

# BEHAVIOUR OF THE BLACK-FACED WOODSWALLOW

## *Artamus cinereus*

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A nest of the Black-faced Woodswallow *Artamus cinereus* was observed for 22.5 hours during incubation and 32.5 hours during the nestling stage, from a hide placed three metres away. The five attending woodswallows were individually colour-banded. Continuous recordings of vocalizations at the nest were made; sound spectrographs of significant vocalizations are presented. A restricted range of vocalizations was heard at the nest. These included a contact call (*qui*), nestling calls, greeting calls (*qua*), at high intensity including a rapid series of 'quas' as a rattle segment. Alert, alarm and mobbing calls based on the 'qua' syllable at increasing rates and intensities and shorter durations were also recorded. Other aspects of their behaviour such as locomotion, foraging, roosting, body care, courtship and reproduction are described.

### INTRODUCTION

The family Artamidae has recently become the 'parent', taxonomically, of an assemblage that, besides the woodswallows, includes the magpies, butcherbirds, currawongs, pitohuis and bristleheads (Schodde and Mason 1999). The woodswallow genus *Artamus* gives its name to this varied family that is largely united on the strength of a shared blue-grey bill colour. Six of the eleven *Artamus* species occur in Australia, but relatively little is known about their lifestyles, largely because they spend most of their time either flying high and fast when travelling, in pursuit of their insect prey, or else sitting quietly on a branch. This does not leave much time for interesting study and, apart from sighting records and general comments, the literature is sparse. Keast (1958) sorted out the geographical distribution and movement of the Australian species and more recently Schodde and Mason (1999) realigned the subspecies. Between 1959–60 Klaus Immelmann spent a very productive year in Australia and wrote extensive accounts of his observations, but unfortunately most of those on the woodswallows are in German and not easily available (Immelmann 1963, 1966). Clunie (1973, 1976) described the behaviour of the White-breasted Woodswallow *A. leucopterus* in Fiji and Recher and Schulz (1983) that of White-browed Woodswallow *A. superciliosus* in New South Wales. For the rest, the literature consists of brief snippets of information (Chisholm 1909; Dove 1909; Heathcote 1931; Cameron 1933; D'Ombrian 1934; Coleman 1945; Rowley 1951, 1976; Hindwood 1956; Immelmann 1960, 1963, 1966; Austin 1972; Bourke 1972; Lowe and Lowe 1972; Sharland 1972).

This paper describes aspects of woodswallow behaviour seen during thirty years of fieldwork in most parts of Australia, including an opportunistic study of Black-faced Woodswallows *A. cinereus* from 1973–1976 (Rowley 1999, 2002).

### METHODS

As described in detail elsewhere (Rowley 1999), a group of Black-faced Woodswallows *A. cinereus* had been colour-banded at

Manmanning, in the wheatbelt of Western Australia and followed from 1973–1976. In 1975 a canvas hide was established within three metres of a nest (number 501) where the five attending woodswallows were individually recognizable. Observations of behaviour were made during hide-watches totalling 22.5 hours ( $n = 7$ ) during incubation and for 32.5 hours ( $n = 7$ ) during the nestling stage. Where relevant these observations have been supplemented with others from the literature.

A continuous recording from a Beyer 100 microphone placed just below the nest was stored on a National Panasonic Cassette Recorder RQ-421DS and vocalizations from the resulting 33 cassettes have been analysed in this paper. Calls were analysed on a Macintosh iMac computer. Sounds were digitized at 16-bit resolution and edited using Soundedit 16, version 2 software (Macromedia Inc.); background noises and irrelevant sounds were removed as far as possible. Sound spectrographs were prepared using Canary 1.2.4 (Bioacoustics Res. Prog., Cornell Laboratory of Ornithology).

### RESULTS AND DISCUSSION

#### *Locomotion*

Mayr (1945) rated *Artamus* as the best fliers amongst the Oscines. Their flight is characterized by short glides interspersed with rapid wing-beats. Unfortunately this appears superficially similar to the flight of the Common Starling *Sturnus vulgaris*, which do not occur in Western Australia. Several woodswallows have been shot in mistake for this invading exotic. Black-faced Woodswallows fly fast and with great agility when hunting close to the ground or when up high, but if the wind is very strong they make only brief sorties from convenient low perches such as fence lines or stray weeds left standing in stubble.

On the ground woodswallows hop with both feet together and appear clumsy since their short tarsi are placed to the rear of the body. They usually perch on exposed branches from which they can easily launch and fly sorties. If they need to move along a branch, they shuffle sideways by moving one foot after the other. Long strong claws enable them to cling to the trunk of a tree all night when roosting, to shelter from a rainstorm, or to stealthily retreat to the under or rear surface of a branch to avoid being seen by an approaching raptor or other predator. This later behaviour appears to be unique, as it is employed to avoid

being seen in what would otherwise be a very exposed position and where flight might be even more dangerous (pers. obs.; G. S. Chapman, pers. comm.).

#### Foraging

Barker and Vestjens (1990) list a wide range of insect families consumed by woodswallows as well as three sorts of plant seeds (*Xanthorrhoea*, *Enchylaena*, and *Rhagodia*). Observation from a hide placed near a nest enabled 96 food items to be identified to order or family (Table 4 in Rowley 2002), although these data were biased in favour of the larger items. Sixty-eight were presumed to have been taken from on or near the ground (a skink, centipedes, grasshoppers, crickets, phasmids, caterpillars and spiders) and 28 whilst in flight (blowflies, lacewings, dragonflies and moths). Grasshoppers provided more than a third of identifiable prey, but since Immelmann (1966) describes Black-faced Woodswallows in the Kimberley catching jumping grasshoppers while flying close to the ground, the Manmanning birds may have been hunting in the same way, which would increase the proportion of prey taken on the wing. Black-faced Woodswallows are obviously specialist predators of these agricultural pests, as are other artamids (McGilp 1935). Even when they were less than seven days old nestlings were fed whole grasshoppers: the legs protruded from the bill until digestion made room for them to be swallowed.

A wide variety of techniques are employed by foraging Black-faced Woodswallows:

- i. Trawling high above the vegetation for aerial insects (pers. obs.).
- ii. By flying swift sorties from exposed 'lookout perches' to snatch flying or stationary prey and return to the same perch (pers. obs.).
- iii. By hovering before snatching insects and larvae from the ground or foliage (Cameron 1933).
- iv. By 'following the plough' in cultivation paddocks, pouncing on prey exposed by the machinery (pers. obs.).
- v. Flying close to the ground and catching jumping grasshoppers (Immelmann 1966).
- vi. Searching eucalypt and other flowers for nectar, which they are thought to lap with their brush tongues, is recorded for Black-faced Woodswallows (Johnstone and Storr 2004), and is reported also for several other species (Chisholm 1909, White-browed Woodswallow; Marshall 1935, Dusky Woodswallow *A. cyanopterus*; Sedgwick 1947, Masked Woodswallow *A. personatus*; McKean 1969).
- vii. Occasionally, large prey are carried in the foot when the woodswallow flies to a place where it can complete dismemberment; such prey may be held in the foot, torn to pieces and eaten (Sedgwick 1947).

#### Roosting

Throughout the years, each evening shortly before sunset, Black-faced Woodswallows gathered in a particular tree

where they chattered and preened. After 10–15 minutes they all took off and flew silently to the roost site for that night. At Manmanning several of these sites were located with a view to netting the birds but only two birds were caught in this way. Most roost sites were in vertical hollow spouts in dead trees, but they also used the scars left after a limb had broken off. On one night they roosted in the hollow centre of an old White-browed Babbler *Pomatostomus superciliosus* nest, and on another in a depression underneath an Australian Raven *Corvus coronoides* nest. The mean size of roosting assemblies was 11 (7–20) birds with roosting sites being recorded in February (1), April (1), July (1), September (8), October (4), and November (1).

Immelmann (1960) described Black-faced Woodswallows arriving at a pre-roosting gathering each carrying a small twig, which was dropped on arrival; we did not observe this behaviour at Manmanning.

This sort of sociable nocturnal roosting scrum also has been observed for Dusky Woodswallows and Little Woodswallows *A. minor* (Coleman 1945; Hindwood 1956; Bourke 1972; Rowley 2000 and pers. obs.).

#### Bodycare

Preening of the body and flight feathers took place regularly whenever the birds were perched. Their sociability was demonstrated by birds preening each other, particularly those areas that were hard for an individual to reach, such as the crown and nape. This allopreening was not confined to mated pairs but extended to all group members including fledglings. When such help was not available woodswallows scratched their heads with a foot passed over the lowered wing. Their wings are long and require special attention; in turn each primary was drawn through the bill, presumably reconnecting any barbules that had become unhooked. This required space and was usually done by the bird itself, away from the others.

Sunbathing or rain-bathing has been reported by Immelmann (1966) to involve ruffling the feathers so as to allow sun or rain to reach the skin of the bird. Nestlings do this by stretching their necks and orienting their bare throats to the sun (see Reproductive behaviour, vi, below).

#### Vocalizations

From analysis of 33 cassettes recorded during hide-watches at the nest in 1975, the vocalizations of attending Black-faced Woodswallows are summarized as follows:

- i. *Contact calls* were usually brief with variation in mood or intent achieved by changes to the intensity or rate of repetition. At the lowest intensity, when a solitary sitting bird appeared to be 'talking to itself', this call could be rendered as *qui* (Fig. 1a), scarcely audible more than five metres from the nest. More frequently heard was a stronger, louder call rendered as *qua* (Fig. 1b) that was used as a basic contact call given by individuals in a flock flying high, by a sitting bird communicating with others nearby or by birds visiting the nest to feed unbrooded young.

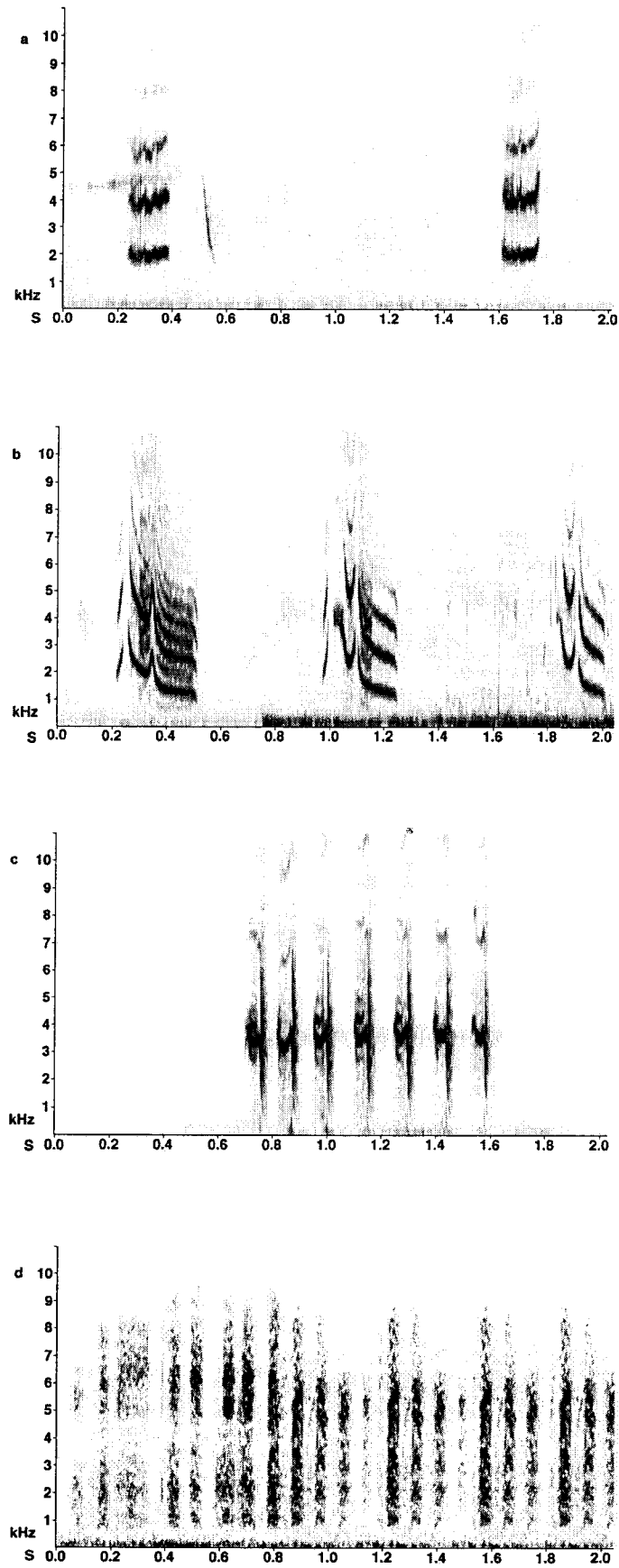


Figure 1. (a). qui call given by lone sitting bird. (b) basic contact call qua. (c) Alarm call, a series of short sharp quas. (d). Mobbing call by several birds uttering loud, short, harsh quas. The horizontal axis measures time (seconds) and the vertical axis is frequency (kiloHerz).

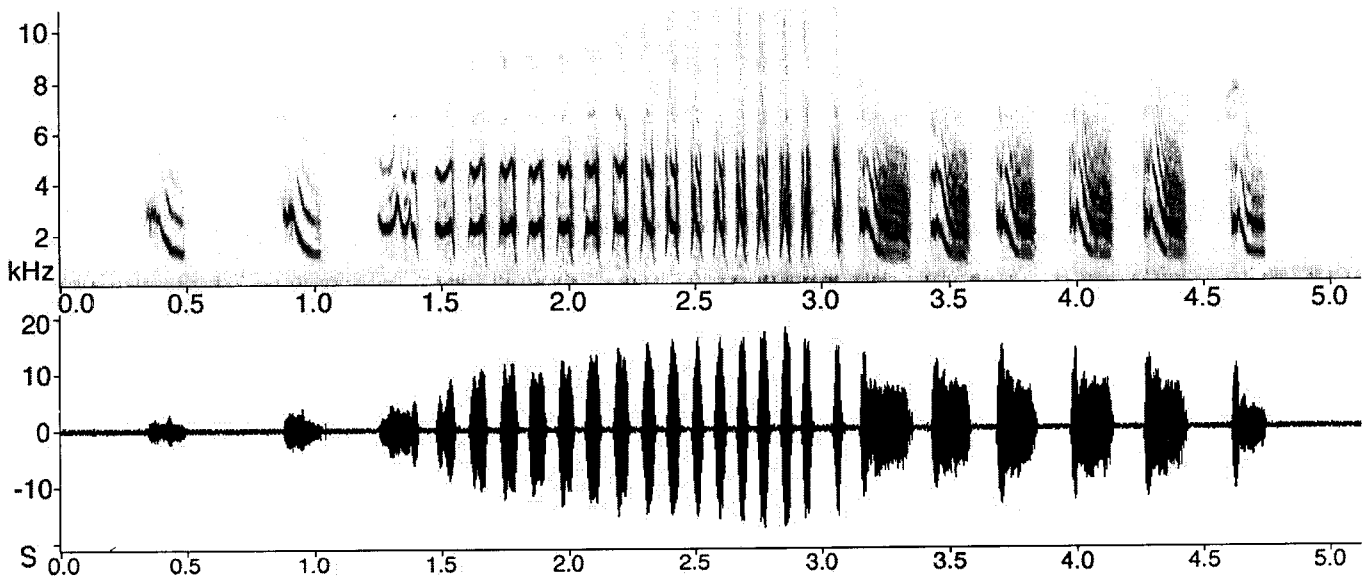


Figure 2. Greeting call given by an incubating or brooding bird towards an approaching relief bird. In this figure, after 1.5 seconds, the call develops into a rattle of increasing amplitude (as shown in the lower waveform plot) as short, sharp quass are repeated louder and louder, and ends with a series of quass. In the waveform plot of sound pressure level (lower), the vertical axis conveys the relative loudness of each part of the call.

- ii. *Greeting Calls* were given by the incubating or brooding bird as soon as an approaching relief was sighted. These loud repeated *quass* became more and more excited, especially if the arriving bird had food to offer, in which case the sitter began vigorous wing-fluttering. Frequently such series incorporated a distinctive rattle consisting of a rapid series of short *qua*-type syllables increasing in amplitude. The rattle was generally followed by a series of loud, longer *quass* (Fig. 2).
- iii. *Nesting Calls* were a series of brief, high-pitched, loud syllables in expectation of food, but subsided rapidly if an alarm was given.
- iv. *Alert, Alarm and Mobbing Calls* were loud short sharp *quass* usually given by a bird on guard duty at a nest. They were graded in intensity from Alert through Alarm to Mobbing. A single sharp Alert *qua* (Fig. 1b) was directed usually at the nestlings to tell them to be quiet. An Alarm (Fig. 1c) was a series of shorter *quass* given when the sentry chased an intruder that did not really pose any threat, such as a Western Gerygone *Gerygone fusca*, Brown-headed Honeyeater *Melithreptus brevirostris*, or Brown Honeyeater *Lichmera indistincta*, or an intruder overhead. Mobbing occurred when the intruder posed a real threat — such as a raven, a perched raptor, an approaching human, a fox *Vulpes vulpes*, or a reptile such as a monitor *Varanus* sp. (Fig. 1d). Mobbing consisted of a series of vigorous swoops accompanied by harsh, short, sharp *quass*; usually several birds joined in, resulting in an effective terrifying cacophony.

The vocalizations described here were heard in a much more restricted situation than those described for Dusky Woodswallows (Rowley 2000). Both species have alarm and mobbing calls, and specific calls heard when a bird approaches the nest. These are based on a short syllable (0.2–0.3 s) that is termed *qua* from its sound in the low

intensity greeting calls. As the intensity of the vocalization increases, either in a greeting situation or alarm/mobbing, the individual syllables are repeated at a faster rate and become louder and much shorter (<0.1 s), and in the case of the mobbing call, harsher. The literature mentions vocal mimicry by woodswallows (Chisholm 1946; Frith 1969), but none was heard in the course of these observations.

#### Reproductive behaviour

The following observations supplement those already described in Rowley (1999, 2002).

- i. *Pairing*. Pairs remained together throughout the year, so long as both remained alive. Outside the breeding season several groups might coalesce and forage, perch and roost together. With the onset of breeding, groups separated and defended, even from conspecifics, an area within five metres of the nest-site. At Manmanning nests were seldom closer than 100 metres. Elsewhere, in more arid parts of Australia, Immelmann (1966) found Black-faced Woodswallows nesting much more colonially, with nests as close as 1.8 metres. In 1983, G. Johnston (pers. comm.) saw Black-faced Woodswallows breeding in loose groups or colonies on the northern Eyre Peninsula, South Australia. Nests were in small Hakeas (c. 2 m high) in Myall woodland and were spaced 1–5 metres apart. This spacing appeared unnecessary, as there were more Hakeas farther afield that were not used for nesting. This breeding event followed the break of a drought.
- ii. *Courtship*. As with several other woodswallows, Black-faced Woodswallows perform a beautiful pre-copulatory courtship display. Either member of the pair started proceedings, which usually began when the birds were perched three to ten metres apart. The initiator part-spread both wings and waved them up and down in time with the rotation of the part-spread tail. Sometimes

the partner ignored this, and the display went no further; usually the partner responded with a like display and the two birds gradually achieved synchrony. After two or three minutes the male flew to the female and mounted her, briefly. The entire display was conducted in silence.

- iii. *Copulation*. This was invariably preceded by the above display and lasted two to three seconds. The male then dismounted and resumed perching nearby. The female settled her ruffled feathers and usually remained perched where she was.
- iv. *Nest building*. After they had chosen the site, the pair sometimes perched together nearby for several days before they started building. Although the nest is unsubstantial it took both birds several days to complete as single stems of grass, twigs and rootlets were gathered and placed in position. It is not known what role, if any, supernumerary group members played at this stage because, like most birds, woodswallows do not like to be watched building.
- v. *Incubation* was performed by all group members. At a nest observed for 22 hours the senior male and female incubated for 25 per cent and 38 per cent of the time, one helper in its third year sat for 20 per cent, while a bird just entering its second year appeared to be refused access to the nest on several occasions and only managed to incubate for 5 per cent of the time. The eggs were covered for 92 per cent of the observation period (Table 1 in Rowley 1999).
- vi. *Brooding* was also performed by all group members when the nestlings were incompletely feathered (the first seven days) and before the day warmed up. Nestlings of this age, when uncovered, sometimes stretched their necks and heads up as far as they would go and, oriented towards the sun, presumably seeking additional warmth.
- vii. *Shading*. When the sun was directly on the nest and very hot, all members of the group spent time perched on the edge of the nest with their wings part-open, effectively providing shade. In four hours observation when the temperature exceeded 38°C, the nestlings were shaded for 60 per cent of the time.
- viii. *Feeding*. All group members shared in feeding the nestlings with the proportion of feeds varying from day to day (Table 2 in Rowley 1999).
- ix. *Faecal sacs* were removed by all attendants. When the nestlings were less than seven days old, attendants swallowed the sacs; later, attendants carried the sacs away and dropped them at a distance from the nest. A sac was removed about once every hour, which with three nestlings voiding, gives an individual excretion rate of once every three hours.
- x. *Care of the young*. All attendants preened the rapidly growing nestlings, until they were more than ten days old and began to preen themselves. Towards the end of their time in the nest they exercised their wings with vigorous waving. Sometimes they left the nest prematurely, before they could fly, when prompted by

alarm calls from their parents. Fledglings were able to fly competently four days after leaving the nest and were difficult to follow after this. In a very strong wind, one brood was found perched on a log and still being fed by adults 14 days after fledging; three weeks later they were still being allopreened by adults.

## CONCLUSION

Even though the details in this paper are from one nest where the participants had been colour-banded, and offered a unique opportunity for observation, much of the behaviour described also applies to species of woodswallows other than the Black-faced Woodswallow. In species in which the basic social unit is often more than a simple pair, with young birds remaining with their parents for more than a year and helping to rear young that are not their own, a well-developed repertoire of social behaviour and vocalizations would be expected. Some evidence of this was seen in the complex vocal exchanges between a sitting bird and its replacement. Further studies on vocalizations in a range of contexts are needed to establish this.

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## REFERENCES

- Austin, C. N. (1972). Woodswallows in Western Victoria. *Aust. Bird Watcher* 4: 211–212.
- Barker, R. D. and Vestjens, W. J. M. (1990). 'The Food of Australian Birds. II. Passerines.' (CSIRO: Melbourne.)
- Bourke, P. A. (1972). 'Clustering' of woodswallows. *Aust. Bird Watcher* 4: 220–222.
- Cameron, A. C. (1933). Some notes on the Black-faced Woodswallow. *Emu* 32: 157–158.
- Chisholm, A. H. (1909). Woodswallows as honeyeaters. *Emu* 8: 219–220.
- Chisholm, A. H. (1946). 'Nature's Linguists.' (Brown Prior Anderson: Melbourne.)
- Clunie, F. (1973). Nest helpers at a White-breasted Woodswallow nest. *Notornis* 20: 378–380.
- Clunie, F. (1976). Behaviour and nesting of Fijian White-breasted Woodswallows. *Notornis* 23: 61–75.
- Coleman, E. (1945). Clustering of the Sordid Woodswallow. *Vic. Nat.* 61: 218–219.
- D'Ombra, A. F. (1934). The White-browed Woodswallow. *Emu* 33: 292–297.
- Dove, H. S. (1909). Woodswallows clustering. *Emu* 9: 30.
- Frith, H. J. (Ed.). (1969). 'Birds in the Australian High Country.' (A. H. and A. W. Reed: Melbourne.)
- Heathcote, W. (1931). Notes on Dusky Woodswallows. *Emu* 31: 168.
- Hindwood, K. A. (1956). Clustering of woodswallows. *Emu* 56: 165–166.
- Immelman, K. (1960). Behavioural observations on several species of Western Australian birds. *Emu* 60: 237–244.
- Immelman, K. (1963). Drought adaptations in Australian desert birds. In 'Proceedings of the XIII International Ornithological Congress.' (Ed. C. G. Sibley). Pp. 649–657. (AOU: Ithaca, N.Y.)
- Immelmann, K. (1966). Beobachtungen an Schwalbenstaren. *J. für Ornith.* 107: 37–69.
- Johnstone, R. E. and Storr, G. M. (2004). 'Handbook of the Birds of Western Australia. Vol. 2. Passerines'. (Western Australian Museum: Perth.)
- Keast, J. A. (1958). Seasonal movements and geographic variation in the Australian woodswallows Artamidae. *Emu* 58: 207–218.

- Lowe, V. T. and Lowe, T. G. (1972). Woodswallows in mid-northern Victoria. *Aust. Bird Watcher* 4: 205–210.
- Marshall, A. J. (1935). On the birds of the McPherson Ranges, Mt. Warning and contiguous lowlands. *Emu* 35: 36–48.
- Mayr, E. (1945). 'Birds of the South Pacific.' (Macmillan: New York.)
- McGilp, J. N. (1935). Birds and grasshoppers. *Emu* 35: 127–129.
- McKean, J. L. (1969). The brush-tongue of Artamidae. *Bull. Brit. Orn. Club* 89: 129–130.
- Recher, H. F. and Schulz, M. (1983). Observations on the breeding of White-browed Woodswallows. *Corella* 7: 1–6.
- Rowley, I. (1951). Courtship feeding of Dusky Woodswallows. *Emu* 51: 80.
- Rowley, I. (1976). *Artamus* spp. In: 'Readers Digest Complete Book of Australian Birds.' (Ed. H. J. Frith.) Pp. 567–571. (Readers Digest: Sydney).
- Rowley, I. (1999). Co-operative breeding by Black-faced Woodswallows *Artamus cinereus*. *Corella* 23: 63–66.
- Rowley, I. (2000). Co-operative breeding by Dusky Woodswallows *Artamus cyanopterus*. *Canberra Bird Notes* 25: 49–58.
- Rowley, I. (2002). Nesting of the Black-faced Woodswallow *Artamus cinereus* in the Wheatbelt of Western Australia. *Corella* 26: 65–69.
- Schodde, R. and Mason, I. J. (1999). 'Directory of Australian Birds.' (CSIRO: Melbourne.)
- Sedgwick, E. H. (1947). Northern Territory Bird Notes. Part 2. *Emu* 46: 349–378.
- Sharland, M. (1972). The lure of the woodswallow. *Aust. Bird Watcher* 4: 213–219.
- Wigan, M. L. (1931). The Dusky Woodswallow. *Emu* 31: 93–95.