

Chlamydera guttata carteri Mathews, 1920 – an overlooked subspecies of Western Bowerbird (Ptilonorhynchidae) from North West Cape, Western Australia

Clifford B. Frith and Dawn W. Frith

'Prionodura', PO Box 581, Malanda, Queensland 4885, Australia

Abstract – The subspecies of Western Bowerbird named *Chlamydera guttata carteri* Mathews 1920, known only from the North West Cape of Western Australia, has remained in the synonymy of *C. guttata* since 1930. A review of all known specimens of *C. g. carteri* and of 33 other *C. guttata* skins from adjacent areas of Western Australia indicate that *C. g. carteri* of North West Cape is a valid subspecies distinctive in its significant small size, particularly wing length, and plumage markings and coloration. Populations of nine other passerine species isolated on North West Cape, one a diminutive endemic subspecies, indicate this as a historic centre for avian subspeciation.

INTRODUCTION

Populations of spotted bowerbirds (*Chlamydera*) from the arid interior of central Australia and mid-central Western Australia were long ago considered to be sufficiently different from those of western Queensland, New South Wales and Victoria to be treated as specifically distinct and were given the name *Chlamydera guttata* by John Gould (1862). They reach the western coastal zone in the area of North West Cape and Burrup Peninsula of northwestern Western Australia (Storr 1984, Figure 1). Among other differences, they have no sign of the conspicuously contrasting nape patch of uniform grey feathering typical of the eastern form. The specific status of *C. guttata* was widely accepted until Mathews (1912, 1946) combined it with the eastern form, *C. maculata*.

Most authors subsequent to Mathews (1946) have treated all populations of Australian spotted bowerbirds as a single species under *C. maculata* (e.g., Whittell and Serventy 1948, Mayr 1962, Gilliard 1969, Schodde 1975, Storr 1977, Cooper and Forshaw 1977). Mayr and Jennings (1952) suggested the possibility, however, that what they termed the "*guttata* group" of bowerbirds in central and western Australia might again be considered a species separate from *C. maculata* of eastern Australia. They considered the material available to them of the *guttata* group "altogether insufficient for determination of geographical variation" and noted that study of more extensive material was desirable. Keast (1961) repeated the view that the *maculata* and *guttata* populations "were approaching, or have reached, that stage of differentiation typical of species".

Schodde (1982) subsequently acknowledged the

mid-central and Western Australian populations of spotted bowerbirds to constitute the distinct species *C. guttata* of Gould (1862). In publications too numerous to detail here, opinion as to the status of *guttata* as a good species or merely as a subspecies of *C. maculata* has swung back and forth during the past two decades. Suffice to say that while the influential ornithological works of Mayr and Jennings (1952), Gilliard (1969), Hall (1974), Schodde (1975), Cooper and Forshaw (1977), Storr (1984, 1985, 1991) treat *guttata* as only a subspecies of *C. maculata*, more recent works accept *C. guttata* as a full species (Schodde and Tidemann 1986, Sibley and Monroe 1993, Christidis and Boles 1994). Little is published supporting either action. Populations of *C. guttata* have now come to be known collectively as the Western Bowerbird.

Based on a specimen (sex not indicated) collected at "North-west Cape, Mid-west Australia, August 7th, 1916", Gregory Mathews (1920) named a new subspecies of spotted bowerbird *Chlamydera maculata nova*. In describing this new subspecies Mathews wrote that it "Differs from *C. m. subguttata* Mathews in having the yellow on the breast and abdomen much deeper and richer flank markings bolder, less black on the throat and upper chest, and the bill smaller" but did not present measurements of birds. The subspecies *C. m. subguttata* Mathews, 1912 was described from the East Murchison River, near Wiluna in Western Australia (see Figure 1), but was subsequently treated as invalid by Mathews himself (Mathews 1930, 1931) and by all subsequent authors.

Within three months of erecting the name *C. m. nova*, Mathews found that it was preoccupied and renamed it *C. m. carteri*, after the original collector

Tom Carter (*in* Carter and Mathews 1920). This subsequent publication contains a brief but slightly expanded description of *C. m. carteri*, and is accompanied by a colour plate of the specimen collected on 9 August 1916 and now in The Natural History Museum, Tring (BMNH 1931.8.1.1). In the plate the lilac nuchal crest is shown to be far larger than it actually is in The Natural History Museum specimen or in any specimens of *carteri*. This may have led Iredale (1950) to state erroneously of *C. m. (nova) carteri* that "The female has a large nuchal frill". Carter and Mathews (1920) also stated that about half the nuchal crest feathers of the only male collected were deep golden yellow but these are in fact simply some crest feathers with a rose-reddish hue, which also occur, to a lesser extent, in the female H. L. White (HLW) specimen 6591 in the Museum of Victoria. The text also refers to a series of six birds obtained at North West Cape; a seventh specimen detailed herein was collected by Gerlof Mees in 1959. Tom Carter published some

notes on the Cape Spotted Bower-bird (still as *C. m. nova*), stating that he had first collected a specimen of it in February 1892 (Carter and Mathews 1921). The specimen unfortunately reached Melbourne as a "mass of loose feathers" (Carter 1903, Carter and Mathews 1921) and has apparently not survived to the present day.

By the time Mathews published the second part of his *Systema Avium Australasianarum* (Mathews 1930), he had apparently lost confidence in the validity of *C. m. carteri* and consigned it to the synonymy of *C. m. guttata*. In a comprehensive review of Australian bowerbirds to subspecific level, Mayr and Jennings (1952) treated the Mathewsian subspecies *nova*, *subguttata* and *macdonaldi* (the last referring to birds of the Macdonnell Ranges, Central Australia) as synonyms of *C. guttata*. This conclusion, however, was presumably based upon examination of only the single specimen of *carteri* in the American Museum of Natural History (AMNH). Since that time *C. guttata carteri* has remained unrecognised (Marshall 1954, Serventy and Whittell 1962, Gilliard 1969, Cooper and Forshaw 1977, Storr 1984, Ford 1987a).

Recent field studies of Western Bowerbirds on North West Cape proved the species to be a common breeding resident, with bowers of males and nests of females not difficult to find (Serventy 1955, Kolichis 1979, Bradley 1987).

METHODS

We examined the three North West Cape specimens of *C. guttata*, from the H. L. White (HLW) collection in the Museum of Victoria and found them to be conspicuously different from birds from the Hamersley Range and the East Murchison River area (see Figures 1 and 2). The northwest end of Hamersley Range is not as discrete as indicated in Figure 1, but becomes lower and broken towards Onslow. During a more recent study tour of most world bird collections containing significant numbers of birds of paradise (Paradisaeidae), we also took the opportunity to examine all available specimens of *C. guttata* from the North West Cape and adjacent areas of Western Australia (see Table 1). In addition to the H. L. White specimens from North West Cape, one was examined in the The Natural History Museum, Tring, two from the Western Australian Museum (WAM) and one at the American Museum of Natural History. Measurements of skins were taken in the standard way. The wing was measured straightened and flattened, with a stopped rule; tail length was taken from the point of insertion of the central pair of feathers into the skin to the tip of the longest feather; and bill width was taken at the anterior margin of the nostril with

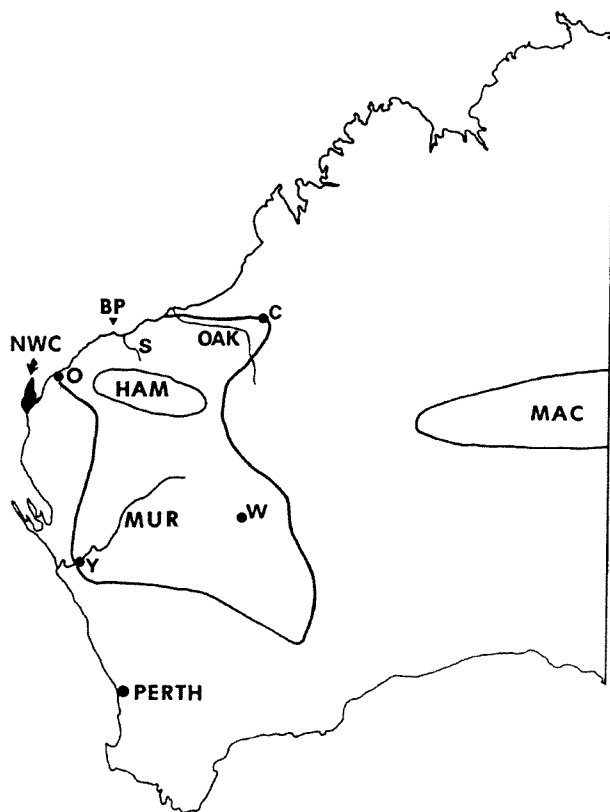


Figure 1 Map of western continental Australia showing locations mentioned in the text or Table 1. Solid black area = North West Cape (NWC); C = Callawa; HAM = Hamersley Range; MAC = Macdonnell Range; MUR = Murchison River; O = Onslow; BP = Burrup Peninsula; Oak = Oakover River; S = Sherlock River; W = Wiluna; Y = Yandil. The solid line encompassing Onslow and the Hamersley and Murchison areas and that encompassing and extending west of the Macdonnell Range indicates the approximate range of *C. guttata* in Western Australia.

digital calipers. Observed differences in some of the measured characters between paired populations of birds were tested for levels of significance with Student's *t*-test. All skins of *C. guttata carteri* and several other skins of *C. guttata* from locations about the North West Cape area in various museums (see Table 1) were photographed under equivalent conditions to enable comparison.

RESULTS

As the morphology of the three North West Cape specimens of *C. guttata* in the Museum of Victoria collection (HLW 6590, 6591, 6592) and the two in the WAM (A8713 collected by Mees and A1224 collected by Carter) was the same (and like that of the two North West Cape specimens examined elsewhere), we first present a composite description of these, with comparative reference to some other *C. guttata* specimens held in the Museum of Victoria. Following this, we briefly comment on the two North West Cape specimens held outside Australia:

The five North West Cape birds held in Australian collections differ conspicuously from those of the Hamersley Range and the East Murchison River area. In the North West Cape birds, the chestnut spotting of the blackish nape

(below the pink nuchal crest) is finer and denser than in birds to the immediate east and south-east. The chestnut spotting on the lower mantle, back, rump and upper tail coverts is also denser (ie. there is less black). The pale spots on the mantle of the North West Cape birds typically have the converging straight edges of the upper half meeting in a sharp point at their apex. This is in marked contrast to those of birds to the south and south-east, in which these spots are typically rounded about their upper half as well as the lower, the spots being roughly circular or heart-shaped overall. Moreover, in North West Cape birds the back spotting is uniformly chestnut, whereas in the adjacent populations the colour of back spotting is variable (chestnut to buff).

The crown of North West Cape birds is conspicuously different from that of birds found to the east and the southeast in being much more finely spotted (almost streaked on the forecrown) chestnut, the black edge of the individual feathers being much finer. The result is that the crown in North West Cape birds is overall more uniformly chestnut than the more variegated and more heavily black-marked crowns in adjacent populations. There is no silver tipping to the crown feathers as is typical of specimens of *C. guttata* to the east and southeast. Ear coverts and throat



A

B

Figure 2 Dorsal (A) and ventral (B) views of Museum of Victoria specimens of *Chlamydera guttata* from Western Australia: three being of *C. g. carteri* from the North West Cape (upper left), four of *C. g. guttata* from the Hamersley Range (upper right), and four *C. g. guttata* from the east Murchison River (lower).

feathers, and those of the upper breast, have far less extensive black edges than in birds to the south and the southeast. This gives these parts of the bird a far more uniformly chestnut look (as in the crown) than the much blacker appearance of these parts in birds from the Pilbara and Murchison (Figure 2).

The 'blackish' colour in the wings (primaries and secondaries) and upper tail (notably the central pair of rectrices) is less black, tending more to brown, in the North West Cape birds than in those to the east and southeast. This is a slight but nevertheless consistent difference found in all five North West Cape birds. The pale broad edging to the primary and secondary wing coverts in four of the North West Cape birds is similar in colour to those in adjacent areas but in Museum of Victoria female skin HLW 6591, it is rich chestnut, as is the back spotting of all five North West Cape birds.

The rich chestnut of the sides of the breast, flanks and thighs is most noticeably more extensive in North West Cape birds than in those to the east and southeast. In birds from the latter areas the chestnut is confined more to the sides of the abdomen, the flanks and the thighs, where the colour is less intense. In North West Cape birds the rich chestnut extends all the way up the sides and further out onto the sides of the flanks, abdomen and breast than in the other birds (in which it is mostly concealed by the wings), and this joins the chestnut of the throat and sides of the neck. The

only exception to this is a crestless female specimen in the WAM (A4126) from Yandil Station on the West Murchison River which has rich and extensive chestnut similar to the North West Cape birds. It shows no yellow on its underparts, however, and has the crown, mantle and back plumage of the East Murchison birds while its chin and throat feathering is somewhat intermediate in coloration and marking. Thus, while it does exhibit the rich extensive chestnut otherwise found only in North West Cape birds, it lacks the yellow underparts of North West Cape birds. Its upperparts are as in East Murchison birds and it is significantly and exclusively larger than North West Cape birds in all but bill length (= 29.7 mm, the length of the shortest-billed North West Cape bird). Thus, the Yandil bird is an atypical Murchison River area individual that is clearly not associated with the geographically remote (Figure 1) and distinctive North West Cape birds.

The specimen of *C. guttata carteri* in the AMNH (679152) collected by Carter at Hooroomooroo, North West Cape on 6 August 1916, has the same appearance as the above North West Cape specimens, with the extensive chestnut thighs, flanks and sides of the breast. The throat is similarly more buff and less black as in other North West Cape birds, but unlike one from Onslow and those from other adjacent areas in the AMNH collection. The crown feathers of the AMNH specimen are streaked and spotted dark chestnut with fine black outer edging and lack silvery tips; the nuchal crest is small. In comparison the bird from Onslow (AMNH 679153) has the crown only spotted dark chestnut, with much silver tipping to the feathers; the nuchal crest is large. The Onslow bird has far less extensive chestnut on its flanks than the North West Cape birds. A bird from 10 miles north of Tambrey, Sherlock River, which is directly north of the central Hamersley Range, is similar to the Onslow specimen. Thus the Onslow and Sherlock River birds are unlike the North West Cape birds but are like those from Hamersley Range.

The single specimen (1931.8.1.1) of *carteri* in the BMNH was collected by Carter on 9 August 1916 at North West Cape. In general markings and coloration it is extremely similar to the specimen in the AMNH and, while its nuchal crest is slightly larger than in North West Cape skins in the Museum of Victoria and AMNH, it is conspicuously smaller than in birds from Onslow, Sherlock River, Hamersley Range and East Murchison area.

Table 1 summarises the measurements of the seven North West Cape specimens and of an additional 33 *C. guttata* skins from adjacent areas held at various museums. Wing and tail lengths of the birds of the Hamersley and Murchison areas

Table 1 Mean measurements (boldface), standard deviations and sample sizes for 40 Western Bowerbird *Chlamydera guttata* specimens¹ from North West Cape (*C. g. carteri*), Hamersley Range and Murchison River area (*C. g. guttata*) of Western Australia.

	Wing length	Tail length	Tarsus length	Bill length	Bill width	Total head length
North West Cape ²	137	91	36.6	30.2	7.6	57.1
	2.77	3.19	0.61	1.00	0.43	-
	7	7	7	7	7	1
Hamersley Range ³	149	94	38.4	30.6	7.4	58.4
	1.27	9.96	1.37	0.78	0.44	1.09
	13	12	13	13	13	12
Murchison River ⁴	148	95	38.9	30.4	7.5	58.0
	2.31	5.35	1.15	1.20	0.32	1.07
	20	20	20	20	20	19

¹ 12 from Museum of Victoria, 11 Western Australian Museum, 10 National Wildlife Collection, CSIRO, 5 American Museum of Natural History, 1 South Australia Museum and 1 The Natural History Museum, Tring.

² 6 females and 1 adult male.

³ 7 adult males, 2 subadult males and 4 females (including 1 from Onslow, 1 from Oakover River, 1 from Callawa and 1 from the Sherlock River - see Figure 1).

⁴ 11 adult males, 2 subadult males and 7 females.

are almost identical (Table 1), there being no significance between them ($t = 1.119$, $P > 0.1$ and $t = 0.163$, $P > 0.1$ respectively). The wing and tail length of North West Cape birds are much shorter than those of birds from the Hamersley Range immediately to the east, however, and the differences are significant ($t = 10.417$, $P < 0.001$ and $t = 2.089$, $P = 0.05$ respectively). Differences in wing and tail lengths of the North West Cape birds compared with those of both the Hamersley and Murchison areas combined (Table 1, Figure 1) are also significant ($t = 10.072$, $P < 0.001$ and $t = 2.471$, $P < 0.02$ respectively).

DISCUSSION

We agree with the current view that there is no justification for taxonomically distinguishing between populations of *C. guttata* of the Hamersley Range and Murchison River areas (Figure 2). Birds from the former may be on average slightly more brownish in the throat and darker on the crown; however Museum of Victoria specimens HLW 6772 and 6774 (subadult and adult male respectively) from the Hamersley Range are all but identical to specimens HLW 1137 and 1138 (subadult and adult male respectively) from the East Murchison in throat, crown, upperparts and all other plumage. Measurements of birds from these two areas are similar (Table 1) and show no significant difference. We do note that a number of species show geographic variation between west and east Murchison (R. E. Johnstone *in litt.*).

It is clear from results presented in Table 1 and above that the seven birds from the North West Cape of Western Australia are on average significantly smaller than those from the adjacent Hamersley Range area (including Onslow and Sherlock River) in wing length (8%) and, to lesser extent, tail (4%) and tarsal length (5% shorter), while their bills are only fractionally smaller and therefore are disproportionately long and broad relative to overall body size. Inexplicably, the original description of *C. g. carteri* (Mathews 1920) includes the statement "and the bill smaller [than *C. m. subguttata*]", and a subsequent description (Carter and Mathews 1920) stated that the "bill of this new subspecies is distinctly smaller, and about 5 mm shorter [than in *C. m. subguttata*]".

The lilac nuchal crest feathers of the North West Cape birds are all far shorter than those of birds from elsewhere, and the crest thus forms a far narrower band. They were not measured, but the shorter crest is nevertheless clearly apparent (Figure 2). The crown coloration and markings of birds from North West Cape differ obviously from those on birds of adjacent areas. This is significant because speciation in bowerbirds is typically emphasized by marked differences in crown

colour. Examples of this are differences between the catbirds *Ailuroedus crassirostris* and *A. melanotis* within Australia and between subspecies of *A. buccoides* and of *Chlamydera lauterbachii* in New Guinea. Likewise, crest size differences among the gardener bowerbirds, *Amblyornis*, of New Guinea reflect speciation in this genus (Gilliard 1969, Schodde and McKean 1973, Frith and Frith *in press*). These examples support the argument that the population of *C. guttata* that is apparently confined to the North West Cape area (Blakers *et al.* 1984, Storr 1984, Ford 1987a, Kendrick 1993) has differentiated at least subspecifically.

The degree of morphological differentiation of *C. guttata carteri* from conspecifics to the east and southeast is far greater than that between the populations of the Hamersley Range and on the Murchison River (see above, Table 1, Figure 1) to which Schodde (in Schodde and Tidemann 1986) was alluding when indicating the species to consist of "one or two races" (Schodde *in litt.*). It is greater than the difference between the far more extensively distributed, mid-central and mid-western Australian populations of *C. guttata*. The difference between *C. g. carteri* and *C. g. guttata* is not unlike the degree of differences found between the long and presently recognised subspecies within *C. nuchalis* and *C. lauterbachii* (Gilliard 1969, Cooper and Forshaw 1977), notwithstanding that Schodde (in Sibley and Monroe 1990) doubted the validity of subspeciation within the latter species.

In view of the above, *C. guttata carteri* Mathews of the North West Cape should be recognised as a subspecies until such time as further collecting and/or genetic studies demonstrate otherwise. Storr (1986), Blakers *et al.* (1984) and Kendrick (1993) clearly indicated the isolated nature of the North West Cape bowerbird population. That its geographical range is so limited is of considerable interest on a continent where this is rarely the case for avian taxa at any level (Keast 1961). Storr (1984) noted ten bird species (one non-passerine and nine passerines) with populations isolated on the Cape Range of the North West Cape. In acknowledging and discussing the Cape Range as a minor geographical isolate, Ford (1987a) noted it is separated from rangelands in the Pilbara by a water barrier (Exmouth Gulf) and a lowland vegetated with open scrub steppe. Ford (1987b) shortly thereafter named the isolated population of Grey Shrike-thrush on the Cape Range of North West Cape as the diminutive subspecies *Colluricincla harmonica kolichisi*.

Because the female AMNH 679152 specimen is dated 6 August 1916, it clearly cannot be the type of *C. maculata nova* designated by Mathews (1920), as he specified in his description a female collected on "August 7th, 1916". Thus the type must be one of the two females collected on 7 August and now

in the Museum of Victoria, Melbourne (NMV, HLW 6590 and 6591). The International Commission for Zoological Nomenclature recommends that, in the case of such a situation in a revision of a taxon (such as the present one) a lectotype be formally designated. We therefore designate the Museum of Victoria female specimen NMV, HLW 6591 as the lectotype of *Chlamydera guttata carteri*. This specimen was collected on 7 August 1916 and has "nova type" written in pencil on Tom Carter's original label. The other five specimens of this form collected during early August 1916 are therefore paralectotypes.

For bibliographical comprehensiveness and in order to avoid potential future confusion, we note that in his account of his collection of the type series of *C. g. carteri*, Carter (*in* Carter and Mathews 1921) provided chronological details contrary to the label data on his specimens. His account indicated that he collected four birds on 6 August, another on 7 August and one more on 9 August 1916. As label data on Carter's female specimens are unambiguously clear, we use these and conclude that his subsequent written account is erroneous.

A possible additional factor contributing to the isolation of *C. g. carteri* on the North West Cape is, as several authors have noted, that Western Bowerbirds feed a great deal upon fruits of, and thereby closely associated with the distribution of, the fig tree *Ficus platypoda*, which grows in sheltered woodland among rocky ranges (Marshall 1954, Serventy 1955, Serventy and Whittell 1962, Gilliard 1969, Cooper and Forshaw 1977, Binsted 1978). This rock-associated fig is significantly sparse or absent in the expansive low arid desert sand plains that separate the sandstone and limestone Cape Range of the North West Cape from more extensive and complex rocky outcrops of the Hamersley Range to the east (CSIRO 1960). Emphasizing the significance of the (approximately two hundred kilometre) isolation of the (up to 300 metres above sea level) dissected limestone ranges of the Cape Range is that the skink *Lerista allochira* is a distinct species dependant upon and endemic to them (Kendrick 1989). In addition, four other reptiles species are all but endemic to the Cape Range peninsula in that three occur elsewhere only to a short distance eastward and one a short distance southward (Kendrick 1993). The lack of available water in this arid lowland barrier might also be significant. If so, these factors would account for the isolation and resultant marked differentiation of the North West Cape Western Bowerbird population (Figure 1, Table 1, Plate 1). The fact that *C. guttata* has spread, probably only quite recently, beyond the southern limit of *Ficus platypoda* (R. E. Johnstone *in litt.*) does not negate this possibility.

ACKNOWLEDGEMENTS

This study would not have been possible without the cooperation of several institutions and their staff. We acknowledge Peter Arnold, Museum of Tropical Queensland, Les Christidis, Ian McAllan and Rory O'Brien, Museum of Victoria, Melbourne; Richard Schodde, Ian Mason and John Calaby, National Wildlife Collection, CSIRO, Canberra; Ron Johnstone, Western Australian Museum, Perth; Lester Short, Joel Cracraft, Mary LeCroy and the Chapman Fund, American Museum of Natural History, New York; Philippa Horton, South Australian Museum, Adelaide and Robert Prys-Jones, Peter Coulston and Michael Walters, The Natural History Museum, Tring, U.K. for access to and/or help with specimen loans or literature. Joan Airey, Jeff and Barbara Davies, Peter and Daphne Fullager, Mary LeCroy and Peter and Janet Marsack provided most kind hospitality. For constructively commenting on a draft of this contribution we sincerely thank Walter Boles, Allan Burbidge, Les Christidis, John Dell, Ron Johnstone, Norbert Lenz, Ian McAllan and Richard Schodde. Dedicated to the memory of Dom. (D.L.) Serventy who ruefully wrote (1950) "After the exacting task of delimiting subspecies- it will be mostly a matter of selecting one of the numerous Mathewsian labels".

REFERENCES

- Binsted, G. (1977). Food of the Western Bower-bird in the Chichester Range, W.A. *West Australian Naturalist* 14: 77.
- Blakers, M., Davies, S.J.J.F. and Reilly, P.N. (1984). *The Atlas of Australian Birds*. Royal Australasian Ornithologists' Union and Melbourne University Press, Melbourne.
- Bradley, J. M. (1987). Vocal behavior and annual cycle of the Western Bowerbird *Chlamydera guttata*. *Australian Bird Watcher* 12: 83-90.
- Carter, T. (1903). Birds occurring in the region of the North-West Cape. Part 1. *Emu* 3: 30-38.
- Carter, T. and Mathews, G.M. (1920). On a new species of Bower-bird. *Ibis* (11) 2: 499.
- Carter, T. and Mathews, G.M. (1921). On some western Australian birds collected between the North-West Cape and Albany (950 miles apart). *Ibis* (11) 3: 75-79.
- Christidis, L. and Boles, W. E. (1994). The taxonomy and species of birds of Australia and its territories. Royal Australasian Ornithologists' Union Monographs 2: 1-112. Royal Australasian Ornithologists' Union, Melbourne.
- Cooper, W.T. and Forshaw, J.M. (1977). *The Birds of Paradise and Bower Birds*. Collins, Sydney.
- CSIRO (1960). *The Australian Environment*. CSIRO and Melbourne University Press, London.
- Ford, J. (1987a). Minor isolates and minor geographical barriers in avian speciation in continental Australia. *Emu* 87: 78-102.

- Ford, J. (1987b). A new subspecies of Grey Shrike Thrush and Long-billed Corella from Western Australia. *West Australian Naturalist* 16: 172–175.
- Frith, C. B. and Frith, D. W. (1997, in press). *Amblyornis macgregoriae lecrovae* – a distinctive new subspecies of Macgregor's Bowerbird (Ptilonorhynchidae) of New Guinea. *Bulletin of the British Ornithologists' Club* 117:
- Gilliard, E.T. (1969). *Birds of Paradise and Bower Birds*. Weidenfeld and Nicolson, London.
- Gould, J. (1862). On a new species of *Chlamydera*, or bower-bird. *Proceedings of the Zoological Society of London* 11: 161–162.
- Hall, P. B. (1974). *Birds of the Harold Hall Australian Expeditions 1962–60*. Trustees of the British Museum of Natural History, London.
- Iredale, T. (1950). *Birds of Paradise and Bower Birds*. Georgian House, Melbourne.
- Keast, A. (1961). *Bird speciation on the Australian continent*. Bulletin of the Museum of Comparative Zoology, Cambridge, Mass.
- Kendrick, P. G. (1989). Two new species of *Lerista* (Lacertilia: Scincidae) from the Cape Range and Kennedy Range of Western Australia. *Journal of Herpetology* 23: 350–355.
- Kendrick, P. G. (1993). Biogeography of the vertebrates of the Cape Range peninsula, Western Australia. *Records of the Western Australian Museum Supplement* 45: 193–206.
- Kolichis, N. (1979). The nest of the Western Bower-bird (*Chlamydera guttata*). *West Australian Naturalist* 14: 132.
- Marshall, A.J. (1954). *Bower-birds: their displays and breeding cycles*. Oxford University Press, London.
- Mathews, G.M. (1912). A reference-list to the birds of Australia. *Novitates Zoologicae* 18: 171–455.
- Mathews, G.M. (1920). Descriptions of new subspecies of Australian birds. *Bulletin of the British Ornithologists' Club* 40: 75–76.
- Mathews, G.M. (1930). *Systema Avium Australasianum*. Part 2. British Ornithologists' Union, London.
- Mathews, G.M. (1931). *A List of the Birds of Australia*. Taylor and Francis, London.
- Mathews, G.M. (1946). *A Working List of Australian Birds including the Australian Quadrant and New Zealand*. Sheperd and Newman, Sydney.
- Mayr, E. (1962). Family Ptilonorhynchidae, Pp. 172–181 in *Check-list of Birds of the World*, Vol. 15. Eds E. Mayr and J.C. Greenway, Jr. Museum of Comparative Zoology, Cambridge, Massachusetts.
- Mayr, E. and Jennings, K. (1952). Geographic variation and plumages in Australian bowerbirds. *American Museum Novitates* 1602: 1–18.
- Schodde, R. (1975). *Interim List of Australian Song-birds. Passerines*. Royal Australasian Ornithologists' Union, Melbourne.
- Schodde, R. (1982). Origin, adaptation and evolution of birds in arid Australia. Pp. 191–224 in *Evolution of the Flora and Fauna of Arid Australia*. Eds. W. R. Barker and P. J. M. Greenslade. Peacock Press, Adelaide.
- Schodde, R. and McKean, J.L. (1973). Distribution, taxonomy and evolution of the gardener bowerbirds *Amblyornis* spp. in eastern New Guinea with descriptions of two new subspecies. *Emu* 73: 51–60.
- Schodde, R. and Tidemann, S. C.(eds). (1986). *Complete Book of Australian Birds*, 2nd. ed. Reader's Digest Services, Sydney.
- Serventy, D. L. (1950). Taxonomic trends in Australian ornithology – with special reference to the work of Gregory Mathews. *Emu* 49: 257–267.
- Serventy, D. L. and Whittell, H. M. (1962). *Birds of Western Australia*. Paterson Brokensha, Perth.
- Serventy, V. (1955). Notes on the Spotted Bower-bird (*Chlamydera guttata*). *West Australian Naturalist* 5: 5–8.
- Sibley, C.G. and Monroe, B.L., Jr. (1990). *Distribution and Taxonomy of Birds of the World*. Yale University Press, New Haven.
- Sibley, C.G. and Monroe, B.L., Jr. (1993). *A Supplement to Distribution and Taxonomy of Birds of the World*. Yale University Press, New Haven.
- Storr, G.M. (1977). Birds of the Northern Territory. *Special Publication of the Western Australian Museum* 7: 1–130.
- Storr, G.M. (1984). Birds of the Pilbara Region, Western Australia. *Records of the Western Australian Museum Supplement* 6: 1–63.
- Storr, G.M. (1985). Birds of the Gascoyne Region, Western Australia. *Records of the Western Australian Museum Supplement* 21: 1–66.
- Storr, G.M. (1986). Birds of the South-eastern Interior of Western Australia. *Records of the Western Australian Museum Supplement* 26: 1–60.
- Storr, G.M. (1991). Birds of the South-West Division of Western Australia. *Records of the Western Australian Museum Supplement* 35: 1–150.
- Whittell, H. M. and Serventy, D.L. (1948). A systematic list of the birds of Western Australia. *Special Publication of the Museum of Western Australia* 1: 1–126.