

DUAL SINGING BETWEEN AN ADULT AND FLEDGLING MARBLED FROGMOUTH

WILLIAM E. DAVIS Jr¹ and BRUCE M. BEEHLER^{2,3}

¹College of General Studies, Boston University, 871 Commonwealth Avenue, Boston, MA 02215, USA

²Associate Research Zoologist, Wildlife Conservation International, New York Zoological Society, Bronx, NY 10460 USA

³Present address: Division of Birds, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560, USA

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INTRODUCTION

Dual singing includes duetting, contact calls and chorus singing. We report here an instance of dual singing between an adult and fledgling Marbled Frogmouth *Podargus ocellatus* in eastern Papua New Guinea. Since duetting by definition includes only singing or calls between members of a mated pair, the vocalizations reported here between an adult and fledgling are probably best described as contact calls. The only reports of dual singing or calling in the Marbled Frogmouth were by Holmes (1981) who speculated antiphonal calling by members of a pair, and by Beehler *et al.* (1986) who reported group or chorus calling. We have found no report of persistent dual singing of an adult and fledgling of any avian species.

METHODS AND RESULTS

On 15 August, 1990, at about 2000 hrs, in Varirata National Park, near Port Moresby, Papua New Guinea, we heard vocalizations from two Marbled Frogmouths which were different from any which we had heard before. The habitat was old second-growth forest and we frequently heard Marbled Frogmouths vocalizing. Beehler recorded the 'duetting' or dual singing of two birds near our camp, and Davis and D. Heath found the two singing birds with the aid of a spotlight. The recordings were made with a Marantz cassette recorder with a uni-directional microphone. The acoustic waveform was displayed

and diagrams (Figs 1–3) were made with a Kay CSL 4300 analysis system implemented on a Zeos 386 computer. One bird was a fledgling with an approximately 8 cm tail, sitting crosswise on a 4 cm branch, approximately 10 m above a forest floor. It uttered a monotonous series of 'whoo' or 'koooo' notes (Figs 1–3) which occasionally became disyllabic 'koo-loooos' (Figs 1 and 2). The adult bird usually sang a low-pitched 'growl' (Figs 1 and 2), the fledgling singing immediately after the adult stopped calling (Fig. 1), but on one occasion the two were recorded singing at the same time (Fig. 2). The 'growl' consisted of a series of low-pitched staccato notes, sounding much like a stick being scraped along a wooden picket fence. The adult bird was approximately 16 m from the fledgling, on a thick branch about 2.5 m from the ground. It was very dark, and there was sufficient undergrowth, so it is doubtful that the birds could see each other. The fledgling continued to call while in the spotlight. The adult bird ceased calling while illuminated, and hissed when the spotlight was turned off. The birds had been calling for about 40 minutes prior to the spotlighting.

The fledgling sang at a rate of slightly more than one phrase per second (Figs 1–3), while the adult's song pulsed at a rate of about one every $\frac{1}{10}$ second (Figs 1 and 2). The fundamental frequency for both the adult and fledgling was about 500 hz. The amplitude of the adult song remained constant, while the amplitude of the fledgling song gradually increased during a song bout (Fig. 3).

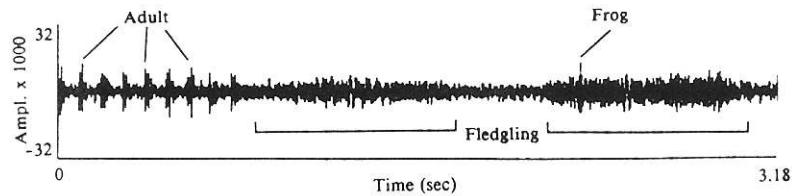


Figure 1. Amplitude vs. time waveform of countersinging adult and fledgling. The fledgling began singing immediately after the adult stopped.

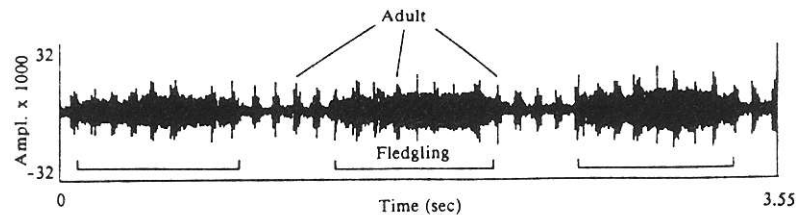


Figure 2. Amplitude vs. time waveform of simultaneous singing of adult (notes approximately every $\frac{1}{10}$ of a second throughout 3.55 second period) and fledgling (three phrases or 'koo-loooo' sounds).

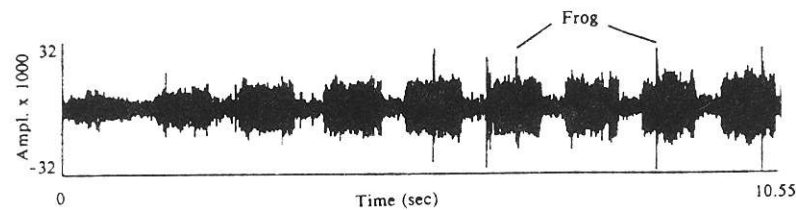


Figure 3. Amplitude vs. time waveform of fledgling bird showing increased amplitude (loudness) with time. The sharp inflections are background noise (frog vocalizations).

DISCUSSION

The song of the Marbled Frogmouth in Australia has been described as: a soft but loud 'kooloo kooloo kooloo' (MacGillivray 1918); 'ooooe' or 'kooloo' (Coates 1985); six to 10 'caw-caw' notes descending in volume and soft 'koo-loo's (Roberts and Ingram 1978) or 'coop-coop-coop-coop-gobble-gobble-gobble' (Corben in Schodde and Mason 1980), and the 'gobble' may be added to the end of the usual 'koo-loo' (Goddard in Schodde and Mason 1980); the 'gobble' may be preceded, or on occasion

succeeded, by a rapid succession of 'woolook-woolook' notes, and another typical call consists of four to six 'whoor-loop, whoor-loop's (Holmes 1981); a loud high-pitched short 'brrrr' and a short barking 'chuck' (Schodde and Mason 1980); wild descending laugh with bill clap, and a short-range, low, pulsating call reminiscent of the call of a Cane Toad *Bufo marinus* uttered by both sexes (Hollands 1991). In New Guinea the Marbled Frogmouth vocalizations have been described as: a rising series of 'hoooa hoooa hoooa' sometimes paired notes followed by a rolling series of trilled notes ending with a click sound made with the bill

(several birds may call as a group) (Beehler *et al.* 1986).

The song of the fledgling is similar to the normal 'kooloo' notes and may be a juvenile version of the adult song. The 'growl' of the adult may be the same as, or similar to, the 'Cane Toad' call reported by Hollands (1991).

Duetting between a male and female is found in more than 100 species of 32 families (Thorpe 1972), but in only eight species in New Guinea (Diamond and Terborgh 1968). Duetting is mutual or reciprocal song between a mated pair of birds (Armstrong 1973). The duetting may be antiphonal where the male and female sing alternately, or the two may sing different or identical phrases simultaneously. Thorpe (1972) reported duetting in six species of owls, and it is found in all four Australian *Ninox* species (S. J. S. Debus, pers. comm., 1992). The only published report suggesting duetting for the Podargidae was Holmes (1981), but Debus (pers. comm., 1992) reports duetting (alternate bouts of the 'oom-oom-oom' calls) in adult pairs of Tawny Frogmouth *Podargus strigoides* early in the breeding season. Debus also reports call and answering by Australian Owlet-nightjars *Aegotheles cristatus*. Countersinging, another form of dual singing, is generally alternate territorial singing by males in adjacent territories (Armstrong 1973). The songs of the adult and fledgling Marbled Frogmouths were generally antiphonal (alternating, see Fig. 1), but occasionally were simultaneous (Fig. 2). There are reports of a juvenile bird (*Laniarius*) joining in the duetting of parents (Hinde 1969; Thorpe 1972), but we have found no report of persistent antiphonal or simultaneous singing of a fledgling and adult bird. Thorpe (1972) reports that young *Laniarius* 'practise' duetting, and considers this important in the development of voice production in young birds. The fledgling frogmouth may have been 'practising' the normal call of the species, but since the adult was singing very different phrases from the young bird we doubt that the dual calling was related to song development. Marbled Frogmouths often participate in chorus calling or song

Beehler *et al.* 1986; pers. obs.) where groups of four to six birds may call together. This chorus singing is probably analogous to the chorus singing of kookaburras, and may be related to territorial defence. It is possible that the dual singing between the adult and fledgling was 'practice' chorus song. The dual singing was more likely for contact purposes, since Marbled Frogmouths are nocturnal and frequently found in dense vegetation where they cannot see each other.

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