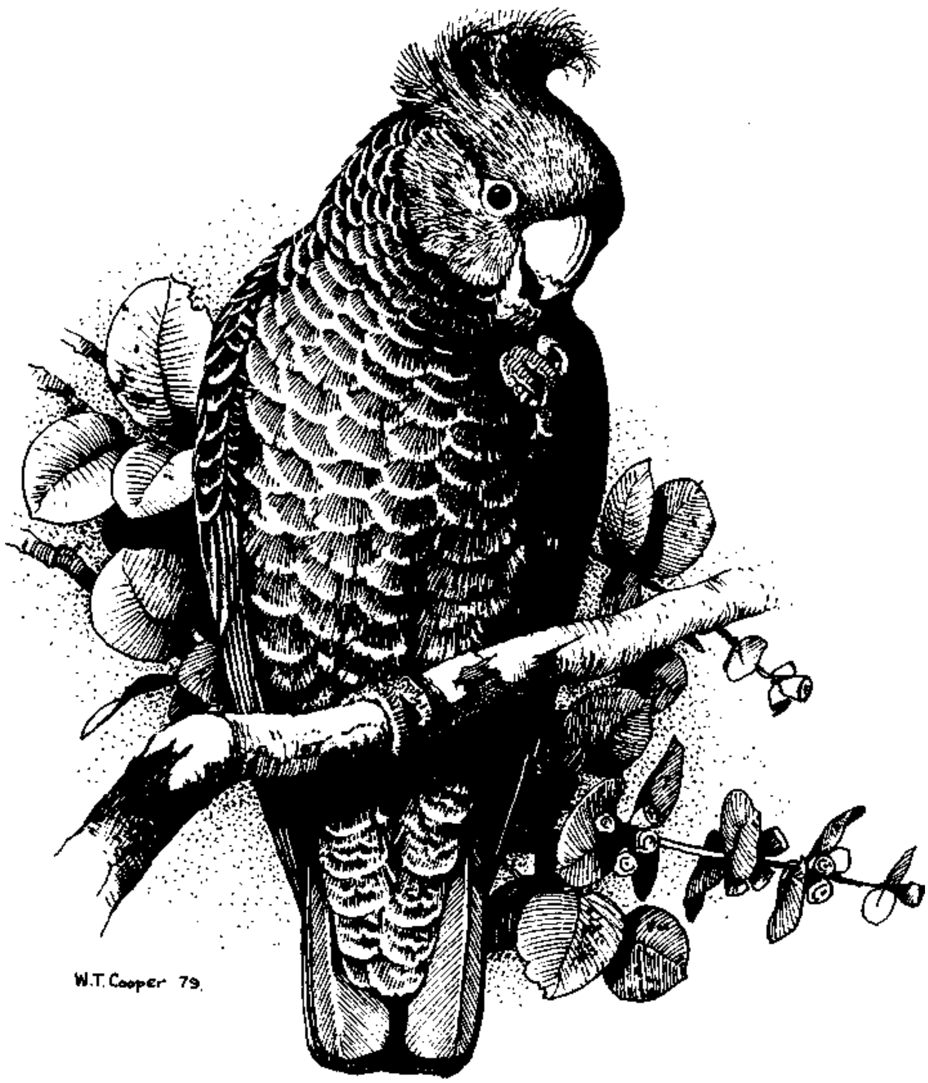
ISSN 0314-8211

CANBERRA BIRD NOTES

Vol 10
No 1
Jan 1985

Registered by Australia Post - publication No NBH 0255



This page intentionally blank

NEW LIGHT ON THE TAXONOMY AND BIOGEOGRAPHY OF AUSTRALIAN BIRDS

Richard Schodde

This article is based on a talk given to COG by Dr Schodde on 11 April 1984.

Australia is richly endowed with bird life, and many of its birds are endemic to the region - that is, they are found nowhere else except, in a few cases, the Indonesian islands off the edge of the Australian continental plate. Among them are the lyrebirds, scrub-birds, cockatoos, mound-building megapodes, lorikeets, broad-tailed parrots, frogmouths, owlet-nightjars, honeyeaters, fairy-wrens, treecreepers, sittellas, mudnesters, bowerbirds and butcherbirds. These are the birds that give our land its distinctive Australian flavour. Together they number almost 400 species out of a total bird fauna of 700, and they dominate the birdlife on land. The remainder of Australia's birds are mostly sea-birds, migratory waders and fresh-water birds. Theirs is a habitat that is cosmopolitan and so they are as widespread. As they tell next to nothing about the source and evolution of our distinctive land birds, they are not dealt with further here.

Where did Australia's land birds come from and how did they radiate and diversify once they got here? These are questions to which we thought we had all the answers twenty years ago. And now it seems, we may have got it all wrong.

What were the reasons for our certainty just twenty years ago? It was not the fossil record, which is too incomplete and still much too underworked and understudied to fill in a full picture of the past. In Australia we may never get much out of the fossil record because it is so patchy. First, we have to rely on the right conditions for fossilization, then a bird has to drop into the right spot at the right time, and then we have to find it again. During the last 70 million years - the time that palaeontologists agree was the era of evolution of modern birds - only two small windows of fossilised birds have been found in Australia. One is in Miocene deposits on the Lake Eyre basin some 15-20 million years ago, and the other is the cave deposits and aboriginal middens of the last 50,000 years.

These deposits are 'windows' on the past, no more, no less. They tell, for example, that giant pelicans and sea-eagles, huge emu-like birds, and a host of flamingos fished and roamed about great shallow lakes in a much wetter Australia 20 million years ago. But the 'windows' do not tell how the birds arose and got there; nor do they identify their descendants clearly in today's birds. Furthermore, water birds, not land birds, tend to be fossilised most, because they forage in places conducive to fossilisation. There are only a handful of land passerines in Australia's Miocene deposits and no parrots at all, and these are birds whose evolutionary roots surely go back well beyond 20 million years.

Our certainty about the origins and radiation of Australia's birds came from two different sets of evidence, one biological, the other geological. The biological evidence came simply from the most obvious thing about birds - their appearance. First of all, the early bird geographers recognised that Australian birds were - by and large - rather different from those in the rest of the world. We had pigeons, but they were mostly short-tailed ground-feeding bronzewings. We had quail, but most were button-quail, of a different family that lacked a hind toe. We had parrots, but in greater array and diversity than anywhere else. And we had masked owls and frogmouths, and kingfishers that were huge, brown and laughed.

The story was the same on passerines, which are today the most diverse order of birds on earth and account for nearly half its bird species. Australia, like every other continent, has its fair share of them but again ours - or at least our dominant group - are rather different. While South America has its oven birds and tyrant flycatchers with primitive voice boxes, North America its 9-primaried warblers and finches, and Eurasia its bulbuls, larks, pipits and thrushes, Australian passerines are dominated by the nectarivorous honeyeaters, glittering fairy-wrens, thornbills, robin-flycatchers, and butcherbirds and currawongs.

So much for the distinctiveness of Australian birds in appearance. But this, at first look, doesn't tell much about their nearest relatives overseas which could give some pointer to their origin. At second look, however, bird geographers noticed that our typically Australian group of birds were most like those in Eurasia. Our robin-flycatchers and whistlers looked most like the Eurasian thrushes and flycatchers. All have 10 primary flight feathers on the wing. Our babblers have every resemblance to the Asian scimitar babblers in appearance. Then there were small frogmouths in south-east Asia. And our sittellas and treecreepers had the same specialised bills and the same unusual branch-gleaning habits as the nuthatches and creepers from Eurasia to North America. On top of that there were the species and genera that Australia shared with Afro-Asia but not any other continent. Among them our pipit, bush-lark, reed warblers, cisticolas, grassbirds, mistletoebird, sunbird and White's Thrush.

All this evidence supported overwhelmingly the idea that, of all continental bird faunas, the Australian is related directly only to the Asian. The next step in logic was obvious. If the ancestral stocks of Australian birds had to come from anywhere, then Asia was the source. Ernest Mayr reasoned this way when, in 1944 he put forward the hypothesis that Australia - an avian void - was colonized by birds in waves from southeast Asia. Earliest to come were the ancestors of the most divergent endemics - the frogmouths, mound-building megapodes, parrots, honeyeaters, butcherbirds and lyrebirds. They were followed at some later time by the robin-whistlers, button quail, bronzewing pigeons, sittellas and treecreepers, grassfinches and woodswallows. And last to arrive, perhaps within the last million years, were species still recognisably Asian; such as Richard's Pipit, the Welcome Swallow, Clamorous Reed Warbler, Sacred Ibis and Great Egret.

The strength of this hypothesis was its very simplicity and for a time it was supported by the second, geological set of evidence that I mentioned earlier. Despite Wegener's brilliant global thesis about shifting continents in the 1920's, geologists throughout the first half of this century held fast to the theory of a steady state in the earth's crust. According to them, the world's continents had always been in much the same position as they are now. Sea level and mountains and islands may have all risen and fallen due to one cause or another through time, but always in the one place. The effect of this, said the zoogeographers, was to make and break land connections between Australia and Asia through the Indonesian archipelagos. A period of low sea-level and enlarged islands would form a series of stepping stones for a wave of immigrants coming to Australia. Then the sea would rise to isolate that wave and to allow it breathing space to diversify, before falling again to let the next wave in. It all seemed to fit Mayr's colonization theory like a hand in a glove.

Understandably, the study of the origin and evolution of Australia's birds fell into disinterest. All was known and proved. What little attention that it did receive shifted from facets of external plumage to features of internal anatomy and behaviour. But such research never got very far, for all sorts of reasons. For one thing, many aspects of behaviour were related directly to the ecological niches that birds filled and, being adaptive, shed little light on long-term evolution. The side-sweeping mud dibbling of a spoonbill's bill and the peculiar hop-creep gait of a treecreeper explained much more about those birds techniques of feeding than their origin. To be sure, ritualised displays and the way labour is partitioned between the sexes in holding territory and caring for eggs and young are conservatively inherited and do point to lines of ancestry - they are too complexly ingrained to be changed easily. But just as they are complex intrinsically, they are difficult to record, tabulate and interpret. In Australia it has been a case of too little expertise to study too big a task.

The same can be said of research into internal anatomy. For years, internal anatomy has been looked upon with awe as the panacea to cure all phylogenetic and evolutionary complaints. How often have you read in reputedly top-flight ornithological books the pompous statement that '...as soon as the anatomy of this group is studied we will be able to classify it with certainty...' or '...until its cranial osteology is worked out this species cannot be assigned to this or that genus...'. It sounds impressive, but it's often just hollow fairy floss.

Granted, internal anatomy has resolved many evolutionary questions that could not be solved easily from outward appearances. It has showed, for example, that on the structure of the foot, New World tropical toucans and Old World tropical hornbills, which are so alike in their general form, bulbous bills and fruit-eating habits, really belong to quite different orders of birds. But for internal anatomy the wins seem to be balanced by losses. There are a number of reasons for this. For one, birds, unlike mammals, wear most of their distinctive traits on the outside of their bodies, for all to see. All of their plumages show varying colours and patterns, for sexual attraction, camouflage, signalling alarm or danger, or for marking territory. And they have voices and behaviour patterns to match. That is why we find birds, among all animals, such intriguing creatures to watch. Inside a bird, however, evolution has gone in the other direction, towards uniformity. It has had to - for inside a tiny body, it has had to cram all the vital organs supported by the most minimal and lightest skeleton possible to permit flight. That there is still something to be got out of internal anatomy for the evolutionist borders on the miraculous.

By the mid 20th century, plumage, behaviour, internal anatomy and patterns of distribution were still the only sources of information available to the student of Australian bird evolution. But what did it matter, for the superficial similarity between Asian and Australian birds and the geological record showed that the Australian bird fauna had been built up from Asian invasions trickling down through the ages. For the more penetrating ornithologists it nonetheless seemed a little too glib. And faced with such evidence, the famous German ornithologist Erwin Stresemann observed despairingly in 1959:

'Science ends where comparative morphology, comparative physiology and comparative ethology have failed us after nearly 200 years of effort. The rest is silence.'

Despair suddenly turned to turmoil in the 1960's with the realisation that the earth's continents had not always been where they are now. Paleomagnetism and evidence of sea-floor spreading had made continental drift a reality. When Australia was supposed to have received its first ancestral stocks of modern birds such as parrots, pigeons, lyrebirds and honeyeaters - it was far to the south. At that time, about 50 million years ago, Australia abutted Antarctica, just after severing land links with South America and earlier with Africa. All these continents had been part of one huge southern supercontinent, Gondwanaland. After breaking from that mass, Australia drifted gradually northwards, only reaching latitudes in proximity to Asia in the last 15 million years.

Proponents of the colonization theory, like Allen Keast, responded by proposing that the Asian invasions and radiation were all compressed into that time. By a stroke of a pen, they had speeded up the theoretical role of evolutionary radiation in Australia's birds by nearly 200%. But the Antarctic connection - and we must remember that Antarctica 50 million years ago was forested at least in part - had revealed an alternative source for Australia's birds. The flightless ratites - emus, cassowaries, ostriches, kiwis, rheas and tinamous - were all shared by the former Gondwanic continents. And Australasia and South America shared the world's radiation in parrots and frogmouth-like birds. Then there were our Black-fronted and Inland Dotterels and Plains Wanderer, all of which are now understood to be waders related to the primitive lapwings and seed-snipe, again in South America. What this implies is that not only did Australia inherit many of its basic stocks of birds from Gondwanaland, but also that those stocks were always there. Australia has probably never been an avian void waiting to be colonized; for as long as there have been birds it has probably always had some of its own.

For the passerines, however, an overriding problem remained. South America was the last of present-day vegetated continents to be in touch with Australia through Antarctica, but its passerines are quite different: over a base fauna of endemic primitive song birds - the ant-birds, oven-birds and tyrant flycatchers - is a veneer, so to speak, of North American 9-primaried songbirds. The basic groups of Australian songbirds, even the lyrebirds and scrub-birds, are all advanced types with 10 primaries in the wing and, as I have said earlier, most like those in Eurasia. Could our songbirds then have come much later than the ratites, parrots and frogmouths, and from Asia not South America within say the last 15 million years. The answer is that we don't know.

Keeping it that way while at the same time opening up a whole new vista on the origin and radiation of Australia's birds is an impending explosion of new information from a novel and ultimately fundamental set of evidence: molecular evidence. It has brought hope out of Stresemann's despair.

The source of the molecular evidence is the genetic material in the cells of all animals. These are genes and they are carried mostly on the chromosomes in the nuclei of the cells. Chromosomes, we now know, are long double-stranded and coiled strings of protein known as deoxyribonucleic acid (DNA). These strings are composed of sequences of smaller proteins known as peptides. And it is these peptides that we believe equate with genes. Individually or in groups they act in coordination to control our physiological, biochemical and developmental processes and so, ultimately our appearance and body processes. The genes don't travel around to do this, they have agents instead in different parts of the body, and these, also proteins - are known as enzymes. Each gene or gene set is responsible for a particular enzyme; and so, conversely, each enzyme reflects a particular gene set. If then, we can identify enzyme differences or substitutions between different groups of animals, we indirectly identify root genetic differences or substitutions.

Substitutions of peptides or genes on the chromosomes happen regularly; and it is this substitution that we believe equates with mutation. The rate at which peptides or peptide groups are substituted varies - some are slow and others comparatively fast - but overall there is, at least theoretically, a constant average rate of substitution or mutation in the total DNA content in the cells of all cellular animals. This becomes more believable when you remember that the total genic complement of the chromosomes for any vertebrate is several million and in that vast numbers slow and fast changes cancel one another out.

Biochemists have used this theory to develop a whole range of techniques to catalogue the genetic differences between animal species. The most fundamental of them is protein sequencing and in particular the sequencing of peptides in DNA in different animals. This will provide the ultimate answer to all questions of relationship, classification and evolution. It allows us to identify precisely each gene difference between each individual, each species, each genus, etc. But, with our present technology this is in cloud cuckoo land. To get through several million genes in one animal is a long, tedious and costly business, let alone the whole class of birds and then the entire animal kingdom.

So the biochemists have looked about for short cuts into this vast store of genetic information. The most direct of these is the hybridisation of deoxyribonucleic acid. It is a technique that Charles Sibley is now using to examine the evolutionary relationships of all the world's living birds, with some remarkable results as we shall see later. It works this way. As I mentioned, DNA is a double stranded string of protein. Each strand of the string is a mirror image, more-or-less of the other. Now if the two strands can be unzipped into single strands, and each single strand is then mixed with the unzipped single strands from another animal, the extent of rebonding or recoiling or hybridising of the single strands from the two different animals into a new double string gives a measure of the genetic closeness or distance between those two animals. And this is what Sibley does under standardised experimental conditions.

Another technique is electrophoresis of enzymes, the direct agents of genes. Peter Baverstock in Adelaide has just had some marvellous results with this method in Australian mammals and reptiles and is now turning it to our birds. Simply, enzymes from heart, liver and breast tissue are diffused along a gel under electric potential so that they all separate out from one another. Then they are stained and identified. About 50 enzymes can be isolated from each bird in this way, a great improvement on the unidentifiable handful that Sibley got from egg whites in the early days of the 1960s. Differences in the enzyme complement from different animals is taken as a measure of genetic distance. And when such information has accumulated from all the members of a genus or family, we have computer packages that build an evolutionary tree from it.

The third principal technique is an immunological one called microcomplement fixation or MCF. It is new to birds and only works well, statistically, when genetic distances between the animals being tested are fairly large. It is well suited, for example, to test whether the pardalotes are related to our thornbills and scrubwrens rather than mistletoebirds; but it would probably be ineffectual in tests to determine whether Spotted and Yellow-rumped Pardalotes were the same or different species. It works in this way. The proteins, say from blood plasma, from a bird are injected into a laboratory mammal, say a rabbit. The rabbit then builds antibodies to the foreign matter that ultimately produce an immune response - as, say, happens to us when we are bitten by mosquitoes. These antibodies produce a high immune response to the injection of any more plasma protein - antigens - from the same or a closely related species of bird. But their response is less to plasma from more distantly related species. This differential is then used for yet another measure of genetic distance between groups of birds.

And the biochemical techniques do not end there. There is still electrophoresis of feather keratins which, although it measures differences between only half a dozen or so proteins, has the advantage of a ready made source of material all over the world. All the collecting work a biochemist has to do is filch feathers from a museum drawer when the curator is not looking. Then there is solid phase radioimmunoassay, using collagen, one of the most universal tissues of animals. And last, but not least, we have comparisons using mitochondrial DNA. This genetic material outside the cell nucleus is thought to mutate quickly and give sound estimates of genetic distance between closely related species and populations within species.

All these techniques are barely past the embryonic stage of development and have only just begun to be applied to birds. Yet already they have produced startling results. Sibley's research with egg-white proteins and DNA hybridisation is the only study that is at all comprehensive for Australian birds. Despite the urgent need to check its results, his twin studies tell the same unexpected story of radiation in our passerines.

His evidence is that, our treecreepers and sittellas, our robin-whistlers and flycatchers, and our acanthizid warblers and wrens are not at all closely related to their look-alike counterparts in Eurasia. They all seem to be more closely related to one another. Our sittellas are close to our robins, our treecreepers are linked to our lyrebirds, and our acanthizid warblers fit in beside our honeyeaters. If this is proved, it is a radiation akin to the marsupials and probably as old.

And this leads us to another important contribution that the molecular evidence can make - it can theoretically estimate the rate of evolutionary divergence in birds and so help us fix the age of the different groups. I mentioned earlier a constant overall average rate of genetic change in organisms. This is called the molecular clock. On the assumption that it works, if the genetic distance found between say the White-throated and Brown Treecreepers was twice that between Brown and Red-browed Treecreepers, it would mean that the evolutionary divergence between White-throated and Brown Treecreepers began twice as long ago as that between Brown and Red-browed. Now this gives us only the relative rate of evolution of these birds, not the absolute. The absolute rate can only be got from tying in relative rates to a geological event of known age that could have caused initial divergence.

Here we come back to continental drift once more. South American rheas, we presently understand, are the closest intercontinental relatives of our emus and cassowaries, and South American Seed-Snipes are closest to our Plains Wanderer. As the date at which South America and Australia broke apart through Antarctica is known - to within a few million years - the extent of genetic divergence between rheas and emus and seed snipes and Plains Wanderer becomes a direct measure of the time that has elapsed from that geological event to the present.

From this we can, theoretically at least, calibrate the absolute rate of evolution in other birds. What Sibley's data for our passerines now suggest is that our old groups - the lyrebirds, treecreepers, flycatchers, honeyeaters and bowerbirds - all began to diverge from one another about 30-50 million years ago, when Australia was much closer to Antarctica than Asia. What is more, their core stock were ancient crow-like birds. In other words, all of our honeyeaters, wrens, warblers and flycatchers came from crow-like ancestors quite different from those giving rise to the flycatchers and warblers in the northern hemisphere. When and from where that ancient crow-like stock came is a question as baffling as any in world zoogeography.

The molecular revolution in bird taxonomy has been heady and overwhelming for morphologists like me. Some even feel that is has stolen their birthright. Far from it. What it is really doing is freeing us from the shackles of convergence. Now we may say of sittellas that they mimic the form and behaviour of nuthatches overseas because they fill the same niche and have evolved to forage in the same way. Here the morphologist can identify convergent adaptations. At the same time he can point to other characters - such as nests and eggs - which tie in sittellas with our robins.

It is going to be an exciting time now that we can unravel the adaptations from the more conservative traits that point to evolutionary origins. And it is going to be very important, for only from such work will we be able to bring home to you - the ornithologist in the street - the unfolding story of evolutionary radiation in our birds in any comprehensible way.

R Schodde, CSIRO Division of Wildlife and Rangelands Research, Gungahlin, ACT

SMALL CAN BE BEAUTIFUL

Doug Ross

Some things one expects to see from time to time in the area between Parliament House and Lake Burley Griffin: lunchtime softball, demonstrators, guns firing salutes, parrots, tourists, and so on. But Rufous Night Heron, Budgerigar and Stubble Quail?

I would have said no until this year, 1984, when those species showed up in the area. Their appearance set me thinking of the other species I had observed there over a period of about 8 years.

What follows is largely personal recollection and does not purport to be any sort of rigorous study of the area. It may, however, serve some objective purposes. Like the Garden Bird Survey for those who participate in it, my recollection demonstrates the general richness of Canberra's avifauna in the longer-term and points up how much of that richness can be found in a very circumscribed area if observations continue long enough.

For me, the 'area' is a tract bounded, on the south by the gravel path between the Parliamentary rose gardens and the reflecting ponds; on the east and west by lines drawn, respectively, through the Administration Building and the High Court and between the Treasury Building and the National Library; and on the north by the Lake retaining wall. (It would be tempting to extend the area offshore, so as to bring in three grebes and more ducks, but no obvious line exists by which to mark off the area's 'territorial sea'.)

The area is a rough square, say 300 m by 300 m - 9 hectares in extent, mostly under grass, some of which is irrigated and all of which is mown regularly. There is a mixture of trees, mostly eucalypts, casuarinas, planes, conifers and poplars, some quite old, others recently planted. The trees are laid out in rows (multiple rows in some cases), giving the area a parkland appearance: it is more savannah than woodland. There is some heavy cover: two rows of gorse (not really recovered from the late drought) that define the edges of terraces; low and medium thickets by the National Library; car park hedges; and a complex by the High Court which, once matured, will be excellent habitat.

The area has more or less permanent water in the reflecting ponds and the Treasury and Library fountains while soaks show up in the grassed stretches after heavy rains.

There is heavy human pressure on the area at certain times: eg. the softball matches and demonstrations referred to above.

One would say, *a priori,* that such an area must have an avifauna. The interesting question for me was how large an avifauna my notebook would reveal.
The results for the (roughly) 8 year period were:

Species seen on the ground or in trees: 60

Species seen overflying: 11

Species heard in the distance: 2

Details are given below. I have dispensed with scientific names in such an informal note. The common names used are those which appear in COG's Annual Bird Report. After much reflection, I decided against any attempt at qualification. To give a single 'indicative' maximum figure per species for an 8 year period would be misleading.

SPECIES SEEN ON THE GROUND OR IN TREES

Included here are some water-related species seen perching on the Lake retaining wall which, by definition, is included in the area.

Great Cormorant
Little Black Cormorant
Little Pied Cormorant
Rufous Night Heron Pacific
Black Duck Maned Duck
Australian Kestrel
Stubble Quail
Eurasian Coot
Masked Lapwing
Silver Gull
Whiskered Term
Feral Pigeon
Peaceful Dove
Gang-gang Cockatoo Galah
Sulphur-crested Cockatoo
Budgerigar
Crimson Rosella
Eastern Rosella Red-
rumped Parrot Laughing
Kookaburra
Sacred Kingfisher
Welcome Swallow
Tree Martin
Striated Pardalote
Silvereye
White-fronted Chat
Spotted Pardalote

European Goldfinch
House Sparrow
Richard's Pipit
Black-faced Cuckoo-shrike
White-winged Triller
Blackbird
Flame Robin
Scarlet Robin
Rufous Whistler
Grey Shrike-thrush
Grey Fantail
Willie Wagtail Golden-
headed Cisticola Rufous
Songlark
Superb Fairy Wren
Speckled Warbler
Yellow-rumped Thornbill
Red Wattlebird
Noisy Friarbird
Yellow-faced Honeyeater
White-eared Honeyeater
White-plumed Honeyeater
White-naped Honeyeater

Double-barred Finch
Common Starling
Australian Magpie-lark
Dusky Woodswallow

Black-shouldered Kite
Australian Magpie Pied
Currawong Australian
Raven

SPECIES SEEN FLYING OVER

Australian Pelican
White-faced Heron
Great Egret
Black Swan
Sacred Ibis

Whistling Kite Australian
Hobby
Brown Falcon
Australian King Parrot
White-throated Needletail

The needletails were, in fact, feeding.

SPECIES HEARD CALLING AT A DISTANCE

Pallid Cuckoo
Fan-tailed Cuckoo

Carcasses found in the area suggest that raptors take prey, or consume prey, in the area rather more frequently than the numbers of species seen on ground or in trees indicates. There are feral cats in the area (living in storm water drains) which feed themselves somehow and which I suspect have caused the disappearance of the small rabbit colony of the gorse hedges. Carcasses seen have, however, been opened up and stripped in *situ* in a way more suggestive of raptors than cats.

There is considerable breeding actively in the area. Species seen engaging in nesting or with dependent young include:

Masked Lapwing
Feral Pigeon
Crimson Rosella
Eastern Rosella
Blackbird
Willie Wagtail

Red Wattlebird
House Sparrow
Common Starling
Australian Magpie-lark
Dusky Woodswallow
Australian Magpie

The area serves as a corridor between the Camp Hill/Capital Hill bush and the Lake, and broods of Pacific Black Duck are seen from time to time on their way from nest to water. The reflecting ponds occasionally serve them as a way station.

There is nothing very momentous in this - although the Rufous. Night Heron, Budgerigar and Stubble Quail are pleasing - and the only lesson to emerge from the data seems to be that assiduity will build up an extensive avifauna even in nondescript and, at first sight, not very promising country.

A D Ross, 64 Sprent Street, NARRABUNDAH, ACT, 2604

GLORIOUS MUD

Doug Ross

The history of Kelly's Swamp during 1984 and the early weeks of 1985 is an excellent case study in the importance of mud.

For most of 1984, the water level in the Swamp was high and there was often heavy weed and water fern growth. During this period, the number of water bird and wader species to be seen was generally depressed: Little Pied Cormorant, White- faced Heron, Pacific Black Duck, Grey Teal, Dusky Moorhen, Purple Swamphen, Eurasian Coot and the occasional Sacred Ibis were as much as one could expect.

If there were small waders present, they were invisible in the rank growth around the Swamp's edges.

From about mid-December 1984, the water level in the Swamp began to fall so that the Cumbungi roots emerged. Additional species began to appear, beginning with Baillon's Crake and the Australian Crake.

By early January 1985, there was mud visible and, by mid-January, when I visited the Swamp after 2 weeks leave, the mud stretches were extensive, although there was still a considerable area covered by very shallow water - say 5 to 10 cms. The range of species reflected the changed state of the Swamp - against the background, no doubt, of changed conditions elsewhere on the continent. More to the point, among the new species appearing were some that were comparative rarities.

The following schedule, in roughly descending order of rarity for the Swamp, shows the position over the four days immediately following my return from leave:

	Number Present			
Species	20 Jan	21 Jan	22 Jan	23 Jan
Red-necked Avocet *Recurvirostra novaehollandiae*	-	2	2	2
Intermediate Egret *Egretta intermedia*	-	1	1	1
Black-winged Stilt *Himantopus himantopus*	-	2	2	2
Baillon's Crake *Porzana pusilla*	2	1	2	-
Australian Crake *Porzana fluminea*	12+	10+	6	-
Glossy Ibis *Plegadis falcinellus*	-	1	1	3
Pacific Heron *Ardea pacifica*	1	-	3	1
Red-kneed Dotterel *Erythrogonys cinctus*	6	6	-	-

	Number Present			
Species	20 Jan	21 Jan	22 Jan	23 Jan
Latham's Snipe *Gallinago hardwickii*	3	20+	4	
Yellow-billed Spoonbill *Platalea fiavipes*	2	-	4	
Straw-necked Ibis *Threskiornis spinicollis*	-	-	-	1
Black-fronted Plover *Charadrius melanops*	6	6	6	-
Sacred Ibis *Threskiornis aethiopica*	-	-	1	-
Great Egret *Egretta alba*	1	-	-	3
Grey Teal *Anas gibberifrons*	20	30	30	20
White-faced Heron *Ardea novaehollandiae*	-	-	3	2
Little Pied Cormorant *Phalacrocorax melanoleucos*	1	-	1	
Pacific Black Duck *Anas superciliosa*	30	30	50	20
Masked Lapwing *Vanellus miles*	2	-	-	2
Purple Swamphen *Porphyrio porphyrio*	2	4	8	-
Dusky Moorhen Gallinula *tenebrosa*	4	4	3	2
Eurasian Coot *Fulica atra*	8	6	4	2

Later in the week there were sightings of Spotless Crake *Porzana tabuensis* and Lewin's Rail Rallus *pectoralis.*

MacNaughton reported the Red-necked Avocet some years ago on the nearby pond on Jerrabomberra Creek but this was the first time I had seen the bird in the area. The contrast between species numbers in mid-December 1984 and mid-January 1985 points up the importance of managing Kelly's Swamp as a wetland in the sense that periodic flooding and drying out would generate mud which, other things being equal, would attract water birds and waders and, what is more, enables them to be seen clear of heavy vegetation at the Swamp's margin.

Past experience indicates that without some input of water, whether by precipitation, inflow or pumping, the present mud would 'bake' fairly quickly while the present shallows would follow the mud/bake-off path at the same time, leaving the Swamp a desert as it was during the recent drought.

The Department responsible for the Swamp has done a good job in protecting and preserving the surrounds of the Swamp. The writer hopes that it may now see its way to find the time and resources to maintain the Swamp itself as a permanent wetland, partly draining it at times and at other times pumping water in, as needs may be, so as to ensure that mud is present for the maximum practicable periods.

A D Ross, 64 Sprent Street, NARRABUNDAH, ACT, 2604

****

ODD OBS

NANKEEN NIGHT HERON AT UNIVERSITY HOUSE *Ian Beveridge*

An immature Nankeen Night Heron *Nycticorax caledonicus* was present at University House 10-14 July 1984. It spent one day on the edge of a first floor balcony; the other days it was perched in a leafless silver birch 3-4 m from the ground near the fish pond, It was not disturbed by people staring at it from close quarters. Twice it was seen to take a large goldfish from the pond. Its back was speckled grey- grown, not reddish-brown as depicted in Pizzey's *A Field Guide to the Birds of Australia.*

TREASURY SIGHTING OF RUFOUS NIGHT HERON *Doug Ross*

On the morning of 16 August 1984, some Treasury colleagues invited me to their room for consultations on a bird perched in a tree in the courtyard by the Treasury fountain. At first sight, the bird could have been taken for a raptor; its heavily barred plumage certainly gave that impression. As further details became perceptible, however, it became clear that the bird was a juvenile Rufous Night Heron
Nycticorax caledonicus, shape of beak, colour of face, colour and shape of feet, absence of tail.

The Rufous Night Heron was fairly common at one time, in the willows on the Jerrabomberra wetlands area, both adults and juveniles, but in more recent years its numbers have dropped away sharply and in very recent times one has been lucky to flush out even single birds. The presence at the Treasury Building, Barton, of a juvenile, a kilometre or more from the nearest typical heron habitat, is explicable only on the ground that the bird was lost or confused and took refuge in a comforting tree close to a (small) piece of water.

The bird was first seen at about 1000. It was present throughout 16 August and again throughout 17 August. This bird was not there at 0900 on 18 August.

REVIEW
THE ECOLOGICAL RESOURCES OF THE ACT
TECHNICAL PAPER 42 NATIONAL CAPITAL DEVELOPMENT COMMISSION
May 1984, 141 pp

It is very useful for a reviewer, and potential readers, when a technical paper presents a clear statement of its objectives and contents. 'The Ecological Resources of the ACT' is exemplary in this regard and I cannot do better than to produce the summary presented on page 3 of the report to present its objectives:

'The main aim of this Technical Paper is to draw together existing information, including that which is unpublished or less accessible, and to consider this information in the context of the problems outlined above.

Chapter 2 identifies and maps the main terrestrial vegetation communities found in the ACT and assesses their importance for conservation. The vegetation map accompanying this chapter extends, in the light of current trends in vegetation classification, the last comprehensive vegetation map of the ACT produced by Pryor in 1939.

Chapter 3 evaluates the ecological importance of the various natural and artificial aquatic ecosystems in the ACT, which, in general, are less studied or understood than the terrestrial ecosystems.

While Chapters 2 and 3 relate to the community or ecosystem level, Chapters 4 and 5 concentrate on individual species. It is not the intention of these chapters to provide a comprehensive description of the flora and fauna of the ACT, as this information can be obtained from other publications already cited. Rather, they concentrate on species of particular interest, because of their uncommonness or susceptibility to disturbance by development.

Chapter 6 discusses movement patterns of wildlife in the Canberra area. The protection of these movements is important for the long-term maintenance of certain wildlife populations in areas close to Canberra and elsewhere.

Chapter 7 deals with the ecological importance of a range of modified ecosystems which have been established through the development of Canberra and through rural activities (particularly forestry) elsewhere in the ACT.

Based on a knowledge of the distribution of vegetation communities and individual plant and animal species, interactions between species, and the movement and behaviour of animal species, it is possible to identify sites, and areas or corridors of particular ecological importance. These are listed and mapped in Chapter 8. Not all of the features listed are of natural origin.

The last chapter discusses a systematic approach to ecological conservation in the ACT. In particular, it brings out ways in which this can be made compatible with, or even be enhanced by, the ongoing development of the Territory.'

The paper is based heavily on a report prepared by Dr David Shorthouse while working with the NCDC during a period of study leave from the Canberra College of Advanced Education. David is now with the Department of Territories and Local Government he is able to apply the results of his study to practical resource management in the new Namadgi National Park and other parts of the ACT.

The paper was prepared by P R Kendall and P B Lansdown of the NCDC's Environment Section with the assistance of Dr David Hogg, environmental consultant.

The immediate environment of Canberra is one of the most intensively studied regions in Australia. The existence of research and teaching institutions such as CSIRO, ANU, CCAE and various government departments has provided a pool of research workers interested in using the ACT as a readily accessible field laboratory. At the same time the region's highly diverse ecology has itself provided a wide range of opportunities for survey and research.

One of the aims of Technical Report No 42 is to bring the results of the extensive amount of published and unpublished research on the ACT environment into one publication. An examination of this bibliography shows how well this has been done. Even so the writers recognised that they may have missed some sources and in the preface indicate that additional information would be appreciated. This invitation may well be taken up by members of the Canberra Ornithologists Group.

One of the interesting aspects of the Report is the presentation of information on the location of sites and species of special biological or conservation interest. Highlighting these should help to ensure that they will be adequately considered in planning for further urban and recreational development.

The Report recognises the importance of rivers, creeks and wetlands to human recreation and wildlife in a dry environment well removed from the coast. Most Canberra residents come from coastal areas where the vast majority of the Australian population lives. The lack of ready access to the sea for recreation is often felt keenly by ACT people. The weekly summer exodus to the south coast is clear evidence of this. The natural waterways, urban lakes and water supply reservoirs near Canberra provide a valuable resource which is described in some detail in the Report.

Another chapter describes the rare and uncommon plant species in the ACT indicating where they occur and their conservation status. This chapter highlights the limitations of present knowledge of rare and interesting plants in the ACT and suggests the need for more survey work. A recent assessment by Mr John Briggs of CSIRO carried out for the Australian Heritage Commission should assist in this regard.

Chapter 5 'Animal Species and Habitats' provides a useful tabulation for all the animal species both native and exotic, known to occur in the ACT. The status of each species and the plant communities in which it has been recorded are presented and designated as optimum habitat, occasional habitat, or marginal habitat. Undoubtedly COG members could add to this table. It is recognised that the knowledge of invertebrate groups is poor. The distribution information on fish species both native and introduced may be of as much interest to the fisherman as the planner.

An interesting chapter on wildlife movements emphasises the need for corridors to allow for migration and other movements. The ecological role of man-made ecosystems is discussed with emphasis on the ways in which wildlife, including birds, have been affected. Not all readers will support the argument justifying the planting of exotic trees on the basis that the environment was already modified when the decision to develop Canberra as the capital was taken!

Chapter 8 lists 104 areas and sites of ecological interest. Most are natural areas with various degrees of modification or isolation however, some entirely man made areas are listed including arboreta and other plantations.

For obvious reasons I am disappointed that the Australian National Botanic Gardens has been omitted from this chapter which includes places such as Westbourne Woods and Yarralumla Nursery.

The final chapter highlights the need for a systematic approach to ecological conservation in the ACT pointing to opportunities for creative conservation in the management of the natural resources.

Obviously, a report covering so wide a topic as the ecological resources of the ACT which have themselves provided the raw material for many voluminous reports and theses, cannot provide detail. By relying on the extensive bibliography to assist the reader who wants more detail on a particular aspect, the Report has been able to summarise information in readily accessible tabular form.

'The Ecological Resources of the ACT' is a useful document for students, planners and residents of the region who have an interest in the environment where they live and its future management.

R W Boden

****

ODD OBS

CHANNEL-BILLED CUCKOO AT ARALUEN, NSW *Richard Gregory-Smith*

We were busy fencing at Araluen on Saturday 27 October. Showers proliferated during the day with short dampish spells between. It was during one of these periods of respite that we heard loud penetrating calls from the tops of a grove of tall gums. I did not have my binoculars with me, so just waited to see if the perpetrator of these sounds would fly out. Fly out it did, and my first reaction was that I was looking at a grey hornbill: the bird flew across our front in an elongated flight posture with neck out, long tail and legs back, something the size of a White-faced Heron. The large down-curved bill revealed its identity - the Channel-billed Cuckoo *Scythrops novaehollandiae.* It did not stay around, but flew off to some distant gums to continue calling. We did not see or hear it again that weekend or the following one so maybe it was just passing through. It was a memorable first sighting.

We looked up the books when we arrived home. How appropriate some of the alternative names to the weather in which we saw it: Rainbird, Stormbird, Storm Cuckoo! We were interested to read that besides laying sometimes two or more eggs in nests of Pied Currawong, Australian Magpie or Torresian Crow (Pizzey), it has also been known to day in the nest of the Collared Sparrowhawk (Readers Digest). The Channel-billed Cuckoo is a summer migrant from Indonesia and Papua New Guinea and is a vagrant south of Sydney.

****

EDITOR'S NOTE

We all noticed that the title and author's name did not appear at the beginning of Ian Taylor's article 'The History of the Emu in the Canberra Area' (CBN 9(4):150-155). This was the result of a printer's error.

ODD OBS

CRESTED PIGEON AT FAIRBAIRN

Derek McCarthy

At about 1600 on 14 October 1984, while playing golf at Fairbairn RAAF Base Golf Course, I observed two Crested Pigeons *Ocyphaps lophotes* on the short mown grass of one of the fairways. Both birds, which were in bright sunlight and observed from about 20 m away, appeared to be feeding. I again observed two Crested Pigeons at the golf course at noon on 24 November 1984, about 150 m from where the 14 October sighting occurred.

****

ALBINO CHAT AT NEWCASTLE

Brendan Lepschi

While birding by the Karagong Cement Works near Newcastle I observed three White-fronted Chats *Epthianura albifrons.* There were two immature birds (as was evident from the fact that they were being fed) and one adult male.

One of the immature birds was albino, the plumage being as follows: head, throat, breast and belly down to vent - pure snowy white; nape to tail including wings - very pale fawn

brown giving a washed appearance; iris, bill and legs - pinkish. I observed the bird in good light from about 5-10 m with 8 x 40 binoculars. Is this the only substantiated record of an albino chat, or are there others?

****

CHOUGHS EAT ORCHID FLOWERS

John Gibson

At about 1400 on 14 October 1984 I observed a group of White-winged Choughs *Corcorax melanorhamphos* feeding on the ground in a relatively open area of forest on Black Mountain. The birds were not searching through the forest litter, but rather were snipping off the flowers of one particular species of orchid, *Glossodia major,* or the Wax-lip. Other species of orchids were ignored by the birds. This could be due to scent, or the purple colour of the orchid, which made it visually obvious.

The birds were eating the flowers whole and seemed to be enjoying themselves. Two weeks later, this species of orchid had largely disappeared and no such feeding was observed.

This page intentionally blank

Canberra Bird Notes is published quarterly by the Canberra Ornithologists Group. The subscription rates are: Student (under 18) $4.00; Single $8.00; Family $10.00 all with one copy copy of CBN; Institutions $10.00.

Editor: Mr P M Davidson, PO Box 301, CIVIC SQUARE, ACT, 2608 *Rarities:* C Bear (583169, H); G Clark, B Baker, R Gregory-Smith

CANBERRA ORNITHOLOGISTS GROUP COMMITTEE

President	Bryan FitzGerald	485140	(H)	
Vice-President	Chris Davey	546324	(H)	411211(W)
Secretary	Bob Digan	511811	(H)	467454(W)
Assistant Secretary	Leonie Andrews			722434(W)
Treasurer	Doug Ross	956041	(H)	633826(W)
Editor	Peter Davidson	583710	(H)	685436(W)
Assistant Editor	Alison Rowell	477390	(H)	685469(W)
Assistant Editor (Annual Report)	Hew Prendergast	496591	(H)	494666 (W)
Records	Ian Taylor	476315	(H)	
Expeditions	Graham Browning	889450	(H)	436374(W)
Conservation	Philip Veerman	815602	(H)	8965=(W)
Exhibitions	Volunteer Required			
Newsletter	Joan Lipscombe	733948	(H)	
Publications	Tony Lawson	889430	(H)	643125(W)
Member	Graham Barwell	540868	(H)	
Member	Jack Holland		(H)	467401*(w)*
Member	Peter Roberts	8845580	(H)	

****

CONTENTS *PAGE*