quite plentiful. Black-backed Magpie, Pied (Black-throated) Butcher Bird (*Cracticus nigrogularis*), Pipit, Ground Cuckoo-Shrike (*Pteropodocys maxima*) were all seen. Kearthland Honeyeater (*Meliphaga kearthlandi*) was quite numerous in the rocky gorges. The writer has now traced the bird from the Everard and Musgrave Ranges in the south to Barrow Creek in the north, and no doubt it has a big range to the west. Another Honeyeater with a wide

range, and found in this locality, is the White-fronted Honeyeater (*Glyciphila albifrons*). The Cloncurry Honeyeater was very common along all the gum creeks. The Dusky Honeyeater (*Myzomela obscura*) was observed in the low scrub at the foot of the ranges. I take this to be Mr. Mathews' sub-species *M. o. griseocens*. The Red-chested Quail (*Turnix pyrrothorax*) was quite plentiful. Grass-Wrens (*Diaphorillas textilis*) were found amidst the boulders of the ranges. Crows (*Corvus cecillae*) were fairly plentiful. Black-faced Cuckoo Shrikes were seen; Chestnut-eared Finches and Budgerygahs were in hundreds. The time here was too short to complete work amongst the birds.

The night spent at Barrow Creek was a mild one (56 deg. F.). The country was covered in grass, which had reached the flowering stage, and threw a purple sheen over everything. We crossed Barrow Creek at 3½ miles from the station, and came in touch with large numbers of natives. Bustards were numerous amidst the high dry grass. A strange blue-leaved Mallee or Gum grew in clumps, with Mulga, Hakea and Eremophilas. We overtook a camel team with our stores, which should have been a hundred or more miles further on; took on twelve large cases of petrol, and stores, which meant much additional weight to the already over-loaded cars. Grass seeds became very bad in the long grass, and we had to abandon one car and push on for water, which we struck at 4 p.m., and then returned for the third car. Crows were numerous at this water. Next morning, the 26th, we were in trouble amidst the big sand-hills, which were covered with many bright flowering plants, one of the mosts conspicuous being a pink *Grevillea*. *Hakeas*, *Cassias* and *Eremophilas* were all in blossom. Amongst the birds frequenting the flowering shrubs were the small form of the Singing Honeyeater and the White-fronted Honeyeater. At 70 miles from Barrow Creek the Keartland or Grey-headed Honeyeater, Brown Hawk—the typical ruddy brown interior form—the small form of the Singing Honeyeater, were met with. Great numbers of Chestnut-eared Finches were breeding, and had many nests, with eggs. At 74 miles we crossed Sutherland's Creek, and reached the great granite boulders called the Devil's Marbles.

At 3.20 p.m. we came to McLaren's Creek, a deep water-course with steep banks. We had to hunt along its banks for miles to find a crossing. Crossing the Gilbert Creek at dark, we went into camp. Birds were not plentiful. The temperature at night was mild (56 deg. F.) Next morning, the 27th, we had the Murchison Range to the east, and soon got in amongst the outlying ridges; anthills or termite mounds gave us much trouble here. Black-faced Wood-Swallows and Budgerygahs were both numerous. Crimson Chats were seen. We now plunged into grass 12 feet in height, and flushed Bustards from this many times. At 120 miles from Barrow Creek we found water, and we were glad to get a good wash. We were in the

midst of a fairly thick Mallee belt, a variety with smooth dark green stems. Grey Ducks (*Anas superciliosa*) were seen in a waterhole; Red-backed Kingfishers, Magpie Larks, and Chestnut-eared Finches, as well as Red-breasted Babbler, were seen. We were now at Tennant's Creek, 1,500 miles from Adelaide. Next day, May 28th, we were on our way again, and saw a good many natives, including a large hunting party out after game, which was abundant in that country. Many stony creeks were crossed. The Black-faced Wood Swallow was numerous, and Whistling Eagles were seen. Paperbark Tea-tree (*Melaleuca*) was taking a prominent part in the vegetation now. Hooded Robins were numerous. At 3 p.m. we witnessed a great fight for liberty by a Bat, which was chased by a Grey Falcon (*Falco hypoleucus*). It lasted fifteen minutes, and the Bat wore the Falcon out by allowing the bird to make great rushes with superior speed, but dodging every time, till the Falcon was tired.

We were in very picturesque wooded country. Reached the renowned Attack Creek at dusk, and went into camp near a fine waterhole. The birds round our camp or those identified while there was still light were: Shell-Parrots, Rose-breasted Cockatoos or Galahs (*Cacatua roseicapilla*), Mistletoe Bird (*Dicaeum hirundinaceum*), Black-faced Wood Swallow, White-faced Heron (*Notophox norvic-hollandic*), Barn-Owl (*Tyto alba*), Boobook Owl (*Ninox boobook*), White-throated Nightjar (*Eurostopodus mystacalis*), Cloncurry Honeyeater, Magpie-Lark, Grey Duck, Grey Teal (*Tringa gibberifrons*), Black and White Fantail, Chestnut-eared Finch and the Diamond Dove (*Geopelia cuneata*). During the 29th, we crossed many creeks, which gave us trouble, as also did the anthills, which were very numerous. There was much paper-bark tea-tree along the creeks. A very bright-flowering *Grevillea*, which formed a large shrub, was very conspicuous. Several species of *Eremophila* were noted, with pink Hibiscus and high porcupine bushes. Many Shell Parrots were in flocks.

At 58½ miles from Tennant's Creek we came out upon well grassed country at Banka Banka Station, owned by the Ambrose Brothers, who entertained us at lunch. Later we passed through the open grass country, entered a timber belt, and came out upon tablelands, with white-barked gums. Shell-Parrots were very numerous, also Chestnut-eared Finches. Red-browed Pardalotes (*Pardalotus rubricatus*) were heard calling in the trees. At 75 miles, we crossed the Tomkenson, and in a large waterhole a Royal Spoonbill (*Platalea regia*) was seen. Brown Song-Larks were flushed from the grass. At 88 miles, we reached Helen Springs at 5.25 p.m. We here noted both Square-tailed and Forked-tailed Kites. Went into camp at Renner Springs at 6.30 p.m. Next morning many birds came to this fine spring for water. There were Australian Goshawks (*Astur fasciatus*), Galahs, Quarrions, or Cockatoo-Parrots (*Leptolophus hollandicus*), Black and White Fantail, Black-faced Cuckoo

Shrike, Red-rumped Kingfisher, Restless Fantail (*Seisura iniquita*). A pair of Australian Cranes (*Antigone rubicunda*) settled close to us, and took little or no notice of our presence. Tuesday, May 30th, we left camp early, and were soon in trouble with the high grass; by 10.30 a.m. we had reached a very rocky ridge, and, climbing over it, descended into the valley, where Powell Creek Telegraph Station is situated 119 miles from Tennant's Creek and 1619 miles from Adelaide. This is a charming spot, and should be a great place for birds, the country being diversified—a fine well timbered range with plains on either side. I regretted much not having a chance to spend time here.

Many tropical trees and plants have been planted close to the station, and are doing well. We left at 1.30 p.m., and passed through low scrub, long grass, and anthills. The small pale form of the Rufous-breasted Whistler (*Pachycephala rufiventris*) was met with. At 13 miles from Powell Creek, Cuckoo Shrikes and Rufous-breasted Whistlers were seen. From a very rocky mountain ridge (along which we had to find our way), Lake Woods, a vast sheet of water) was sighted to the west. After descending to lower ground several fine reaches of water were found in the creeks and beautiful timber, with vast grassy plains to the west. Black-faced Wood Swallows were numerous. We camped on the edge of the great grassy plain. The night temperature was mild (57 deg. F.) Many water-birds were travelling during the darkness (for we were in close proximity to the great storm waters). Amongst them could be distinguished the Pied Geese (*Anseranas semipalmata*). Birds seen round the camp in the morning were: Chestnut-eared Finches, Black-faced Wood-Swallows, Diamond Doves, Red-breasted Babblers (*Pomatostomus rubeculus*), Pied Butcher-Birds, Bustards, Fairy Martins (*Hylochelidon ariel*), Red-browed Pardalotes, and Galahs. Leaving camp we crossed a great plain of waving grass.

We were now approaching the flooded areas, and when we came in sight of the waters thousands of Pelicans, Cormorants, and other water-birds were seen. Bustards came quite close to the cars or allowed us to pass them by at a distance of a few feet. Birds were numerous, including Brown Hawks, Whistling Eagles, White Cockatoos, White-necked Heron (*Notophox pacifica*), Red-browed Pardalote, Rufous-breasted Whistler, Black-faced Wood-Swallow, Brown Song-Lark, Quarrions, or Cockatoo-Parrots, Red-kneed Dotterels (*Erythrogonys cinctus*), and Black-fronted Dotterels (*Charadrius melanops*). In the afternoon we reached the edge of the fast-running flood waters at Newcastle Waters, and had to pull the cars through water 7 to 8 feet deep and 150 yards wide by means of a rope passed through a pulley-block on the opposite side and brought back and fastened on to one of the cars. No. 1, having a winding gear, pulled the other two over. It was dark by the time two cars were over, and we had to leave the one which did the pulling till



A white barked Gum (*Eucalyptus terminalis*) a feature of a large area of the Northern Territory and the nesting tree of hawks and eagles.



Crossing Newcastle Waters after a "Cloud burst." The car (almost submerged) is being hauled over by a second car.

next morning. Birds were flying up and down the stream in the morning, amongst them being White-faced Herons, White-necked Herons, Grey Ducks, Grey Teal, Black Cormorant (*Phalacrocorax carbo*), Little Black Cormorant (*P. ater*), Pied Cormorant (*P. varius*), White-headed Stilt (*Himantopus leucoccephalus*), Red-kneed Dotterel, Black-fronted Dotterel, Plumed Egret (*Egretta intermedia*), Royal Spoonbill, Kites, both Square-tailed and Forked-tailed. Yellow-throated Miners were seen in the timber. Pratincoles were very quiet, alighting on the ground within a few feet of us. We now went a long way west of our route to get round some very boggy country, and had to cross several bad creeks and plains of high grass, where Brown Song-Larks were numerous. When we entered low sub-tropical scrub, Crested Pigeons became plentiful, and Bustards and Quarrions were seen in numbers. Later we were moving through high grass out on a boundless and treeless plain. Here a large Bush-Lark (*Mirafra*) first appeared. When flushed they hovered over the high grass for a time and then dropped into it. Several Pipits were seen, and Black-faced Wood-Swallows were plentiful. A very rufous *Mirafra* was observed, but no specimen was taken. I take this to be *M. rufescens*. After crossing a treeless plain 17 miles across we entered sub-tropical open park-like country, with many young Quarrions and Shell-Parrots.

The country was very lovely with many wild flowers. We next reached Frew's Ironstone Rounds, a most wonderful formation—immense pot-holes in an ironstone formation. On the water were Pelicans and Grebes, and perched on the rocks were Royal Spoonbills, and close handy Australian Cranes, Galahs, and Cloncurry Honeyeaters. We now motored through a beautiful open forest or park-like country; it was a very beautiful and rich country. The vegetation was intensely interesting. In the high grass were many anthills. Black-faced Wood Swallows were still plentiful. The first specimen of the Black-tailed Tree-creeper (*Climacteris melanura*) here came under observation. Rufous-breasted Whistlers were plentiful as we were passing through thick scrub. Some of the *Eucalypts* were in blossom here, many trees being capped with masses of bloom.

It was very interesting to see numbers of Black-faced Wood-Swallows clustering on the gum blossom for the honey the flowers contained. We were now passing through a wonderful piece of country, well timbered and grassed, and the land was rich. Much of this country was park-like in appearance. We went into camp at 136 miles alongside a fine waterhole. Birds round this camp were very numerous. Species seen included the long-tailed Finch (*Poephila acuticauda*), very plentiful in the bush country; Banded Finch (*Steganopleura bichenovii*), very numerous in the thick brush along the watercourses; Chestnut-eared Finch, Diamond Dove, Red-browed Pardalote, Quarrion. This bird was very numerous, and there were large flocks com-

posed mostly of young birds. They rose in parties of eight or ten to twenty, right in front of the cars. Budgerygahs were also in great numbers. Galahs, Red-tailed Black Cockatoo (*Calyptorhynchus banksi*), were seen in very large flocks. Brown Flycatcher (*Microeca fascians*) were numerous. Apostle-Bird (*Struthidea cinerea*) were seen in large parties. A large Brown Quail (*Synoicus*) was flushed in the high grass, but the species was not identified. There was also a species of Honeyeater (*Melithreptus*) which was not identified. The Red-backed Kingfisher was seen. Native Companions, Black Falcon (*Falco subniger*), Black and White Fantails, and the White-eyed Duck (*Nyroca australis*) were also observed.

Leaving camp early next morning, June 4th, we passed through beautiful, well-grassed, park-like country. There were a good many natives, mostly of small stature. Their dead were seen on platforms in the trees. Reached Daly Waters Telegraph Station during the morning, and received a great welcome from the officer in charge, Mr. Hultze, and his assistant, Mr. Woodroof. We had now travelled 1,650 miles. Weather was mild, the last night temperature being 54 deg. F. Gouldian Finches (*Peophila gouldiae*) were numerous here. Next morning a beautiful specimen of the White-breasted Cuckoo-Shrike (*Graucalus hypoleucus*) came and sat on a stump near the cars. Soon after leaving Daly Waters we were in high grass up to 8 feet high. Black-faced Wood-Swallows were numerous still, and at 23 miles we saw a very large flock of Masked Wood-Swallows (*Irtamus personatus*). We had now some very rough country to get over. There was a beautiful wild flower, like a globe amaranth, which covered hundreds of acres, producing a bright pink coloration over the whole landscape. This with thousands of butterflies made an unforgettable scene. We camped on water at noon.

Gouldian Finches, mostly immature, were numerous. The Red Goshawk (*Erythrotriorchis radiatus*), the Red-winged Parrot (*Iprosimictus erythropterus*), Black-tailed Tree-creeper (*Climacteris melanura*), Pied Butcher-Bird, and Black and White Fantail, were noted here. We were running down a chain of waterholes along a creek. High grass was everywhere. We came to a grave marked "John Pearson, died May 29th, 1899." Tree marked on the side of waterhole —; another tree 70 yards west marked M. This was the waterhole where John Forrest, afterwards Lord Forrest, camped when he reached the overland telegraph on his great journey from Perth in 1874. Brown Hawks, the Little Wood-Swallow (*Irtamus minor*) and the Red-breasted Babbler, were seen here. We camped on water that night, and it was cold, 35 deg. F. Monday, June 5th, we were travelling through high grass. Many Wrens (*Malurus*) were flushed, but not a single male bird in summer plumage did we see, so it was impossible to identify the species. Passing over a flooded area which was covered in grass 8 to 10 feet high, the Warlock Ponds



A Water-hole in the Northern Territory. Haunt of Egrets and Jabirus amongst the Water-lilies (*Nymphæas*).

were reached. These waterholes had beautiful flowering water-lilies on their surface, and there were thousands of birds. *Jalirus (Xenorhynchus asiaticus)* stalked about in the water, and struck quaint attitudes. Coots (*Fulica atra*) were in hundreds. Plumed Egrets, White Ibis, Pelicans, Large Black Cormorants, and Pied Cormorants were in numbers. Still going north, we passed through a beautiful park-like country with bright flowering shrubs, and trees with leaves changing from green and yellow to gold, and from that to red and crimson.

The rich, ruddy-brown termite mounds amongst the golden grass made a wonderful landscape. Wedge-tailed Eagles (*Accipiter audax*) were seen, and Brush Bronze-winged Pigeons (*Phaps elegans*) were numerous for the last few days. The Partridge-Pigeons (*Geophaps smithi*) now put in an appearance; they kept very close to the ground, creeping about with their heads down, and in some instances they even allowed the cars to pass over them. Waterholes in the timbered country were met with, and they were covered in very beautiful blue Water Lilies. With a Snow-white Egret or two perched on a snag or fallen tree these made a wonderful picture. A beautiful Yellow Hibiscus came into the landscape; also a tango or deep ruddy orange coloured flowering gum made its appearance. Quail (sp. ?) and Masked Wood-Swallows were numerous. We reached the outskirts of civilisation in the Territory at Marremboy that night, having travelled 1840 miles. The night was cool (42 deg. F.). We observed that the Brown Hawks have changed and have no ruddy coloration being of the *I. b. occidentalis* type. There were many bright flowering Grevilleas, which attracted many Honeyeaters.

Next morning, June 6th, we moved on at an early hour, and soon entered a very rough and hilly country. There were patches of a long-leaved Mulga, and there were some of the chrome or tango-coloured flowering gums, the great masses of bright blossoms having a very marked effect upon the landscape.

We descended a very deep gorge, through which a creek found its way. The scenery was very beautiful. We met with several big flocks of Partridge Pigeons, and the Leatherheads, or Noisy Friar Birds (*Philemon corniculatus*) were making a great noise amongst the strange tango-coloured gum blossoms. The whole of the country is here heavily timbered. The Black-faced Cuckoo Shrike was there, and several Red-winged Parrots passed over. We also met with large flocks of Quarrions and Galahs. At 11.50 we had reached the Katherine River. Having forded this deep watercourse, the cars came out up a steep bank over 100 feet high. We camped on the north side of the Katherine, and were on the move at a very early hour next morning to try to make Darwin that night. We passed through open scrub country till we reached Pine Creek.

Many watercourses were now winding in front of us, and at Brock's Creek we examined the pineapple plantations, the

fruit being of excellent flavour. Most of the creeks had the large variety of ornamental bamboo along their banks. The McKinly Creek was very beautiful. The country is a very beautiful and well watered one. The run into Darwin was fine.

Many Kangaroos of a small species crossed our path during the late afternoon and evening. We reached the hotel at 7 p.m. Next day was spent sending off telegraph messages to the south, calling on the Administrator, etc. On the 9th, after breakfast, we made out on to the Rapid Creek; the country was very heavily timbered, and there was much bird life there. Saw Drongos (*Chibia bracteata*), Olive-backed Orioles (*Oriolus sagittatus*), Yellow Oriole (*O. flavocinctus*), Green-winged Pigeon (*Chalcophaps chrysochlora*). These beautiful pigeons were numerous. Bar-shouldered Doves (*Geopelia humeralis*), very common; the White-breasted Cuckoo-Shrike (*Graucalus hypoleucus*), White-shouldered Caterpillar-eater (*Campephaga tricolor*), and Varied Lorikeets (*Psittenteles versicolor*), in great numbers amongst the flowering Eucalypts.

We had a trip down the coast for about 50 miles one day, but saw very few sea birds. A Tropic-Bird and a few Terns were all that came our way.

We made a start at an early hour on the return journey on Monday, June 12th. We had not gone far from Darwin when the Forest Kingfisher (*Halcyon macleayi*) was met with. There were some large flocks of Black Cockatoos (*Calyptorhynchus macrorhynchus*). White-breasted and Black-faced Cuckoo Shrikes, White Ibis, Black-headed Stork or Jabiru, White-faced Heron, Pied Butcher Birds, Diamond Birds (*Pardalotus uropygialis*), Partridge-Pigeons, very numerous; Long-tailed Finches, Kites, Whistling Eagles, Little Wood-Swallows (*Artamus minor*), Nankeen Night-Heron (*Nycticorax caledonicus*), Plumed Egrets, Magpie-Larks, Red-backed Wrens (*Malurus melanocephalus*), Nankeen Kestrels (*Cerchneis cenchroides*) were all seen, and Wedge-tailed Eagles (*Uroaetus audax*) were plentiful during the day. It was all timbered country, and the cycads, palms, bright flowering shrubs, and forest trees, as well as the magnetic termite mounds (all with long axis north and south), spiral mounds, and others again huge buttresses 25 feet high, all made a wonderful scene. We arrived at Pine Creek in the evening, and at 3.30 a.m. next day we drove out into the ranges to a rich valley, where the Chinamen are growing rice.

The party returned to the hotel for breakfast, after which we continued our way south. Crimson Finches (*Neochmia phacton*) and Gouldian Finches were numerous, and Red-faced Finches (*Bathilda ruficauda*) were seen. We reached the Katherine River at midday, and Marrimboy by 5 p.m. We left there at 8 a.m. the following day, and halted on the edge of several lily ponds. The sight was very fine. By midday we had reached the head waters of the Roper River. The grass

was very long, and we had much trouble getting through, much of it being over 8 feet high. We came to the site of the old Elsey Station, saw Mr. Gunn's grave, crossed the Elsey River, and at 103 miles from the Katherine we came upon the remains of Birtles' car and camped near a hole in the Burdum Creek. For the next day we followed the Burdum Creek down for a long way. We reached Daly Waters Telegraph Station in the afternoon. Black-tailed Tree-creepers, Rufous-breasted Whistlers, Red-wing Parrots and Bronze-wing Pigeons were noted. The weather was very hot. Next morning we were away by 8.30, passing through a wonderful country, open forest land, till we reached Frew's Ironstone Ponds. Here we saw Pelicans, Little Grebe (*Podiceps ruficollis*), Coots, and around the ponds there were Native Companions or Australian Cranes, Budgerigahs, Chestnut-eared Finches, Crows, Diamond Doves, and Red-backed Kingfishers. The dry country birds were now putting in an appearance. The treeless Sturt Plain, with its ruddy-brown grass, was traversed; the only birds seen were Bush-Larks.

When we got back to Newcastle Waters there were many Pratincoles. The next day we got the cars over the water (or, more correctly, under the water). At 1 p.m. on the 17th of June, we left the scene of our great adventure with the troublesome water behind us, and with cars too heavily loaded by far struck out to the eastward, passing over a saddle in a low range. The vegetation was the Blue-leafed Gum, Bloodwood and Paperbark (*Melaleuca*). At 4 miles we changed our course to S.S.E., with a vast open plain under waving grass to the east. We were following the foot of the range, avoiding going out on to the plain till we were compelled, for it was very rough going. Black-faced Wood Swallows were plentiful. A hen Bustard came within a few fet of us. Black and White Fantails or Willie Wag-tails were plentiful. Jacky Winter (*Microcca fascians*), Crimson Chats and Brown Hawks were seen, the last-named having the dark coloration of *I. b. occidentalis*. The Rufous Song-Lark was seen, but was very silent, a well-known habit when the birds are not nesting. A Spotted Harrier (*Circus assimilis*) went skimming over the waving grass, and Galahs were seen travelling towards the ranges. At 34 miles from Newcastle Waters I saw a very rufous Bush-lark hovering over the grass; it was one of the *Mirafra*, without doubt; this may be *M. rufescens*, of Ingram.

We now took our course over the great plain, which was fearfully rough, and threatened to shake everything to pieces. We came to a depression with some box trees, called Tandiger Creek by the natives, 44 miles, when darkness came upon us, and we camped on a fine waterhole. The night was mild (50 deg. F.). When the day broke a lovely scene unfolded itself—a fine sheet of water with large box trees along its edge, and a great many White and Straw-necked Ibises in the trees. There were Blue

or White-faced Herons and Whistling Eagles, and a Weebill (*Smicrornis*, sp. ?). Leaving camp early we had difficulty in finding a crossing. At 50 miles we entered a well-grassed flat, with bean trees. We passed over a very rough piece of country, and at 74 miles made Monmoona Creek. Nankeen Kestrels were very numerous here. We followed the creek down for a long way, and then made out over the treeless plain. Several waterholes were seen in low depressions or "gilgies," and here Squatter-Pigeons (*Geophaps scripta*) were met with in great numbers.

They kept down in the long grass during the greater part of the day, but towards evening rose and congregated in great flocks of several hundreds, and flew round and round the waterholes. After drinking, they flew round for a while and dropped in pairs or ones into the grass almost in the darkness.

Although there were many hundreds of fully-fledged young, odd pairs were still breeding. Some of my companions saw a pair doing the broken-wing trick, and several specimens taken by me showed unmistakable signs of breeding. The writer saw one pair of Chestnut-quilled Rock-Pigeons (*Petrophassa rufipennis*) on a rocky ridge, the only time these birds were seen. Bustards were very plentiful on these vast prairies of rolling grass, and there were numbers of Quail. I secured specimens of a light form of Bush-Lark (*Mirafra*), with large bill, which I am not able yet to place. The night of the 18th was cold (44 deg. F.). We moved off next morning early, and during the day saw many Brown Song-Larks. I secured a very small Boobook Owl of very light coloration from the long grass, which appears to be a very distinct type. We were out on vast plains—not a shrub, let alone a tree, in sight; and the ground over which we were travelling was fearfully rough. Hunted for some time for a crossing over the lately flooded "Broad"—a deep and wide depression in the plain. Having reached the far side, we were out on to the bumpy plain again amongst the long grass.

We now struck rising ground, in places all the world like islands in a sea of grass. On these islands, or pieces of elevated ground (which are islands in reality in wet time, for the grass land would be soft and boggy all round), low scrub was growing, a stunted round Blue-leafed Gum, Bloodwood, a bright yellow flowering Cassia, and other shrubs. A Brown Hawk was seen, but he was of the dark variety. The Australian Pratincoles (*Stiltia isabella*) were very numerous, and were seen in dozens upon any bare piece of ground. We bumped through the grass over rough ground for many miles, and then reached higher ground and better going, soon to meet rough ground again.

On the evening of the 21st we went into camp on a "gilgie"; there was very little muddy water, and no wood. We boiled the billy with dry mallow stems. The night was cold (44 deg. F.), with a strong S.E. wind blowing. Next morning

there were great numbers of Squatter-Pigeons all round, taking their morning flight. There were many hundreds of birds in some of these flights. There were also many Native Companions, or Australian Cranes, and one dance consisted of a hundred performing birds—a most wonderful sight. Their strange calls were heard throughout almost every night, while we were on the great plains. At midday we were much relieved at the sight of Anthony's Lagoon at 180 miles. We had been making for this water across the trackless plain, and we were now rapidly approaching the Queensland border, and getting within the pale of civilisation once again. We continued on from Anthony's Lagoon, and traversed country similar to that near Barrow Creek, the vegetation being the same, and the red termite mounds had re-appeared. Black-faced Wood Swallows had also come into evidence, and the everlasting "Porcupine Grass" (*Triodia*). White-headed Stilts were seen on Anthony's Lagoon, and there were thousands of Chestnut-eared Finches drinking there.

We now passed over open downs country covered in a great crop of Mitchell Grass, for all the world like a crop of wheat ready to harvest. We came to a creek thickly lined with Gidgea trees, and cattle were seen, so we knew we were approaching a cattle station. Brunett Downs was reached at 4.30, at 58 miles from Anthony's Lagoon. Next morning we went down to the large waterhole and found vast numbers of Pelicans, both the Large and Small Black Cormorants, and the Little Pied Cormorant, White-faced Herons, Black-fronted Dotterels, Caspian Terns (*Hydroprogne caspia*). Mr. Barnard did a good deal of work here some little time ago. We left at 9 a.m., and made rapid strides homeward, for we had a beaten track now.

Cloncurry Honeyeaters were very plentiful all through the country, and the White-barked Gums were often seen. Willie Wagtails were seen. Alexandra Station is one of the largest in the world (12,000 sq. miles, with 50,000 cattle). At 150 miles, Black-faced Wood-Swallows, Bush Larks, Brown Hawks, Kestrels, Pratincoles, were very numerous. We came to the Rankin River at 163 miles, and passed through waving Mitchell and Flinders grasses. We camped on Lorne Creek. On June 22nd, a very cold morning, we made away through the Acacia shrubs, and were soon passing through "Mulga" (*Acacia anura*). Over the tableland country we saw many Kestrels. At 254 miles from Anthony's Lagoon we came to a gate, and passed through into Queensland. The country changed. It was very bare and poor, and at 263 miles we came into Camooweal. We left at 6.30 p.m.; went four miles, and camped in low scrub; very poor country, very dry, and no water. Our next stage to water is 50 miles. For 8 miles, stunted Blue-leaved Gums, and we crossed the Georgina at 27 miles; stopped the car, for I was sure the MacGillivray Parrot (*Barnardius barnardi macgillivrayi*)

passed overhead. They flew so rapidly that I lost sight of them. We now entered rough rocky ranges. Black-faced Wood Swallows were all along the track, and Rufous Whistlers were heard and seen. Pied Butcher-Birds and Hooded Robins were noted. At 99 miles from Camooweal we stopped for lunch in a deep gorge, on the bank of a creek lined with Redgums. As soon as I got out of the car I saw the Macgillivray Parrot, and secured a specimen. They were very silent, and kept up in the leafy tops of the Myrtle trees. The birds seen on this creek were the Barn-Owl, Red-breasted Babbler, Crested Pigeon, Pied Butcher-Bird, and Yellow-throated Miners. We were on the Leichardt Creek in the afternoon, but the birds did not differ.

Kestrels were often seen. Redgums, Mulga, Bloodwood, Gidyea, White-barked Gums, Cassias, Porcupine Grass, and other vegetation were seen during the day. The country was very rocky, dry and dusty; in fact, the dust was awful at times. At 147 miles, we camped at 6.30 near a beautiful bush of pink flowering Hibiscus. The night was mild, the glass falling only to 58 deg. F. At daylight we were on the move, and passed through some very rough but picturesque country. Great masses of rock covered in vegetation towered over us, as we passed through some of the gaps in the ranges. The same birds were seen. Galahs made their appearance again. At 262 miles we made the town of Cloncurry, and stayed there the night. Leaving at 10 a.m., June 25th, we passed out over a rocky ridge and into the ranges beyond. The country was very rough, but picturesque. In one place a great mass of granite boulders was simply alive with Wallaby, and we pulled up and watched them gambolling about. There was little change in the birds.

A little after leaving Cloncurry a small party of Macgillivray Parrots was seen. Emus were met with. We had not seen any of these birds in the Territory. Black-faced Wood Swallows were numerous. Shell-Parrots were met with, and Black-backed Magpies put in an appearance. Chestnut-eared Finches, Masked Wood-Swallows, Brown Hawks and Spotted Harrier were all seen. Yellow-throated Miners were there; also Red-breasted Babbler, Bower Birds, and Grey Jumpers were seen. The vegetation changed but little. We camped at 125 miles for the night. The night was mild (57 deg. F.). We were up early. The birds seen round the camp were:—Black-backed Magpies, Galahs, Pardalotes, Weebills (Tree-Tits), Cloncurry Honeyeaters, Black-faced Wood-Swallows, Whistling Eagles, Chestnut-eared Finches. Birds seen during the day on our line of travel were Black and White Fantails, Square-tailed Kites, Restless Flycatcher, Red-backed Kingfisher, White Egrets, Australian Pipits, Spotted Harrier, Little Falcon, Wedge-tailed Eagle, Quarrions (Cockatoo Parrots), Pied Butcher Bird, Australian Bustards, and Emus. At 223 miles we made Winton—a large town. We had lunch and sent away wires, and we were off again.

At 76 miles from Winton we went into a dry camp after dark. The night was warm (60 deg. F.) Small Pied Butcher Birds, Crows, Crested Pigeons were round our camp. Quarrions and Australian Cranes were seen. On the 27th of June we covered a good piece of country, and reached Longreach, 121 miles from Winton. Observed few birds during the morning. After leaving the town saw Yellow-throated Miners, Black-faced Wood-Swallows, Crested Pigeons, Black-faced Cuckoo-Shrikes, Fantails and Singing Honeyeaters; we travelled through high grass much of the time. On Balkaldena Station, at 73 miles from Longreach, Australian Cranes and Grey-crowned Babblers (*P. temporalis*) were seen. We camped that night on a very low piece of ground, but in a beautiful district. The weather was threatening for rain, and it set in during the night, developing into a down-pour; so we were fixed for a while, as we could not move.

The vegetation was very lovely. Next day Emus came right up to the camp. Australian Cranes were close by. Grey Ducks, Laughing Kookaburras (*Dacelo gigas*), Restless Flycatchers, Jacky Winters, Wrens (sp.?), Thornbills (sp.?), Frogmouth (*Podargus*, sp.?), Spiny-cheeked Honeyeaters, Rufous Song-Lark (*Cinchorhamphus mathewsi*), the last-named singing very loudly; Galahs, Whistling Eagles, Crested Bell-Bird, Pied Butcher-Bird, Yellow-tailed Black Cockatoos, Red-wing Parrot, and Bower Bird were noted. We pushed on over a sandy piece of country, which was well timbered. We now got on to black soil, which was very wet, and we had a great job to make any headway. We went into camp after dark on low ground, and heavy rain set in. The morning of the 29th found us in a pretty mess, for we had to remain till the country dried up. Birds round the camp were Australian Cranes, Striped Honeyeaters (*Plectorhyncha lanceolata*), Grey Thrush (*Colluricincla harmonica*), Crested Bell-Bird, Yellow-throated Miner, Bower Bird (the latter came on to the table for the crumbs), Narrow-billed Bronze Cuckoo (*Chalcites basalis*), Striated Thornbill (*Acanthiza lineata*), Yellow-tailed Thornbill (*Geobasilus chrysorhous*), Butcher Bird, Hooded Robin, Spiny-cheeked Honeyeater, Cloncurry Honeyeater, Chestnut-eared Finch, Crimson Chat, Restless Fantail, Crows, and Black-backed Magpies.

It was a cold night (37 deg. F.). We got away at 9.30 a.m., through fairly open grass country. We saw Emus, Australian Cranes, Kestrels. At 204 miles, 7.30 p.m., we reached Tambo, and were glad to get there, for the day has been bitterly cold. A cold night (37 deg. F.). On July 2nd, we packed up, and got away at 7.50 a.m. Going was very heavy, just natural tracks; heavy black ground. We saw Emus, Black-faced Wood Swallows. We reached Charleville at 7.30 p.m., at 332 miles. We had a bitterly cold day in the mud. The mercury dropped to 33 deg. F. that night. We saw Red-capped Robin, Brown Tree-creeper (*Climacteris picinnna*), Black-faced Wood-Swallow,

Emus, Brown Hawk, White Cockatoo (*Cacatua galerita*), and Wedge-tailed Eagle. We saw the first Rabbits to-day. We reached Cunnamulla at 7.35 (132 miles); a cold night (35 deg. F.).

We were away again at 9.45 a.m., across black soil country. Galahs were very numerous. Black-faced Wood-Swallows, Whistling Eagles, Brown Hawk, Bronzewing Pigeon, Pink Cockatoo (*Cacatua leadbeateri*). We arrived at Bourke at 296 miles at 6.30 p.m.; night cool (42 deg. F.). Away again by 10.30 a.m. on July 5th. We did not see many birds, as we came down the Darling River that day, and went into camp at 108 miles from Bourke. That evening we saw a good many Red-backed Parrots (*Psephotus hematototus*) and Galahs. Rain fell in the night, and made it very bad for us, for we had no tents. In the morning we saw many Black Cormorants, Little Pied Cormorants, Galahs, Crested Bell-Bird, Greenies or Chickawees (*Meliphaga penicillata*), Laughing Kookaburra, Tree-Swallows (*Hylochelidon nigricans*), Winking Owls (*Tyto connexus*) were calling in the night. That day Pelicans, Black-faced Wood-Swallows, Brown Tree-creepers, Restless Flycatchers, and Galahs were seen. We reached Wilcannia at 5.30, at 211 miles; a very cold day. Leaving next day, we saw Black-faced Wood-Swallows, White Cockatoos, Grey Teal (*Tringa gibberifrons*), Grey Ducks, and Spiny-cheeked Honeyeaters. We reached Menindie at 4.10 p.m., 95½ miles, after crossing the Darling on the punt. Along the river were White-necked Herons, White and Straw-necked Ibises, Pelicans, Grey Duck, Grey Teal and Black and Pied Cormorants. At 7.30 we went into camp, at 122 miles from Wilcannia. Next day, the 8th, it rained, and although we pushed on as fast as the slippery soil allowed, we saw few birds.

Some Emus, Yellow-billed Spoonbill (*Platalca flavipes*), Egrets, Grey Duck, and Grey Teal, Wood Duck (*Chenonetta jubata*). We reached Mildura thick with mud, and left again next day in the rain. At Hattah camped for the night. Reached Birchip, 86 miles, next day through heavy mud; it was bitterly cold. Next day, the 11th, made Ararat at 10.25 p.m., 221 miles. The following day we turned west, and reached Mt. Gambier at 4.55 p.m., 373 miles. The going was wet and sticky. Leaving Mt. Gambier on the 13th, we reached Robe for the evening meal; then went on to Kingston for the night. The following day went along the Coorong to McGrath's Flat—the Messrs. McCallum Brothers' station and home. Leaving McGrath's Flat before daylight next morning, we arrived at the G.P.O., Adelaide, at 11.20 a.m. on July 15th, with a huge crowd awaiting to greet us.

So 5,560 miles was accomplished across Australia since May 9th—a record that will take a lot of beating, but unfortunately too fast a trip for the best ornithological work. The writer has marked down the country to be worked, and will do this as opportunities are presented. Many notes were taken which should be valuable to science in general.

Birds of Lake Frome District, South Australia

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Part. I.

The Lake Frome District comprises about six thousand square miles of country. If we take a map of South Australia and draw a line from Farina through the centre of Lake Frome and on to the New South Wales border, this would very nearly represent the middle of the district. If we travel along this line in imagination, we will gain some knowledge of the country. First we start in the high rugged hills of the Flinders Range, then pass over "gibber" (small stones) tablelands, and open plains, till we reach Lake Frome, which is a lake in name only, it being nothing more than a saltpan, and containing water only in its deepest parts after a heavy rainfall. Passing over Lake Frome, we reach the sandhills, a collection of high red sand dunes, running in an east-west direction. We travel through these till we reach the New South Wales border. In the sandhills many small lakes are to be seen, unfortunately usually dry, and containing water for a few months only after rain. Several artesian bores form channels of water several miles long. These are the only permanent waters; in fact, with the exception of a few rock springs and a small area of mud springs in the Flinders Range, the whole district is devoid of permanent natural waters, though water is easily obtained by sinking wells. The district is unfortunately subject to severe droughts. At the time of writing it is eleven months since the last fall of rain.

The average yearly rainfall is 5 inches. To compile a list of birds in this part on a given date would not be fair to the district, for in drought time few birds are to be seen, they having sought better quarters, and in a good season the list would contain many species that visit the locality only at long intervals. The writer, from observations made during a period of 15 years' residence, endeavours to record every species identified during this time. Some of the notes may not agree with observations made in a country with a higher and more regular rainfall, but they tend to show that many birds alter their habits to conform with the conditions ruling in their habitat. It will be noticed that the breeding season is very irregular. In bad years, few birds attempt to breed; in fact, most of them seek better quarters, but, when a break-up of the drought occurs, they return and commence nesting operations at once. The best rains usually fall in the summer months, so that birds which breed in the spring about Adelaide are often found nesting in this district at the end of the summer or in autumn or winter. In good seasons some birds nest practically all the year, and in this way make up for the non-breeding years.

Dromaius novae-hollandiae. Emu.—Usually plentiful, except in very bad seasons, when they seek better quarters. Breed freely, preferring same nesting site year after year. Old bleached egg shells often noted with freshly laid eggs. No nest is formed other than that small sticks, stones, etc., that may have been on selected site are worked out in a circle. Clutch varies from 6 to 11 eggs, according to season. Breeding starts in normal years at end of April, and young are plentiful by end of June, does not breed at all in bad years; lives chiefly upon vegetable matter and fruits, which are taken whole, the stones being passed out in their normal state. A quantity of stone and hard objects is swallowed, possibly as an aid of digestion. No record has been made of an Emu having died from eating poisoned meat and pollard baits. Practically no grubs, grasshoppers or insects taken as food. Emus are rather troublesome to fences, and many meet their end through becoming entangled in fencing wires.

Coturnix pectoralis (Stubble Quail) and **Synoicus australis** (Brown Quail).—Occur only in good seasons, when both species, more especially the latter, appear in great numbers and inhabit the clover flats and swamps; no record of breeding in district.

Turnix velox. Little Quail.—These fine little birds come along in thousands when the season is favourable. Breed in fair numbers; clutch, 4 eggs. Nest a small grass-lined depression in ground under grass tussocks at edge of small swamps, crabholes or almost any situation affording cover. Gives two or three squeaking calls when suddenly flushed.

Pedionomus torquatus. Plain-Wanderer.—Very rare, only two having been seen during last three years. A female was captured and presented alive to Capt. S. A. White. No record of breeding.

Geopelia cuneata. Diamond Dove.—Common, breeds freely. Nest, a few light twigs used in forming a flat frail platform, which is usually placed in a fork of a low tree, sometimes on the top of an old Babbler's nest, and at other times on debris washed up in bushes in creeks. Clutch invariably 2 eggs, which can generally be seen through bottom of nest. Bird sits close to eggs and young. Both birds feed young. Breeds at any time of year in accordance with season. Its mournful note is often heard during the night, especially in breeding season.

Phaps chaloptera. Bronzewing.—Plentiful, breeds freely. Nest a platform of sticks in a horizontal fork in low, thick bush or on a heap of debris in a tree. The depression for eggs is better defined than it is with the Crested Pigeon. Young birds have adult plumage from nest, but the colour is somewhat pallid in comparison. These fine Pigeons congregate in great numbers at some of the springs. Just at dusk and at daybreak they come and go singly, landing with a thud a little distance from water and walking in. They prefer dark gullies and the shade of thick trees by day. Usual breeding season, August to October, but of course depending on rainfall, still it is more regular than most of the birds. Clutch, 2 eggs.

Lophophaps plumifera. Plumed Pigeon.—Only a single specimen noted on "gibber" (stony) tablelands.

Ocyphaps lophotes. Crested Pigeon.—Very numerous. The metallic sound made by these birds as they fly in flocks of a hundred or more strong is wonderful. Breed freely; nest a frail platform of sticks placed in fork of tree, upon old nests of almost any of the larger birds or on top of creepers and parasitic growth in low bushes, usually placed within 10 feet of ground, though a record has been made, 14th May, 1919. Saw Crested Pigeon flush from two eggs in nest built inside old Magpie's nest, 24 feet from ground. Clutch is invariably two eggs. Birds sit closely on eggs and young; the young

assume adult plumage before leaving nest, but the coloration is not as bright as in the adult bird. This Pigeon usually deserts nest if eggs are handled, but before doing so will push off any eggs in the nest. The writer has observed them do this on more than one occasion. They do not desert the young when handled. If "an exception proves the rule," I might say that I have taken an incubated set from one bird, but later on found a fresh set, and not wishing to take both, I restored the incubated set to its nest, and the Pigeon which was sitting on nest, when I returned, successfully reared its young.

Porzana fluminea. Spotted Crane.—Rarely seen in swamps; no record of breeding. One bird chased by Black Falcon took refuge in house, and is now doing well in captivity.

Tribonyx ventralis. Black-tailed Native Hen.—In good seasons it comes along in thousands, and a few birds can generally be noted along bore streams. Breeds occasionally in polygonum swamps; clutch 5 to 7 eggs. Record made, "19th September, 1918. Moolawatana Bore. Thousands of Water Hens disappeared during night, none visible this morning." Heard afterwards that a heavy thunderstorm fell on 17th September, 1918, at a station 60 miles away, and thousands of these birds arrived the day after.

Porphyrio melanotus (Swamp-Hen) and **Fulica atra** (Coot).—Rarely seen, remains only a short time. No record of breeding. During a hot summer, 1916, one bird (Swamp Hen), apparently in need of water, came into the fowl yard and continued to live with domestic fowls for several months, and became very quiet, but when rain fell it disappeared.

Podiceps poliocephalus. Hoary-headed Grebe.—This is probably the only species of Grebe found in district, certainly it is the only resident. Fairly numerous in good seasons, and odd pairs may be seen at any time on small natural pools of water in hilly country. Breeds freely on swamps in good season and also on small springs. The nest is a compact mass of water-weeds, rushes, etc., attached to reeds, rushes or almost any object standing in water. The nest itself floats on the water; clutch, 3 to 5 eggs. Before leaving nest, the bird drags up a quantity of water-weed, and completely covers the eggs. I have never observed the bird covering herself when sitting on eggs, nor do I think that she does. The eggs are a bluish white, sometimes slightly lime encrusted, when first laid, but from contact with vegetable matter they gradually change to a dark chocolate brown when at point of hatching. Young birds leave the nest as soon as hatched. The young are dusky brown, covered with down with a few grey spots here and there. The flight of this Grebe is very rapid, straight ahead and low. Have often made it fly from small pools. Breeding season of visiting birds takes place when conditions favourable—swamps full of water—but the resident birds usually nest in September to November.

Chlidonias leucopareia (Whiskered (Marsh) Tern), **Gelochelidon nilotica** (Gull-billed Tern), and **Hyproprogne caspia** (Caspian Tern).—The two smaller Terns visit the district in fair numbers, but only an occasional Caspian Tern has been noted in good seasons; probably do not breed in district.

Larus novæ-hollandiæ. Silver Gull.—A few Gulls noted every good season. One bird was feeding with domestic fowls on 28th February, 1919, a very hot and dry time; stayed only a few hours. A young bird in down just able to fly captured alive at bore stream. Possibly reared in district. No record of its breeding in locality.

Erythrogonys cinctus. Red-kneed Dotterel.—A few birds generally found along bore streams, and a great increase in number takes place

in good seasons. Breeds on small islets in swamps and along bore streams; nest a slight depression in sand, usually scantily lined with short pieces of dry herbage and invariably placed under a bush; clutch, 4 eggs. Whereas Red-capped and Black-fronted Dotterels are usually found in pairs, this species is usually in fair-sized companies.

***Lebixyx novae-hollandiae*.** Spur-winged Plover.—A few pairs always along bore streams; nests on small islets in stream, making a slight depression in ground. This is usually lined with short pieces of sapphire, saltbush and grass, and a few pieces of dried earth are placed round depression. Eggs, 4 in number, placed with pointed ends to centre of depression. Breeds in August and September. Apparently visitors even in good seasons.

***Zonifer tricolor*.** Black-breasted Plover.—Nomadic, appearing only when grubs or grasshoppers are about. Nests freely. Eggs, four in number, placed points in centre in a depression in ground; a slight lining of small twigs and grass in depression usually surrounded by several pieces of horse manure. Breeds at any time when conditions favourable. Resorts to the usual decoying antics to lead one from its nest. Have seen a bullock tread upon the wing of one bird that fluttered about to protect its nest. The wing was broken, but this did not prevent the bird from returning to its four "chipping" eggs.

***Charadrius ruficapillus*.** Red-capped Dotterel.—Resident along bore streams and springs; numbers largely increasing in good seasons, when it breeds freely, laying its usual complement of two eggs in a small depression, no lining, on open ground on a small islet. Occasionally nests may be found as far away as a mile from water; in these cases the nest is usually formed close to a bush. Young birds leave the nest as soon as hatched, and apparently need no instructions in the way of disappearing from one's sight. They are curiously mottled, downy objects, and when crouched down look like a hairy caterpillar curled up; they resort to the well-known tricks to lead danger from nest and eggs and the young, but only if suddenly flushed.

***Charadrius melanops*.** Black-fronted Dotterel.—Found in pairs along bore streams and at springs—in good years, however, their numbers largely increased. Breeds freely, laying two or three eggs in a slight depression in ground, usually close to edge of water and rarely on islets. The depression is generally lined at bottom with small, short, dry twigs. When available a stone-strewed patch of sand is selected as a nesting site, and the eggs are then hard to locate, especially as the bird keeps a good look out for danger and leaves the nest quietly. If suddenly flushed direct from nest it pretends the broken-winged tricks to perfection. In good seasons this bird nests at almost any time, but in normal years during October to December.

***Peltohyas australis*.** Australian Dotterel.—The writer has fully dealt with this bird in the "S.A. Ornithologist," vol. v., part 2, April, 1920. The only additional note is that although the writer has not observed this fine bird watering at stock tanks or troughs during the hot summer months, when there was no surface water, his brother (L. K. McGilp) records that upon an evening early in January, when camped at a stock tank, he saw hundreds of Dotterels come to water just at dusk.

***Himantopus leucocephalus*.** White-headed Stilt.—Rare visitors, remaining only a few weeks, usually in summer months. No record of breeding.

***Recurvirostra novae-hollandiae*.** Red-necked Avocet.—A few always present along bore streams and at mud springs. When lakes are full, thousands of them come along and commence breeding operations im-

mediately. In May, 1918, thousands of young were reared; clutch, 4 eggs, placed in a bare depression, rarely lined, in damp mud of islets. Nesting in colonies, nests being close together. When disturbed they give forth their loud barking call so energetically that one cannot hear another speak. The young leave nest as soon as hatched, and are curious balls of light-coloured, mottled down. It is a pretty sight to see the parents with the young chicks wading along water's edge, the young look like Red-capped Dotterels from a short distance. Parents make no attempt to protect the nest other than flying overhead "barking" continuously. Eggs are placed with points to centre of nest.

Pisobia acuminata. Sharp-tailed Stint.—In February, 1918, some of the deeper parts of Lake Frome held flood waters. Thousands of Swans, Ducks, small Dotterels, Avocets soon gathered there. On May 18th thousands of these Stints were first reported to me. I visited the lake and found much of interest, as this was my first introduction to the bird in its natural state. Truly, they were in thousands, but were divided up in flocks of fully 500 strong. When disturbed, I was astounded to watch the perfect "company" flying of each flock; they twisted and turned as one bird, and all settled practically as one mass in the water. I discharged shot after shot to disturb them, and each time their evolutions were wonderful. None remained by 10th July. This is the only record for district, as it was also a record so far as water to any extent being in Lake Frome during my residence at Moolawatana.

Stiltia isabella. Australian Pratincole.—Locally known as "Spear-wing" on account of its pointed wings. Visit locality in large numbers in good seasons only. Breeds occasionally, laying 2 eggs only—small ends together, on bare ground, no depression formed. If a stone-strewn spot is chosen as a nesting site, the stones are scratched out in circle, but more often a hard, bare clay patch is chosen. Young leave nest as soon as hatched, and when approached either crouch down in herbage or in small cracks in ground and even down rabbit burrows. Birds sit closely to eggs, and when disturbed pretend injury, but will quickly return to nest or young. On account of protective coloration, they are hard to see until their bobbing action calls one's attention. When not nesting they are very wary, and easily take to flight, which is a peculiar "side-slipping" action. The call is a plaintive whistle. These birds may be seen watering at stock tanks at any time during the day.

Burhinus magnirostris. Southern Stone-Plover.—Fairly plentiful in ranges, but rarely seen or heard on the plains and sand hills. Breeds in September and October, two eggs being deposited on bare ground at the foot of a small shrubby bush. Bird sneaks quietly from nest and remains close at hand.

Eupodotis australis. Bustards or Wild Turkey.—When a good season gives an ample supply of food in the shape of grubs and grasshoppers, these birds appear in numbers, but they leave to follow the food supply. For many years none nested in district, though about ten years ago several nests with the single egg were noted. The egg is laid on bare ground close to a shrub, and invariably rising ground is chosen for the nesting site. The old male birds are the last to arrive and the last to leave the district. When danger is near, the female, which does the incubating, will often crouch down on its nest, but directly one stops near the nest, she sneaks a few yards and then rises. If one continues straight on she will remain on nest.

Antigone rubicunda. Brolga (Native Companion).—Small parties come along in good seasons when lakes are full; others are often seen passing over district flying at a great height. Only once saw a party of 23 birds dancing on a flat near a bore stream. One record of a

nest in district. On a small islet in Teatree Lake a large nest was placed on the ground between cane-grass; it was a flat mass of sticks and grass, some of the latter being quite green. Two Brolgas were close at hand, and appeared very nervous, but did not leave the vicinity. The nest resembled a Swan's nest, but was built of finer materials. A few days afterwards a thunderstorm filled the lake, covering the island with water, and the birds disappeared. Date, May 29th, 1918.

Threskiornis molucca (White Ibis) and *Threskiornis spinicollis* (Straw-necked Ibis).—Visitors in good seasons. Very few of the former species, but large numbers of the Straw-necks. The White Ibis prefers to remain about swamps and creeks containing water, but the other species spends most of its time feeding on flats, seeking after grubs, many of which they secure from out of the ground by probing down with their long bills. The Straw-necked Ibis is indeed a very valuable bird.

Plegadis falcinellus, Glossy Ibis.—A rare visitor for short periods only. In the summer of 1912 one bird walked into the house at an out station; it was almost exhausted from want of water and the extreme heat. It remained for quite six months, during which time it became so tame that it allowed itself to be caught. It was amusing to see it and a kitten playing together. It did not seem to relish the usual scraps thrown out from the hut, but preferred to secure its own food. Every morning, it paraded a wire fence a few yards in front of the house, at every post it would poke its bill into the wire holes within reach and in this way secured a great many spiders, etc. It disappeared one night in May or June.

Platalea regia (Black-billed Spoonbill) and *Platalea flavipes* (Yellow-billed Spoonbill).—A few of the former and a fair number of the latter occasionally call in for a short period during good seasons. It is amusing to watch both species fishing; they wade along in shallow water with their long spoon-like bill right down in the water, the bill is worked from side to side as the bird walks along. No record of breeding.

Egretta (species ?).—In July, 1918, several white Egrets were seen on a fresh-water lake. No specimen was taken for identification. It was possibly the Plumed Egret. They remained only for a week or two. No other record.

Notophox novæ-hollandiæ. White-faced (-fronted) Heron.—Fairly common in good seasons. Breeding now and again in gums, the usual stick nest; clutch, 3 eggs. Odd pairs remain in hills, around permanent springs.

Notophox pacifica. White-necked Heron.—Very numerous in good seasons, and they prefer to spread over the district on small crab-holes and claypans. No record of breeding.

Nycticorax caledonicus. Nankeen Night Heron.—Usually a few birds in box trees along bore streams, numbers largely increased in good seasons. Birds in immature plumage also plentiful, but I doubt if these Night Herons breed in district. Have not seen plumes on any adult birds.

Chenopsis atrata. Black Swan.—Visits the district in large numbers when lakes are full, immediately starts breeding, building its nest of small branches of trees, bushes, leaves and down from its own breast. Nests are sometimes within a yard or two of one another. In May, 1918, hundreds upon hundreds nested on islands in deeper parts of Lake Frome. The clutch varied from 4 to 7 eggs. A small band of aboriginals camped on edge of water, and until my visit were living upon the young and eggs of the Swan. I threatened to stop their rations from the Government, and I also called on them the next

night with the remains of a bag of bait, which I scattered close to their camp in the dark. The following day they cleared out, and the birds were left to rear their young. The aborigines claim that the Swan will continue to lay eggs so long as they are removed from the nest as long as the water lasted in the lake. I would not vouch for this. I camped about a mile from the island, and just after sunrise something disturbed the Swans from the water; the roar made by their wings striking the water, in their clumsy effort in rising resembled the roar of a heavy sea, a rushing gale of wind, or an express train some distance away.

Anseranas semipalmata. Pied Goose.—A party of eleven is the only record; seen on stock tank for one day only; disappeared during night.

Anas superciliosa. Grey (Black) Duck.—Common in good seasons, generally a few residents on stock tanks, bores, etc. Breeds freely; nest made of a few thin twigs and leaves in a depression under samphire, polygonum, on islands in lakes. No hollow trees in vicinity. Breeding season after first rainfall in year sufficient to fill lakes. A few resident birds nest in reeds and rushes of permanent springs; these nest in September or October. Clutch from 6 to 8 eggs; eggs in nest usually partly covered with down.

Chenonetta jubata, Maned Goose; *Dendrocygna eytoni*, † Plumed Whistling Duck; *Virago castanea*, ° Chestnut-breasted Teal; *Virago gibberifrons*, Grey Teal; *Spatula rhynchotis*, † Blue-winged Shoveller; *Malacorrhynchus membranaceus*, Pink-eared Duck; *Stictonetta naevosa*, ° Freckled Duck; *Nyroca australis*, White-eyed Duck; *Oxyura australis*, * Blue-billed Duck; *Tadorna tadornoides*, Chestnut-breasted Shelduck (Mountain Duck).

All these Ducks have been identified at one time or another. Those marked * recorded for first time in May, 1918, have not appeared since; 1918 was a record year for rainfall, and all the small lakes were filled. Those marked † are rarely seen except in good seasons. All the others appear in great numbers in suitable conditions, and also in small numbers on stock tanks, springs and bore streams. Very few indications of breeding have been noted; the waters are not suitable, as they have few large trees and little polygonum near them. Young of the Mountain Duck, Grey Teal and Pink-ear Ducks have been noted on several occasions, and those of the Wood Duck once only. These were all unable to fly, and prove that these Ducks breed in the district. In good seasons the waters teem with Ducks and Water Fowl of all descriptions, but when a dry period arrives few remain. The Wood Duck has appeared in smaller numbers of late years, but in May of this year I was surprised to see them in hundreds on waters just south of this district. I had never seen so many together before.

The Chestnut-breasted Teal is quite a distinct species from the Grey Teal, and I have only one record of a specimen on Wattakilla Lake on May 11th, 1918. There were a few with thousands of other species of Ducks on the water.

Biziura lobata. Musk-Duck.—Not plentiful, except in year 1918. Have no record of its nesting in district. Single birds, usually males, often seen in stock tanks. They fly away during night. Have never been able to make it rise in daytime, though have often caught one in shallow tanks with the help of wire netting; one particular bird I carried home alive a distance of six miles. It did not attempt to fly out of trap, though it was free to do so. I put it in a 10,000 gallon iron tank, the water being only within 3 feet of top. It remained there, diving and swimming round until nightfall, but next morning our "smelly" pet had gone. It could not have climbed out, as the sides of tank were of plain sheet steel.

(To be Continued.)

Camera Craft

Camera Craft has brought to light many fine nature studies and subjects; but latterly members have been submitting prints without notes, which always enhance the value of illustrations. One was received without even the photographer's name. The subject was a fine group of Magpies at Belltrees, N.S.W. (See *Emu*, ante, plate 48). The picture was attributed to Mr. H. L. White, instead of to Mr. Sid. W. Jackson. We regret the mistake. Mr. Jackson's pictures are always welcome.

Nest of Pink-Breasted Robins—Hearing the distressed cries of a Robin, and the jubilant calls of a Shrike Thrush (*Colluricincla harmonica selbii*), I proceeded to the spot, and saw the latter fly from the Robin's nest. Carefully lowering the stick I found the two eggs just smashed, as per photo.—third egg being untouched.—Miss J. A. FLETCHER, R.A.O.U., Woodbridge, Tas.

Photographing the Dotterel.—Early in Oct., 1921, I watched, with Mr. Littlejohns, a pair of Black-fronted Dotterels (*Charadrius melanops*) on a stretch of pebbles at Bendigo, and eventually discovered two young birds. I visited the locality again on 22nd October, and, after a long wait, observed an adult Dotterel near a small pond.

When I approached she became very excited and tried to lead me away, but she became quiet when I pretended to follow; so I felt sure her chick was very near. At length I found the little chap, which, from its size, I judged to be not more than 24 hours out of the egg.

I placed him in the sun, set up the camera two feet away, attached 12 feet of cotton to the shutter and waited for the female to approach. When at last she did, I released the shutter, but, unfortunately, she was too far away to be in focus, and, in addition, was nearly out of the picture. I tried again, but this time she kept away and made sounds like a fly in a match-box. The young one replied in the same way, and, to my surprise, and annoyance stood up and ran after its mother. I had thought it too young and too frightened to move. It looked very funny as it ran off and flattened itself out when I chased it. This sort of thing occurred several times.

When the female bird found that the youngster responded to her calls she kept further away, so I wrapped the young bird in a piece of paper, placed it beneath the camera, and focussed on a spot about 18 inches away. This time the mother came closer, and I was able to expose another plate.

During September and October of the present year I found the Black-fronted Dotterel again nesting freely along the Bendigo Creek. The Red-kneed Dotterel (*Erythronyx cinctus*) was there also, and a few nests were found. Photography was a much more simple business at nests of eggs than with the young birds the previous year, and I was able to obtain pictures of both species. —MARC COHEN, R.A.O.U., Bendigo, Vic.



X

Nest of the Pink Robin (*Erythrourus rubinivestris*) with eggs broken by a Shrike Thrush.

Photos. by Miss J. A. Fletcher, R.A.O.U.

Photo. by Mare Cohn, R.A.O.U.

The Black-fronted Dotterel on nest.



Stray Feathers

New Zealand Notes.—It may be of some interest to Australian members to know that this year the Double-banded Dotterel, *Charadrius bicinctus*, is a very rare bird here. I have seen only five individuals all told. Last year a flock of twenty was counted by me on the local domain, of which at least five pairs nested in that area, say 50 to 100 acres. In spite of much search, I found no nests until after the young had hatched out; when I found several broken shells, and was promising myself better luck (with more perseverance) this year. To my astonishment not a single pair has nested on the domain, and all told, as I have said, I have seen, while doing my rounds, and while fishing in the rivers, only five individuals. Have they nested in Australia this year? By the way, has anyone noticed that the introduced Goldfinch feeds freely on the seeds of the Blue Gum, *Eucalyptus globulus*, a common tree on the Canterbury Plains. I frequently see the dainty little birds picking at the ripe seed-capsules as they lie on the road, presumably trying to extract the seed therefrom.

A bird census of this district might be interesting. My bounds are:—The Selwyn River, Lake Ellesmere, and the sea to the mouth of the Rakaia River, up that stream to the Christchurch-Dunedin railway, and back along that to the Selwyn. The latter river is a rain river, and the Rakaia is snow-fed. Both contain trout, and the Rakaia swarms with salmon, mostly Pacific, and a few Atlantic. The fishing is excellent, and the shooting (Pheasants, Quail (Californian), Hares and Rabbits) would be so too, if it were not for inveterate poaching. The avifauna, if shore birds be excluded, is almost wholly exotic, and I think four pairs of Kingfishers (*Halcyon vagans*) and the same number of Robins (*Petroica macrocephala*) for the whole area (about 10 miles square), and a pair of Warblers (*Pseudogerygone igata*) and the Grey Fantail (*Rhipidura flabellifera*) to each farm (and perhaps half that number of the Swamp Harrier (*Circus gouldi*) would complete the census. I had forgotten the Pipit (*Inthus nova-zealandica*) and the Silver-eye (*Zosterops lateralis*), but it's a poor list surely.—T. J. ICK-HEWINS, M.B., B.S., R.A.O.U.

P.S.—Since writing the above I have been watching the Rakaia River in flood, after heavy thunderstorms in the Southern Alps, and was reminded by the diving Terns of watching a flooded river in New South Wales two years ago, and seeing the White-plumed Honeyeater (*Meliphaga penicillata*), taking deliberate headers into the torrent, going apparently right under almost every time. I have never seen any other land bird go so thoroughly into the water, especially into a swift-flowing and turbid stream.—T. J. ICK-HEWINS.

The Pheasant-Coucal.—The range of the Pheasant-Coucal (*Centropus phasianinus*) extends from N.W. Australia to New South Wales. The writer has observed it from the north of the Richmond River to La Perouse, near Sydney. It is more numerous in the Clarence and Richmond River districts than anywhere else, although along the Karuah River it is fairly common, while at La Perouse, in swamps near the Coast Hospital, odd birds have often been met with. The alluvial flats of the coastal rivers, where bracken fern is intermingled with sword-grass and rushes, or shallow fresh-water swamps and creeks overgrown with sedge, reeds and rushes, constitute the habitats and favourite haunts of this handsome and quaint species. In sugar-cane fields adjacent to creeks, low lying damp ground, or swamps, it is extremely plentiful, and has often been disturbed while searching for food among the cane.

The Pheasant-Coucal is mainly insectivorous, all manner of insects being devoured, large or small, while many other small animals frequenting damp and swampy places add to its bill of fare. Systematic investigation might prove that it is of real and inestimable value to sugar-cane growers, and may be found to be of great assistance in minimising the depredations of the two sugar-cane beetle pests (*Nyctotrupes australicus* and *Lepidoderma albo-hirtum*), which cause extensive damage at times. It is impossible to give any idea of the raucous and harsh notes of this bird—a raucity and harshness all its own. Its progression on foot is none the less characteristic; sometimes it hops, while now and then it has recourse to a sort of canter, when in the open; but in the rushes and such like it creeps and runs with celerity. One has to see it to appreciate fully its wonderful adaptability in getting through thick growth.

During the breeding season, which usually commences in October and extends over several months in favourable weather, the female is very cautious, and is seldom seen; but the male may often be seen perched in a low tree overlooking its haunt. When an intruder encroaches on its domain, and flushes it unexpectedly, it rises by a most laborious flight, simultaneously gives forth its harsh notes, and seeks refuge in any low tree protruding just above the rushes, where it can view its enemy without showing its form completely. Perching on a lower branch close to the trunk, it scans the surroundings, then cautiously it hops from one branch to the next one higher till the limit of its ascent is reached, when it descends to a lower branch, returning to the undergrowth by a hover and a flutter, simply flopping down as it reaches the tops of the rushes. It is essentially a ground bird, seldom taking to the wing unless forced to do so.

On November 2nd, 1919, a few miles north of Ballina, a nest was found with two incubated eggs; a couple of other nests were also found not completed. As the season was very dry at that time, it may account for the small number of eggs, three to five being the usual sitting. The nest containing the two eggs was.

placed in the centre of a large tuft of sword-grass near the ground, and was composed of short lengths of rush and grass, and lined with some leaves from a *Callistemon* or *Melaleuca* tree, both of which were growing handy. The longer blades of the tuft were drawn over and down, being interwoven with the rigid stems and shorter blades, and forming a hood over the nest proper, giving the combined structure a tubiform appearance, with the entrance at one end and the exit at the other.

This addition to the nest affords shelter from heavy rain, shade from the scorching sun, and invisibility from enemies, especially the wily and ever-present Raven.

Near Ballina, one day, while walking with a local juvenile through a partially dry swamp covered with rushes, sword-grass and stunted tea-trees, we came across a dead male Coucal. My companion informed me that it was shot on account of eating fowls' eggs, and this was one of the culprits. A most reprehensible procedure is resorted to. A dog is sent into the swamp to scare the birds into the low trees, where they are promptly shot. We boiled the billy on the edge of the swamp, and, just as we were about to sit down to lunch, a Raven flew up from the rushes with an egg on its bill. It appears, to carry off a fowl's egg that it thrusts its bill into the egg, and lets it remain thus till a place of safety is reached, where it can devour the egg free from molestation. My mate was convinced that the Coucal may be wrongly sacrificed. Whether he has convinced the ruthless destroyer or not I have never heard.—P. A. GILBERT, R.A.O.U., Kalembe, N.S.W.

* * *

Kooweerup.—Sixty-five Magpies were counted yesterday in a paddock on newly ploughed ground here; some are busy building their nests, pulling bits of cord out of the bags they find about; they are making the nests in the pine-trees near the private house. There are also Blackbirds, Magpie Larks, Butcher-Birds, Wattle-Birds, Starlings, Thrushes, and Parrots, also many other kinds, so we shall probably have a good nesting season. The place seems alive with birds. We also see some hundreds of Sea-Gulls feeding on what they find on the land being ploughed and harrowed; they are very tame. There are also numbers of Plovers as well. The Sea-Gulls look very picturesque, wheeling about in the air, like silver and grey clouds; our pony got frightened at them, apparently taking the birds for aeroplanes.—J. CECIL LE SOUEF.

* * *

Birds Observed near Wellington, N.Z.—In my paper on the above, recently published in *The Emu*, I mentioned the probability of the Blue (Reef) Heron (*Demicretta sacra*) nesting in the harbour. I have since been informed that these birds actually do nest in the locality suspected, about six miles from the city.—ROBT. H. D. STIDOLPH, R.A.O.U., Masterton, N.Z.

Breeding Birds in the Perth Zoo.—We have had a good breeding season in the Zoo here. A pair of European Sheldrakes, which have been 17 years in the collection, bred five ducklings this year, the first time they have bred. We have also Canadian Goslings, young Mallards, Indian Yellow-bill Ducklings, Emus, and Ibises; numerous Guinea-fowl of three species, and Indian Pochards. A pair of Indian Bar-head Geese bred and reared four young, after being in the collection for 21 years without breeding. About 50 Nankeen Night-Herons, which bred here, have gone to a new rookery this year to breed, and only the pinioned ones, about four, have stayed behind and nested. I expect them all to come back with their young. I would have had a much better season, but the "ubiquitous boy" intervened, and destroyed many nests. I have two nests of White Swans, and a boy stoned one nest, breaking the fertile eggs.—ERNEST A. LE SOUEF, B.V.Sc., Vice-President R.A.O.U.

* * *

American Golden Plover.—I thought it might interest your readers to know that last month there were 6 American Golden Plover in this district, and Mr. F. W. Price, of "Baroona," shot one and brought it in to me. They were about 45 miles from the coast, and were on a little ploughed ground close to a swamp. We have tried to locate them since, but without success. I have never known them in this district before. I understand that the only specimens they have in the Sydney Museum were taken from Lord Howe Island.—J. FALKNER, R.A.O.U., Singleton.

State Secretaries' Reports.

New Zealand.

Bird Protection in New Zealand.—During the 1921 session, Parliament passed an efficient "Animals Protection and Game Act," which came into force on the 1st of April this year. Nearly all indigenous birds are protected, those not on the list being birds considered harmful. These include the Kea (*Nestor notabilis*), Black-backed Gull (*Larus dominicanus*), White-eye (*Zosterops lateralis*), all species of Shags (*Phalacrocorax*) except the Chatham Island Shag (*P. featherstoni*), the Hawks (*Circus gouldi*, *Nesierax novæ-zealandiæ* and *N. australis*), and the Mutton-Birds (*Puffinus griseus* and *P. tenuirostris*). The last-named are not protected, probably on account of the Mutton-Bird industry of the Maoris. Birds included in native game, to shoot which a license is now necessary, are Black Teal (*Fuligula novæ-zealandiæ*), Grey Duck (*Anas superciliosa*), Shoveller (*Spatula rhyncotis*), Eastern Golden Plover (*Charadrius dominicus*), Godwit (*Limosa novæ-zealandiæ*), Knot (*Tringa canutus*), Turnstone (*Morinella interpres*), and Black Swan (*Chenopsis atrata*). All other native ducks than those mentioned above are absolutely protected.

Provision is made in the Act, whereby any bird may be removed from the protected list, or, likewise, added, or the protection may be removed in certain districts only. It is unlawful for any person to take a dog or firearm into any sanctuary, or in any way do anything likely to cause any bird to leave such an area. A fine of £10 is liable to be imposed on any person who unlawfully takes or kills any bird or animal within a sanctuary, with a further fine of £1 for each animal or bird so taken or killed. Similar fines are provided for any person convicted of shooting imported and native game during a close season.

In the shooting of game, the use of metal-patched or metal-cased bullets, heavy guns, cylinders, silencers, and live decoys is prohibited. The Minister may authorise any person to catch or take any protected bird, or the eggs of any protected bird, for any scientific or other purpose approved by him. For shooting game without a licence, a person is liable to a fine of £20; for taking or killing any protected bird, or selling, offering for sale, or having in his possession any protected bird or the egg of any such bird, or robbing or destroying or having in his possession the nest of any protected bird, a person is liable to a fine of £25 for every such offence.

These provisions are very drastic, but unfortunately, the law is practically a dead letter, as far as birds outside of game birds are concerned. Occasionally a person is fined for shooting native pigeons or pukekos. But for every one fined, there are probably a hundred who escape detection. It remains, however, for the act to be enforced, and our native birds would receive adequate protection.

New Zealand is very fortunate in the number of sanctuaries it possesses for bird-life. All reserves under the Scenery Protection Act are sanctuaries, and as these amount to 313,333 acres, it will be seen that these alone afford considerable protection. Besides these, many other areas, amounting to thousands of acres, are reserved as sanctuaries. The Sounds National Park, embracing the West Coast Sounds of the South Island, and covering 2,326,200 acres, is one huge refuge for our birds. Ornithologists and bird-lovers generally should congratulate themselves on this satisfactory state of affairs.—R. H. D. STIDOLPH, R.A.O.U., Masterton, N.Z.

New South Wales.

The inaugural meeting of the Ornithological Section of the Royal Zoological Society of New South Wales and New South Wales members of the Royal Australasian Ornithologists' Union was held in the Royal Zoological Society's rooms on 21st April, 1922, and there was an attendance of eleven members. The following officers were appointed:—

Chairman: Dr. E. A. D'Ombraïn.

Vice-Chairman: Mr. P. A. Gilbert.

Hon. Sec.: Mr. Neville W. Cayley.

Messrs. E. Nubling and C. W. Chisholm were elected to act with them as an executive committee.

The present membership of the section is 40; this number we hope will be greatly increased in the near future, when the work and objects of the Section become better known.

Meetings are to be held on the third Friday in the months of February, April, June, August, October and December, special and executive meetings being held when necessary.

The following items have been discussed and action taken thereon:—

1. The establishment of permanent camps in suitable localities for purposes of bird observation.
2. The exhibition at sectional meetings of birds, nests, eggs or photographs bearing on bird life.
3. The action of the trustees of the National Park in allowing the timber to be cut down for milling purposes.
4. The Wild Life Preservation Act and gun license, and the appointment of hon. rangers.
5. Representation to the Minister for Education requesting reconsideration of his action in discontinuing the publication of the Gould League Supplement to the Educational Gazette.

All these matters have been thoroughly investigated.

The action taken by the Section relative to the timber felling in National Park proved successful in having the operations stopped, and the Section by this action alone has more than justified its existence. The members of the affiliated societies, in fact, the public of Australia, are deeply indebted to Messrs. J. Ramsay, F. Lynne Rolin (President of the Wild Life Preservation Society of Australia), and A. R. Hordern, for the splendid part each played in bringing about this result, to the whole-hearted support of the Press, the Royal Society of New South Wales, the Linnean Society of New South Wales, the Wild Life Preservation Society of Australia, the Trustees of the Australian Museum, and to the Union Pictures Ltd.

Owing to the trouble incurred in fighting the Trustees of the National Park, no steps so far have been taken relative to establishing a permanent camp, but we hope before next season to establish at least one camp.

Messrs. J. Ramsay and N. W. Cayley presented the Section with a lantern. Mr. Ramsay also presented a fine collection of his bird slides; he made the suggestion that if members would kindly donate slides or lend their negatives for the making of slides, a representative collection would soon be available for illustrating lectures or for exchange with kindred societies. Members of the Union are kindly invited to assist the cause by donating slides or lending their negatives.

So far we have had no official notification of the suggested additions to the Wild Life Preservation, or the Gun License Acts, but we believe that these acts when officially gazetted will bring them in line with similar acts of the other States.

It is our intention to arrange a series of lectures, illustrated with lantern slides, and members of the affiliated societies who are not already members of this Section are invited to join up and help to make the Section a big factor in furthering its objects, *i.e.*, to popularise and further the study and protection of our native birds.

NEVILLE CAYLEY,

Hon. Secretary of the Section and State Secretary, R.A.O.U.

Reviews

THE BIRDS OF AUSTRALIA

By GREGORY M. MATHEWS, F.R.S.E.

Vol. x., pt. i., treats Scrub-Wrens and the Superb Warbler. The high standard of this great work is well maintained, and the beautiful hand-coloured plates by Gronvöld are excellent. The historical notes for which Mr. Mathews is justly famed are again a striking feature. Five species form the genus *Sericornis*, the sixth being the mysterious lost *S. tyrannula*, founded by De Vis, for the "one example of this bird, and that of unknown sex." An especially fine plate depicts two pairs of Superb Warblers (Blue Wrens), one of the first known and best known of Australian birds. Its name (*cyaneus*) is from Ellis's *Narrative of the Voyage of Captain Cook* (1782), which recorded that, in Tasmania, they met with "A small bird . . . with a bright blue head which we . . . called *Motacilla cyanea*."

THE SONGS OF THE BIRDS

By W. GARSTANG, M.A., D.Sc., Professor of Zoology in the University of Leeds.

Throughout the civilised world much attention has been given recently to the song of birds, which has proved to be a most interesting and complicated business. It is difficult indeed to understand clearly how the sound is produced, at all events in detail, especially how the musculature of the syrinx works. It is still more difficult to be quite certain why the birds sing. More recently observers who possess good musical ears or gramophones have been copying the song of birds in musical nomenclature. As, however, many birds do not use the diatonic scale, this has involved difficulty. The investigation has led to the discovery that the range, while generally limited to an octave or less, is greater sometimes—this circumstance may be related to the limited length of the cochlea of birds.

The interesting little work which is the subject of this review deals with the matter from many points of view. Professor Garstang writes verses on the subject of birds, and reproduces most excellent black and white sketches by Mr. J. A. Shepherd, the whole forming a most attractive volume. Professor Garstang has not devoted his attention exclusively or even largely to the setting down of the song of birds in musical notation, but he has endeavored to reproduce it also by the syllabic method. He describes the Blackbird as the Beethoven of birds. He omits reference to the extraordinary imitative capacity of the bird, which reaches its maximum in Europe, at all events with the Blackbird, which is able to imitate a large number of other birds. The writer recently heard a Blackbird imitate the call of a Korean duck to its ducklings. He traces the evolution of the song of birds from the cry of alarm and surprise to the development of song, and naturally enquires why the bird sings as it does.

Those who wish to obtain information so far as it can be given are recommended to read this charming little book of about 100 pages. Our copy is from Angus & Robertson, booksellers, Sydney.

"AUSTRALIAN NATURE-STUDIES."

Dr. J. A. Leach has recently been elected President of the Royal Australasian Ornithologists' Union. It seems fit and proper that he should issue his book "Nature Studies" at the same time, if only to prove he is not likely to be an idle President.

The price of the book (12/6) is marvellously reasonable, considering that besides letterpress of good taste, point and diction, there are 512 pages, 2000 original drawings, and six handsome art life coloured plates of rare and beautiful birds. These plates alone are worth half the price of the book. Why so cheap a book? Because the author has made his subject a labour of love, into which he has put years of exceptional experience, *i.e.*, as organising inspector of nature study for the Education Department of Victoria.

The three principal parts of the work are: I.—"Plant Life;" II.—"Animal Life" (which of course includes Birds); and III.—"General Studies," which includes rocks and soils, action of wind and water, etc."

When the student has mastered the chapter on Birds, Birds of Australia, Bird Structures, Bills or Beaks, Legs and Feet, Wings and Tails, Feathers and Colours, Nests and Eggs, he will, indeed, be an ornithologist, not merely a "lover of ornithology," as pedantic persons are pleased to call the bird-lovers.

The romance of the mosquito is most interesting—"Truth stranger than many fictions." The whole life-history of the insect may be followed at home in one's back yard, where are

water-tubs, discarded preserved fruit tins, that have caught moisture from passing showers. It is the mother mosquito with her venomous neb—"a case of surgical instruments"—that lends point as well as special interest to the subject.

Leach's "Bird Book" has been easily first as the cheapest book of its kind in the world. Now, Leach's "Nature Studies," which has been carefully and artistically produced by Critchley Parker, 376 Flinders Lane, Melbourne, will be a fitting companion. "Cast thy bread upon the waters, for thou shalt find it after many days." In like manner, through first reading Dr. Leach's splendid work, many future natural scientists will arise.

A QUARTETTE OF NATURE BOOKS

Published by Whitcombe & Tombs, Melbourne and Christchurch

Mateship with Birds, by A. H. Chisholm, R.A.O.U., late State Secretary for Queensland, is a charming book. It embodies many of Mr. Chisholm's famous bird studies, and is fully illustrated by reproductions of excellent photographs by some of the most distinguished bird photographers of the R.A.O.U. The chapters are no dry matter-of-fact history of the bird treated, but personal experiences linked on to what is best in Australian and British literature in appreciation of birds, nature and man. They include: The Gifts of August, September Rivalry, October the Witching, The Passing, With Children in Birdland, The Idyll of the Blossom-Birds, The Aristocracy of the Crest, Days Among the Robins, Fine Feathers, and Fine Birds, The Spirit of Australia and The Paradise Parrot Tragedy, an interesting account of the history and re-discovery of one of the most interesting and beautiful of birds—the Paradise Parrot, which bird-lovers had feared was extinct. The title "Mateship" gives the keynote of this fine book. It should be available to every nature-student, and should be in every school and public library. Price 7/6; 196 pages.

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Correspondence

To the Editors of "The Emu."

Sirs,—With regard to the origin of the name "Nullarbor," I showed the copy of the last *Emu* to Professor Sir Edgeworth David. As is well known, he recently spent some time in Central Australia. He was very interested in the two paragraphs concerning the subject, but said he was afraid that the gentlemen who wrote them were mistaken. His party enquired into the origin of the word, and discovered that it was derived from the two Latin words "Nullus" and "Arbor." The plain was named by Delissa, who surveyed the boundary between South Australia and Western Australia.—I am, yours etc.,

GEO. V. SCAMMELL.

To the Editors of "The Emu."

Sirs,—Messrs. Kinghorn and Cayley's very fine paper on the Storm Petrels published in the *Emu* for October last is a good example of the useful work which may be done by assembling available skins and instituting close comparisons. In the case of most Australian birds the type skins are not available to local students, and the action taken by the authors of the paper quoted in obtaining from M. Berlioz a sketch and notes with reference to Vieillot's type of *Fregatta grallaria* was the nearest solution of the difficulty.

I think it necessary, however, to point out that by some oversight the authors have omitted any reference to my connection with some of the skins dealt with by them.

In October, 1910, Mr. (now Professor) T. Harvey Johnston gave me a bird which he had picked up at Lord Howe Island, and placed in spirit. I had a skin prepared by Mr. Robert Grant, of the Australian Museum, and I identified the bird. The label attached to the skin is in my handwriting as follows:—"Fregatta grallaria, Vieillot. Loc. Lord Howe Island. Date, 10th October,

1910. Taken by T. Harvey Johnston. First record for L.H.L." I sent this skin to Mr. Gregory Mathews, who described it in his "Birds of Australia," vol. ii., pt. 1, p. 42 (1912), expressing his opinion that it was a distinct species, but he refrained from giving it a name. In writing to Mr. Tom Iredale, who was assisting Mathews, I commented upon the rather unusual procedure adopted by the latter, and received a reply to the effect that the bird was not named, but only described, and there was nothing to prevent me from remedying the defect and giving it a name! As I did not agree with the conclusion that it was a new species, I did not adopt the suggestion. The skin subsequently was acquired by Mr. H. L. White, and is now in the collection of the National Museum, Melbourne, and is Specimen C referred to by Kinghorn and Cayley. Mathews later obtained several skins of Storm Petrels from Lord Howe Island, four of which he described and named. One, doubtless similar to mine, was designated, with somewhat sardonic humour, "innominatus."

When Messrs. McCulloch and Troughton brought Specimen A, referred to in the paper under review, from Lord Howe Island, they submitted it to me for identification. At first I was inclined to regard it as a new species, but upon obtaining Specimen C from Melbourne, and making a careful comparison, besides studying the literature, I came to the conclusion that the new skin was merely a juvenile *F. grallaria*, in which the white abdomen was in process of development. This opinion I conveyed to Mr. Cayley. When Specimen B came to hand, I understood that Mr. Cayley was convinced that there were several species represented in the material contained in the two Museums (Sydney and Melbourne), and that he proposed to describe and figure two new species. That he has altered his opinion and arrived at the same conclusion as myself is very gratifying to me, and my congratulations are tendered to him and his collaborator for the very conscientious piece of work they have produced.—Yours, etc.,

A. F. BASSET HULL, C.F.A.O.U.

Sydney, 2nd December, 1922.

To the Editors of "The Emu."

Sirs,—A paper on Storm Petrels, by Messrs. Kinghorn and Cayley appeared in the second part of "The Emu" (vol. xxii.), pp. 81 *et seq.* I am very glad to see new workers taking such an interest in those small birds. But I would like to comment on two matters connected therewith.

Those authors say that I have confused *leucogaster* with *grallaria*. Had they read my article in the "Birds of Australia," vol. ii., on *grallaria*, this statement could not have been made. As a matter of fact, it was I who pointed out the differences between those birds; on page 40 of my work I say that "Gould's *T. leucogaster* is a different species . . ." and on p. 44 I say that "*F. grallaria* is distinct from *F. leucogaster*." This does away also

with the statement that the bird figured as *grallaria* is *leucogaster*.

The writers go on to say that the measurements sent them of the type of *grallaria* were first published by them in their paper. But on page 41 of my work I gave the measurements of the type, in 1912 (*over 10 years ago*). The type was sent to me from France for examination.

Yours, etc.,

GREGORY M. MATHEWS.

Foulis Court, Fair Oak, Hants., 14/11/22.

About Members

The popularity of Mr. A. H. Chisholm, R.A.O.C., who, for the past seven years, has been a member of the literary staff of *The Daily Mail*, Brisbane, was evidenced on the evening of 19th September last, when the combined staffs assembled in the composing-room, in large numbers, for the purpose of saying good-bye to him. Mr. Chisholm has severed his connection with this paper, with a view to taking up a position on the staff of the *Daily Telegraph*, of Sydney, about the end of the year.

Mr. C. E. Sligo (editor), in the unavoidable absence of the managing director (Mr. Norman White), presented Mr. Chisholm with a pair of field glasses, which should prove of great value to him in his ornithological ramblings. Mr. Sligo referred to Mr. Chisholm's sterling qualities as a journalist, and voiced the hope that, should Mr. Chisholm decide to return to Queensland, he would again join the "*Daily Mail*."

Members of the R.A.O.C. will congratulate Mr. Chisholm on his promotion, although the Union loses his services as State Secretary for Queensland. No doubt some other useful office will be found for him in the Mother State.

Obituary

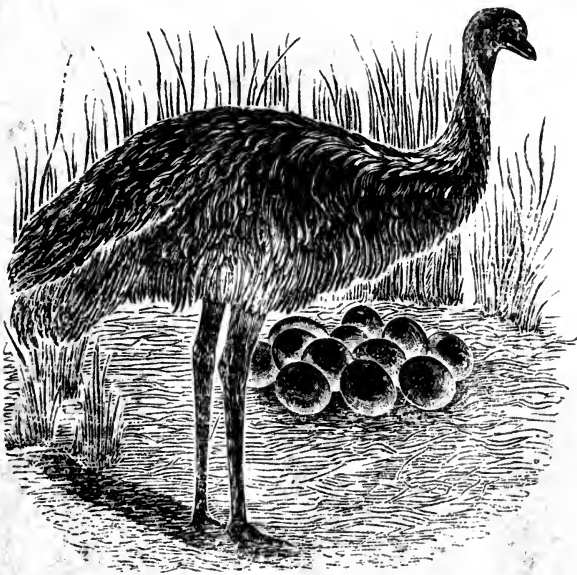
Mr. Joseph Gabriel, the well-known and genial field naturalist, has passed on. He had a strong leaning towards ornithology, and assisted in that direction in exploring Bass Strait Islands, notably with the Field Naturalists' expedition to Kent Group, 1890, and to Furneaux Group, 1893. He also landed on the bald and bleak Albatross Island, 1895, with the late Mr. H. D. C. Ashworth, when the latter secured some excellent pictures of Albatrosses. In 1894, during a memorable Riverina flood, Mr. Gabriel joined with Mr. A. J. Campbell in visiting the haunts of various wild-fowl among the back waters of the Edward and Wakool Rivers, when there was much adventure.

Mr. Gabriel was a pharmaceutical chemist by profession; as a man he wore a spotless garb; he was born in Wales 75 years ago, and spent his younger days at Bendigo, Victoria.

Date of publication of this part of "*The Emu*" was Jan. 5th, 1923.

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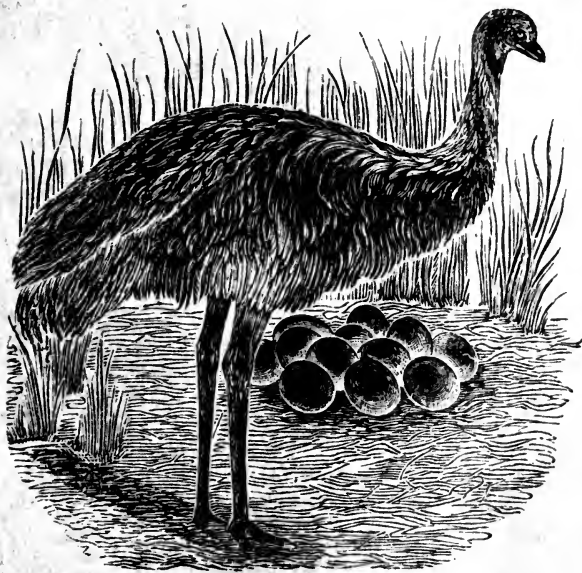
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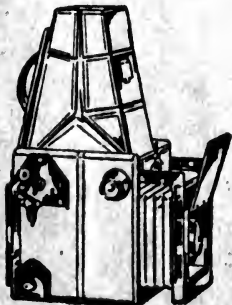
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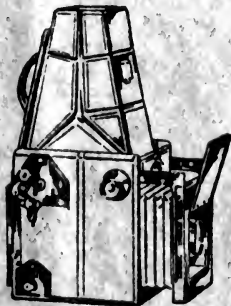
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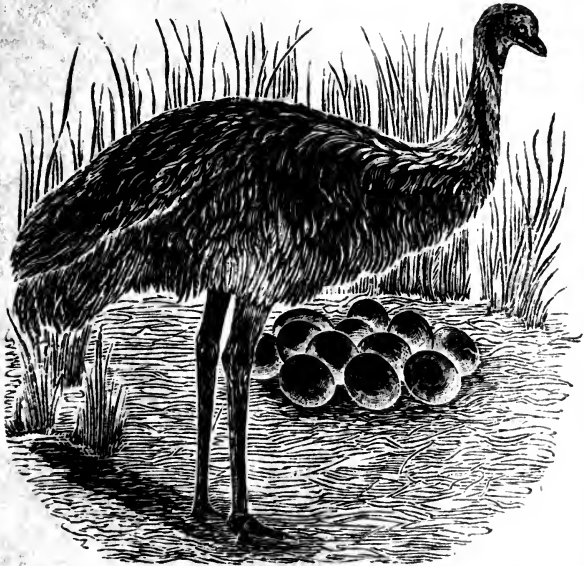
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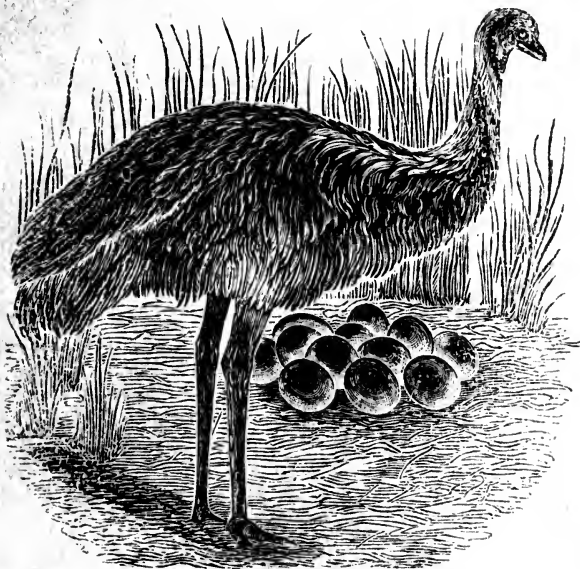
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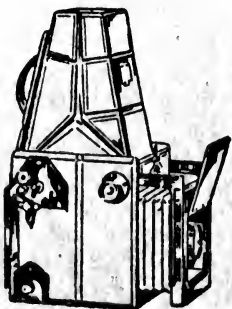
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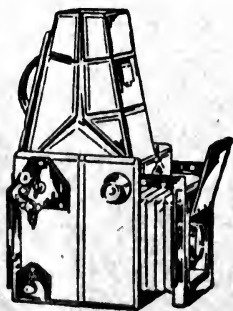
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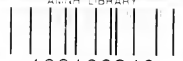
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