

# **BREEDING DISPLAYS AND CALLS OF THE BANDED DOTTEREL**

*(Charadrius bicinctus)*

By MARY BOMFORD

## **ABSTRACT**

Described are the Banded Dotterel's threat display and call, used by either sex to defend the territory; wing-clicking flight display, used by the male to advertise territorial ownership; scrape display used by the male to entice the female to inspect the nest scrape; coition and associated display; changeover display given at the nest by either sex during incubation; displays used by parents to call chicks for brooding; and distraction displays and alarm calls given when predators approach the nest or chicks.

## **INTRODUCTION**

The Banded Dotterel is a small plover which breeds only in New Zealand. The main breeding habitats are dry, open, stable areas of shingle, sand or stones, on riverbeds, lakeshores, seashores, fields or mountain tops and slopes. Phillips (1980) has given the most detailed descriptions of the display behaviour of this species. In addition, Stead (1932) and Soper (1972) gave brief descriptions of the distraction displays performed when people approach nests or chicks, and Cunningham (1973) described some calls. The present study provides greater details and photographs of the types of breeding display and the situations in which they are given.

The main study site was the Cass River delta on the west shore of Lake Tekapo, Canterbury, which is a typical high country breeding ground (Bomford, in press). All observations were made between July 1977 and January 1978 (Bomford 1978).

## **THREAT DISPLAY AND CALL**

Aggression was nearly always limited to stereotyped threats, and body contact was rare. Both non-breeding birds and territorial breeding birds gave threat displays and accompanying threat calls, but these were far more frequent in the breeding season.

On the Cass River delta in late July, just before birds left the social feeding flocks to establish breeding territories, aggressive encounters between flock birds increased sharply. Birds began to occupy territories in early August (Bomford, in press). Males were more aggressive than females and did more to defend territories against intruders, but females often flew to support their males in prolonged disputes.



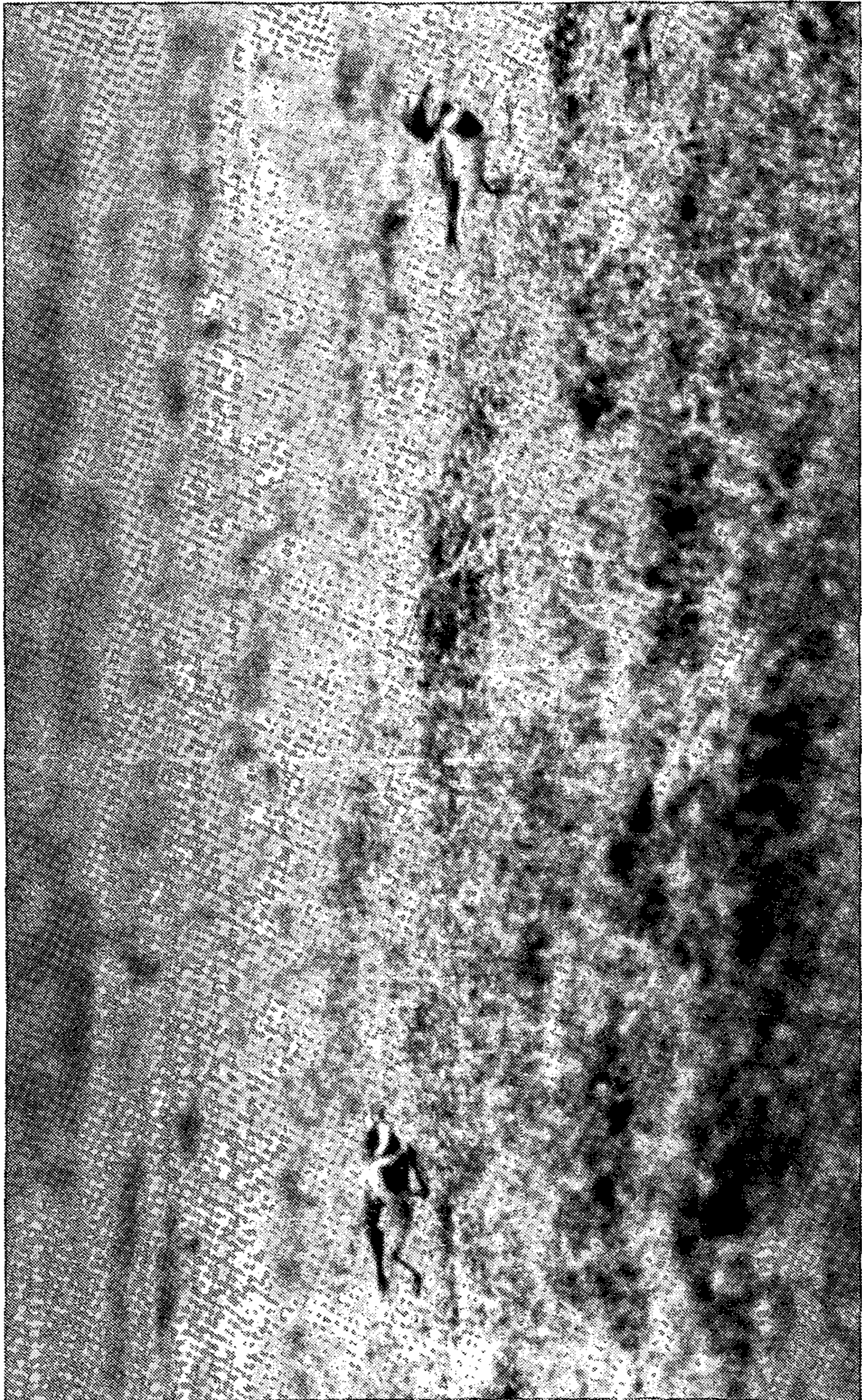


FIGURE 1 — Male Banded Dotterel running in the horizontal threat posture, chasing an intruder from his territory





FIGURE 2 — In the horizontal threat posture, the black chest band is clearly displayed and the raised white flank feathers give the bird added width

The following description of a typical display is based on observations of more than 300 displays. The bird runs rapidly towards an intruding bird, holding its body in a horizontal posture (Figure 1). The throat is puffed out, clearly displaying the upper black chest band, but largely hiding the lower chestnut band. In this horizontal running posture the dark bands across the forehead, face and chest, alternating with white, produce a striking pattern (Figure 2). The white feathers along the flanks are raised over the closed wings, making the bird appear abnormally wide.

After running in this horizontal posture for 2-10 m, the bird halts abruptly, facing the intruder, and immediately jerks itself into an upright posture with the head held back, the chest lifted and pushed forwards, and the white flank feathers still fluffed out (Figure 3a). In this posture the broad chestnut chest band is prominently displayed surrounded by white but the upper black band is largely obscured by the lifted chest (Figure 3b). This sudden flashing of the chestnut band is very striking to an observer at ground level.

The displaying bird usually repeats this horizontal run with a following pause in the upright posture several times, coming closer to the intruding bird with each successive run. The display is always accompanied by a threat call, which is given at any time in the display sequence. Cunningham (1973) aptly described this threat call as *che-ree-a-ree*, and it has a fast, rolling rhythm with the accent on the second syllable.





FIGURE 3 — Male Banded Dotterel standing in the upright threat posture.  
a. The chest is lifted and thrust forwards.  
b. The chestnut chest band is clearly displayed but the upper black band is largely hidden by the raised chest.



If the intruder runs away, the owner follows in the horizontal posture and gives repeated threat calls. If the intruder flies away, the owner usually takes flight after it, again giving threat calls, and if the bird lands within the territory, threat displays are resumed. But if the intruder flies further, the owner always turns back from the chase, suggesting an awareness of a territory boundary.

If the threatened bird does not retreat, the displaying bird repeats the horizontal run and upright posture display until it comes within a metre of the intruder, and then both birds face each other in upright display postures. Then one bird makes a run in the horizontal posture towards the other, but turns when it gets close and abruptly retreats. The disputing birds often alternate in making such threats, or instead, they both run together in horizontal postures in roughly parallel directions. If neither bird retreats, such disputes with parallel running may continue for up to 30 minutes, and the disputing birds are often joined by their mates. Parallel running may help define mutual territory boundaries.

Higher-intensity aggression is sometimes seen after two birds have faced each other in upright threat postures. One bird jumps up and comes down as though to land on the other bird's back, but the attacked bird dodges or flutters away. Occasionally such attacks are very one-sided, the same bird repeatedly jumping up at the other, but more often the disputing birds jump up alternately. Sometimes both birds jump up simultaneously, chest to chest, only to land again and face each other in upright threat postures. Such altercations usually end when one bird retreats and is chased away with threat calls. Alternatively, the intensity of aggression declines and the jumps are replaced by parallel running.

Fights were observed only three times. They lasted for up to a minute. Two fighting birds moved so rapidly that they looked like a whirling ball of feathers. The birds sprang at each other and used beating wings and striking feet and bills in the attack. Feathers were plucked out in two fights. One fight was between two males, the second was a male fighting a female whose chicks were hatching, and the third was a female fighting another female who had a recently hatched chick 50 m away.

Banded Dotterels also directed threat displays at and chased away other species that intruded on their territories, including Skylarks (*Alauda arvensis*), Pied Oystercatchers (*Haematopus ostralegus finschi*), and Wrybills (*Anarhynchus frontalis*).

### TERRITORIAL FLIGHT DISPLAY

Males gave flight displays frequently during the first 2-4 days of territory occupation. The earliest flight display observed on the Cass River delta was on 9 August, and 80% of all flight displays were recorded in the following two weeks. Occasional flight displays were seen until November.

All 56 flight displays observed were given by males, 44 straight after an intruder was chased from the territory. Usually, however, no flight display followed the chasing of an intruder.

Flight displays are stereotyped. On turning back from the chase, or on

take-off, the male starts a unique wing-clicking flight in which each wing-beat emits a loud click, audible for over 100 m. The wing-clicking male flies in curves, circles and figures of eight over the territory and frequently changes direction. The maximum height reached averaged 7 m, ranging from 2 m to 15 m. Visual estimates of the area displayed over ranged from 180 m<sup>2</sup> to 3320 m<sup>2</sup>, and averaged 1530 m<sup>2</sup> for the 56 displays observed. The area defended on the ground appeared to be larger, especially compared with the small areas covered in the briefer flight displays. Wing-clicking lasted from 5 to 120 seconds, averaging 40 seconds. Flight displays were recorded from early dawn until dusk but were not heard at night.

No call is specific to the Banded Dotterel's flight display, although such calls have been described for several other *Charadrius* plovers (Simmons 1953 and 1956, Drury 1961, Glutz von Blotzheim 1975). The most common call associated with the Banded Dotterel's flight display is the *che-ree-a-ree* threat call, which was given just before or during 79% of the displays recorded, sometimes even when no intruder was present. Another call occasionally given is a *kwereep* courtship call, but this call was heard in only 7% of flight displays. At the end of a flight display the male glides to the ground, assumes an upright threat posture for a few seconds, and runs in a horizontal posture for several metres, even if no intruder is present. If an intruding bird is present, it is vigorously chased with threat displays and calls. After a flight display the male often stands on a rise with a good view and looks around his territory.

### NEST SCRAPE DISPLAY

Nest scrape displays are given from the first day a pair occupy a territory. The following description is based on 30 observed scrape displays. A male makes a scrape in sand or shingle by shuffling with his breast and kicking backwards. Shallow scrapes are often made that are never used as nests. The male stands, crouches or sits in a hunched posture in the scrape with his back feathers raised and calls his mate with the *kwereep* courtship call. This call has a soft, crooning quality and it slides up the scale in the second syllable. The call is repeated every few seconds until a female approaches. The male then stops calling and starts bowing (Figure 4). The head is lifted high and then bowed forwards and downwards in a series of rapid jerks. This jerking bow is repeated up to 20 times, the movements becoming faster and more exaggerated as the female comes closer. During this bowing display, the male pushes his chest lower and lower into the scrape, until his body is tilted forward steeply.

The female approaches the bowing male slowly, with many stops and starts. She often circles the scrape, and the male may swivel around to keep facing her. When she eventually runs up to the scrape, she holds her body in a horizontal posture. The male quickly backs out of the scrape, keeping his body hunched, and rapidly fans and closes his tail once. On two occasions a female touched the male's flank with her bill at this stage of the scrape display. On another three occasions the female stood beside the male and both bowed their heads together for a few seconds. Usually the female hunches her body slightly and steps directly into the scrape, while the male stands facing her at right angles (Figure 5). Sometimes the female just stands

in the scrape for a second or two before running off, but usually she crouches down and shuffles around in the scrape for up to 10 seconds, while the male stands close by, facing her.

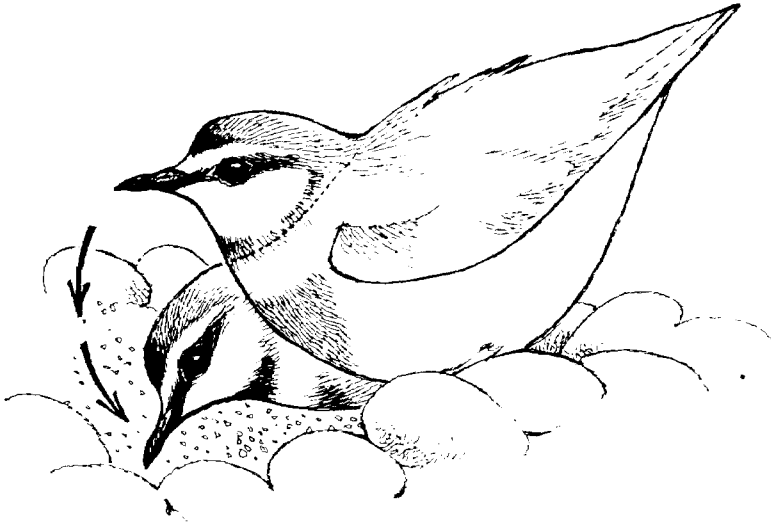


FIGURE 4 — The nest scrape display given by the male to attract the female. The male hunches his body in the scrape and then repeatedly lifts his head and bows it forwards and down in a series of rapid jerks

When the female runs from the scrape, the male usually returns to settle in it for a few seconds. He then runs off in a horizontal posture, being particularly vigorous at chasing intruders at this time. Alternatively the male walks from the scrape slowly, picking up small stones and pieces of plant and throwing them over his shoulder towards the scrape as he goes. (Birds of both sexes often did this throwing independently of scrape ceremonies until the time of late incubation, and the small objects so collected formed a nest lining up to 3 cm deep.)

#### COITION AND THE PRECEDING DISPLAY

Coition was observed seven times and the preliminary display without coition four times. Coition is preceded by a scrape display. When the female leaves the scrape she pauses 1-5 m away and the male approaches her from behind, holding his body upright. As he comes close, his steps become shorter and he lifts his feet higher. Eventually he stands right behind her for 5-15 seconds, high-stepping on the spot and swaying slightly from side to side in time with his stepping, but all the time retaining his upright posture. On three occasions when coition was not achieved, the female walked away from the male while he was high-stepping. Each time the male high-stepped forwards again until he was just behind her, but when she continued moving away he desisted and ran off in a horizontal posture. When a female is receptive to the male's

approach, she stands in front of him with her tail conspicuously raised and then slowly crouches down. The male then jumps on her back, flutters his wings to balance himself, and then folds them. Once a male jumped on to the back of a female which had not crouched, but he slipped down again within 5 seconds. When the male is mounted, he crouches down with his belly against her back and then bends his tail downwards and repeatedly moves it from side to side. In the seven coitions observed the male stayed mounted for 20-122 seconds, averaging 79 seconds.

At the end of mounting the pair tip over backwards, the male apparently pulling the female over on top of him. For 2-5 seconds the pair remain together with the male leaning backwards on his rump, supporting himself in this position with rapidly flapping wings. The female is tipped backwards on top of the male and is apparently supported in this position by his legs. When the pair finally flutter to their feet, the male immediately assumes an upright posture for a second or two, facing the female, and then both birds often preen or settle their feathers before walking or flying away.

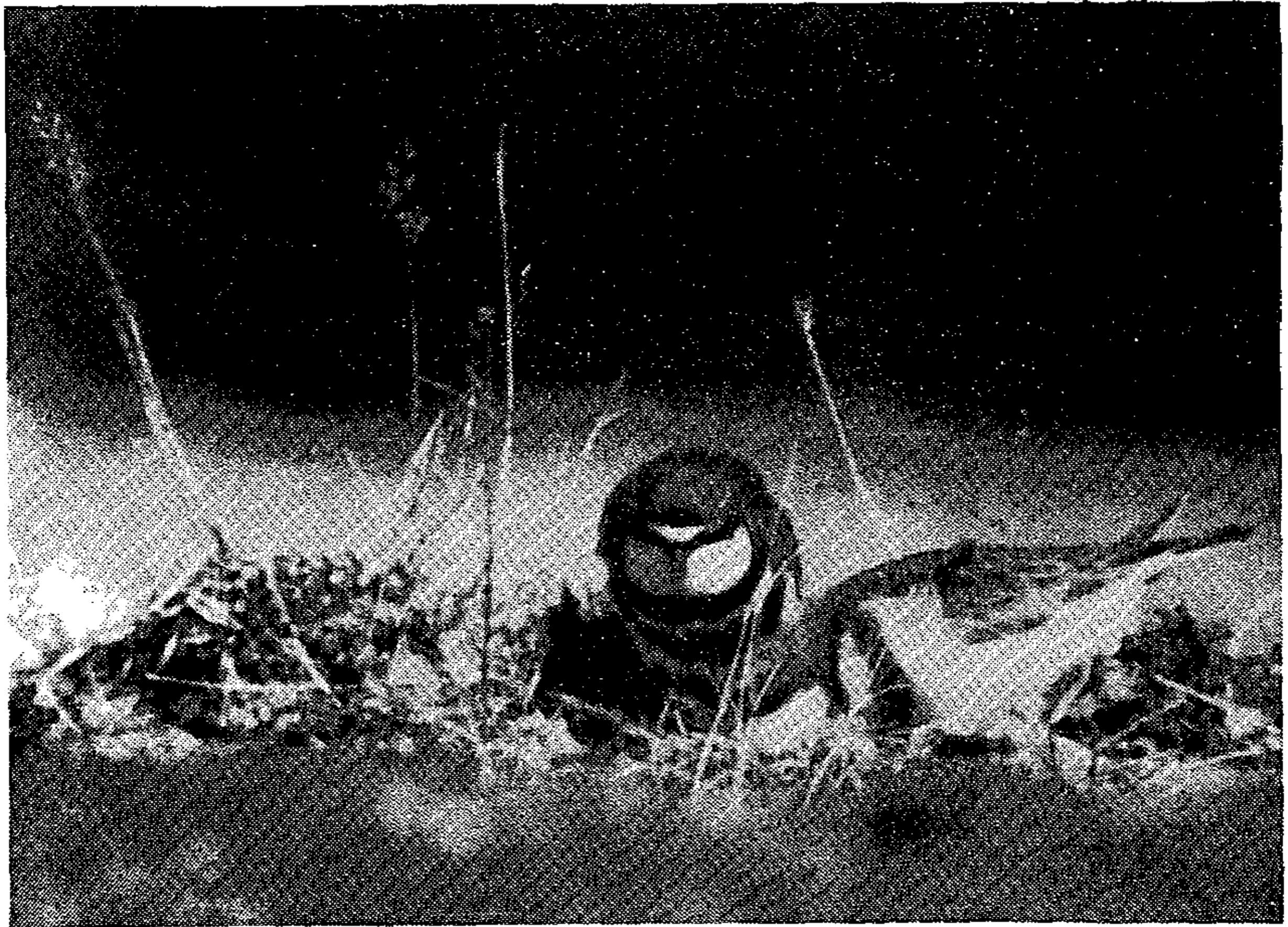


FIGURE 5 — The arrival of the female at the end of the nest scrape display. The male (left) has just backed out of the scrape and the female is about to enter it

### CHANGEOVER DISPLAY

Eight incubating nests were observed from hides, each nest being observed from dawn to dusk. The total time spent observing these nests was 109 hours.

Both sexes incubate the eggs and the number of changeovers observed at any one nest during a day ranged from 2 to 16, averaging 6. The usual



sequence of events at a changeover is for the incubating bird to see its mate approaching and simply leave the nest and fly or run away. Sometimes, when the incubating bird has left the nest on the approach of a predator or an intruder, the mate returns to incubate the eggs. In only 12 of the 46 (26%) changeovers observed was a changeover display given. This display is indistinguishable from the head-bowing nest scrape display given during courtship, except that changeover displays are given by either sex, whereas nest scrape displays are given only by males. In three of the changeover displays the incubating bird initially called its mate with the *kwereep* courtship call. Twice it was the female that called. More often the incubating bird simply sees its mate nearby and gives a head-bowing display until the mate comes (Figure 6).

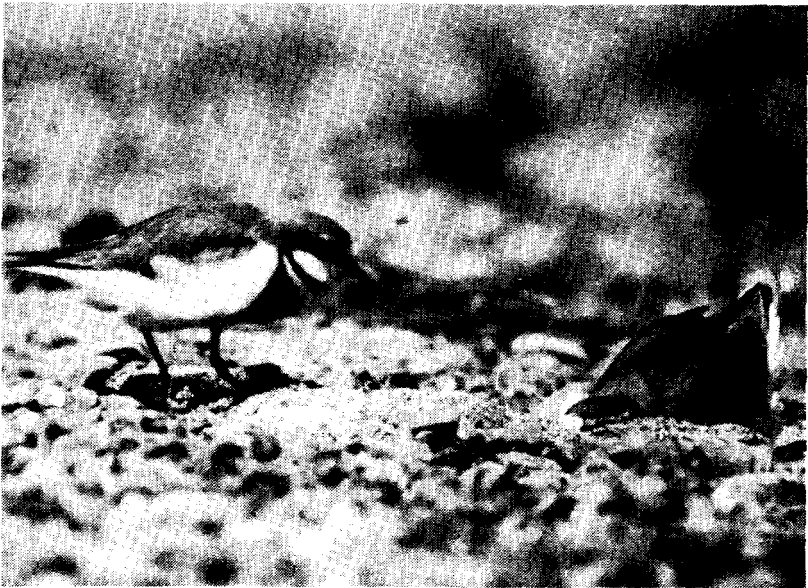


FIGURE 6 — The changeover display given during incubation. The female in the scrape (right) is head-bowing to the approaching male

### CHICK-CALLING DISPLAY

Parents use two methods to call young chicks for brooding. A parent within a few metres of a chick often crouches, fluffs its feathers and gives repeated soft *chirp* calls. Usually the chick then comes to the parent, but sometimes it either ignores the invitation or approaches the parent and then turns away.

The other method parents use to call chicks is head-bowing, which is sometimes preceded by a few *kwereep* calls. Soft *chirp* calls are also sometimes given during this head-bowing display. Chicks always come to parents when called in this way. When a chick arrives the parent rises and fluffs out its feathers so that the chick can crawl under for brooding.

## ALARM CALL AND ESCAPE BEHAVIOUR

Sitting birds stay alert during the day, and the nest is nearly always sited to give a good view of the surrounding land (Bomford, in press). Even though incubating birds sometimes turn their heads on their shoulders and close their eyes, they keep opening them, presumably to check for predators. A sitting bird is camouflaged by its drab back plumage, which blends with the surrounding shingle, and by the dark chest bands, which resemble the shadows of stones and so visually disrupt the bird's image.

Banded Dotterels do not rely solely on camouflage for defence against predators. When a potential predator is seen, they give alarm calls and leave the nest. The alarm call is usually a loud high-pitched *pit*, but it varies in pitch and tone, ranging down to a lower *chip*. Sometimes an alarmed bird alternates these two calls. Stead (1932) was the first to describe the *pit* call, but Falla *et al.* (1966) have recorded both variations. Alarm calls are repeated every second or two and their sound carries well. Thus, although most Banded Dotterel nests on the Cass River delta were spaced 100 m or more apart, the alarm calls of a disturbed bird caused birds in neighbouring territories to become alert.

Cunningham (1973) observed that, when a predator is close to a nest and the parents are alarmed, the *pit* call becomes louder and more drawn out, sounding like *peet*, and further, he distinguished between the sound of *peet* calls given by males and females. *Peet* calls were heard in the present study when a person was close to young chicks, but a difference between male and female calls was not discerned.

Whenever a bird of prey flew near a nest, the parent birds flew up and circled around, repeatedly giving alarm calls and often flying near the predator. Banded Dotterels were not seen to swoop towards or dive-bomb birds of prey. This was in contrast to other wader species on the delta – Pied Stilts (*Himantopus h. leucocephalus*), Black Stilts (*H. novaehollandiae*) and Wrybills – which were often seen making aggressive dives towards Harriers (*Circus approximans*). Stead (1932) also recorded that Banded Dotterels do not swoop at predators.

On the approach of a person, a Banded Dotterel usually left the nest in a crouch-run when the person was still 50-100 m away. Simmons (1955) defined the term 'crouch run' as "a low run by the wader away from the intruder, with its legs bent, neck contracted, and body horizontal". This aptly describes the Banded Dotterel's crouch-run. When crouch-running away, the Banded Dotterel keeps its drably coloured back or sides towards the approaching person so that its conspicuous chest bands cannot be seen. The bird crouch-runs 50-100 m from the nest, often going behind small plants or other objects to conceal its retreat. If the person continues to approach the nest, the bird flies back or runs back in stops and starts. Sometimes the mate or Banded Dotterels from neighbouring territories also approach, and an intruder may be surrounded by as many as 12 birds bobbing and flying around giving alarm calls, while the defence of territory boundaries is temporarily neglected.



## DISTRACTION DISPLAYS

How closely a parent bird will approach a person depends on the individual bird and the stage of incubation. During laying and early incubation, birds often remain 20-40 m away, giving alarm calls and bobbing. Bobbing is an upward jerking and relaxing of the head and chest. If the person walks towards the bird it runs off, giving alarm calls but staying only 5-10 m in front of the approaching person and repeatedly looking around to see if it is being followed. If the person stops the bird stops, and if the person runs the bird also runs to maintain the 5-10 m distance. This is contrast to escape behaviour in the non-breeding season, when Banded Dotterels usually run away when an approaching person is about 25 m away and, when followed, fly up and land 50-100 m away.

As incubation advances, the parent birds more frequently come close to intruders, and distraction displays are frequent in late incubation. Once the eggs have hatched nearly all birds give a distraction display if a person approaches the nest or chicks, and when a chick gives a *scree* alarm call one or both parents always respond with a distraction display. Simmons (1955) defined distraction displays: "Distraction-display comprises those forms of conspicuous behaviour (dependent on the major reproductive drive) which have been specially evolved by natural selection to deflect potential predators from eggs or young, by presenting to these predators stimuli releasing and directing their hunting behaviour". Distraction displays given by Banded Dotterel involve injury feigning.

In low-intensity displays, usually given before the eggs hatch, the bird leaves the nest in a crouch-run when an approaching person is still about 100 m away, and then returns to run across in front of the intruder at right angles to their line of approach to the nest. When close to the person, the bird leans its body to one side and lowers its wings and tail slightly. In this posture it runs to a distance of 10-30 m from the intruder and crouches down, often partly concealed by a large stone or small shrub. Sometimes the bird false broods, shuffling around and fluffing out its feathers as though settling down on eggs. False brooding is common during the first week of incubation and is always done in silence.

Once hatching starts, displays become more conspicuous and are always given on the side of the intruder away from the chicks or eggs. When a Banded Dotterel chick is released from the hand, one parent often gives a conspicuous distraction display to the side away from the retreating chick, while the other parent flies above the chick giving alarm calls.

Conspicuous distraction displays are fairly stereotyped. In the sideways-leaning posture described above, the bird runs from the intruder, sometimes giving a rapid sequence of *pit* calls. The bird then crouches down and spreads its wings, often in a place where it is partly concealed from view. Soper (1972) has a photograph of a bird in this 'spreading posture'. In this position the bird often repeatedly gives long drawn-out *weer* calls. This call is always loud, but it varies considerably in pitch and tone between birds. When giving this call, a displaying bird often flaps its wings for 5-30 seconds, sometimes hitting them noisily against the ground. Usually the bird stays in one place while displaying, but some birds shuffle towards the intruder.

In the highest-intensity displays the bird comes close to the intruder, often to within 1 m, and gives *weer* calls that are louder and more strident than those given in lower-intensity displays. The bird circles the intruder, repeatedly raising the wing furthest from the intruder and fanning and lowering its tail. The wing on the near side is often partly unfolded but not raised. Soper (1972) has a photograph of a Banded Dotterel displaying in this posture.

A Banded Dotterel giving a distraction display often attracts other Banded Dotterels, especially if it flutters on the ground giving *weer* calls. When another Banded Dotterel runs up, the displaying bird immediately ceases displaying, gets up and moves away.

Banded Dotterels were not seen to give any distraction displays to cattle or sheep, even when they came close to an incubating bird. Nethersole-Thompson (1973) described Dotterels (*C. morinellus*) "exploding in the face of large but non-aggressive mammals to deflect them from walking on the nest". Banded Dotterels just quietly leave the nest if stock come within a few metres, and they soon return.

## DISCUSSION

Despite its geographical isolation the Banded Dotterel is, in its behaviour, a typical *Charadrius* plover. Threat displays similar to that of the Banded Dotterel have been described by Simmons (1953) for three European *Charadrius* plovers: the Little Ringed Plover (*C. dubius*), the Kentish Plover (*C. alexandrinus*) and the Ringed Plover (*C. hiaticula*). Simmons described displays ranging in intensity from stereotyped threat displays to fights, and the horizontal threat posture assumed by the Little Ringed Plover is similar to the Banded Dotterel's horizontal posture. Similar horizontal postures have also been observed in aggressive Black-fronted Dotterels (*C. melanops*) (Maclean 1977), Wrybills (*Anarhynchus frontalis*) (Bomford 1978), Red-breasted Dotterels (*C. obscurus*) (Phillips 1980), Dotterels (*C. morinellus*), Golden Plovers (*Pluvialis apricaria*) (Cramp *et al.* 1983), and in Spur-winged Plovers (*Vanellus miles novaehollandiae*) (van Tets, pers. comm.). An upright threat posture has been described for the Greater Sand Plover (*C. leschenaultii*) (Simmons 1953, Penny, 1971) which is similar to that described for the Banded Dotterel in the present study.

Phillips (1980) described two horizontal display postures for Banded Dotterels, either of which may correspond partly to the horizontal posture seen in threat displays in the present study: (1) 'Horizontal, bulged breast', which he observed only in males whereas I observed my horizontal posture in both sexes; (2) 'Horizontal spread', which he described as similar to my horizontal posture, with the white flank feathers raised. However, he found that "the neck was withdrawn so the black collar was hidden", and his drawing of this posture shows a clear contrast to my horizontal posture in which the black collar was always conspicuously displayed (Figure 3b).

Flight displays are described in the European literature for other *Charadrius* plovers (Glutz von Blotzheim 1975) where a male advertising role for these displays is suggested when territories are isolated. The heights reached by male Banded Dotterels giving flight displays make them visible



for a long way. That the *kwereep* call is given in 7% of flight displays suggests that these displays may serve to strengthen pair bonding because this is the call usually used by a male to entice a female to approach. Possibly flight displays serve both to notify other males of territory occupation and to attract females.

The wing-clicking during the flight display of the Banded Dotterel has not been described for any other *Charadrius* plover and may be unique.

Phillips (1980) described 'Choke' and 'Bow' displays, which perhaps both correspond to the head-jerking bows described in the present study for scrape displays, changeover displays and chick-calling displays. Phillips also gave a similar description of coition in Banded Dotterels to that given in the present study and, further, he found that Wrybills and Red-breasted Dotterels have similar coition behaviour. In addition, coition behaviour similar to that of the Banded Dotterel has been described or illustrated for the Ringed Plover and the Little Ringed Plover (Glutz von Blotzheim 1975), the Kentish Plover (Rittinghaus 1961), the Red-capped Dotterel (*C. ruficapillus*) (Davis & Reid 1964, Hobbs 1972), and Kittlitz's Plover (*C. pecuarius*) (Slight 1966, Took 1967). Male Banded Dotterels, Kentish Plovers, Ringed Plovers, Little Ringed Plovers, Kittlitz's Plovers and Red-capped Dotterels all mark time in an upright posture behind the female, and all remain mounted for a long time and conclude coition by tipping over backwards. Given the similarity of the coition displays of Red-capped and Banded Dotterels, the record of hybridising between the two species in Canterbury (Oliver 1955) is not surprising.

Distraction displays observed in this study are also similar to those of many other *Charadrius* plovers. The late P. Child and B. D. Heather (pers. comm.) have observed false brooding in the Black-fronted Dotterel (*C. melanops*) similar to that described for the Banded Dotterel. The conspicuous distraction displays given on the side of an intruder away from the eggs or chicks have also been recorded for Ringed Plovers and Little Ringed Plovers (Ledlie & Pedlar 1938, Drury 1961).

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## SHORT NOTE

### A Glossy Ibis in the Chatham Islands

On 31 December 1984, we were in a party from the 1984-1985 Taiko Expedition visiting several sites at the north-eastern end of Chatham Island. At the side of a small lagoon near the causeway of the Taia-Hapupu Road (176°21'E, 43°47'S), we saw a Glossy Ibis (*Plegadis falcinellus*) wading at the water's edge. From about 50 m away, as we studied it through binoculars for 30 min. and photographed it, we could see well its purplish-bronze plumage and long, downcurved bill. This seems to be the first record of the species at the Chathams.

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