Notes on the breeding behaviour of captive Whistling Swans

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Introduction

Whistling Swans *Cygnus c. columbianus* have bred only rarely in captivity. The first report was near Winnipeg, Canada in 1945 (Delacour 1954). The species did not breed in Europe until 1976 when a pair at the Flamingo Gardens and Zoological Park, Olney, Bucks., England, hatched two eggs, and a male and a female cygnet were hand-reared. In the same summer a pair at The Wildfowl Trust, Slimbridge, Gloucestershire, England, also hatched two eggs, one cygnet being reared by hand, the other by the parents. The incubation behaviour of this second pair was studied, allowing comparison with the natural state (Scott 1977), and with the captive breeding of the closely related Bewick's Swans *Cygnus c. bewickii* (Evans 1975).

History of the Slimbridge pair

The male was a wild-caught bird, received in early 1961. For about ten years he lived with his constant companion, an extremely belligerent male Bewick's Swan, on a large lake, which was visited each winter by several hundred wild Bewick's Swans, with which they had many aggressive encounters. Once a roughly-shaped nest was constructed. A female, captive bred at Kortright Waterfowl Park (Ontario Waterfowl Research Foundation) Canada, in 1973, arrived at Slimbridge in May 1975, and the pair were put in an enclosure, 330 sq m, with a pool and an island of 10 sq m. The female was full winged when she arrived, and so was feather-cut until the autumn, when she was pinioned. This did not prevent her breeding less than a year later.

Laying period

On 8th May an egg was found on the ground. A nest-shaped pile of straw was at once put on the island, and five more eggs were laid at two-day intervals.

At first the male was quite disinterested, and indeed the first two eggs laid were unfertilized. However, on 13th May, after the third egg had been laid, he was sitting on the nest when the female was off. Table 1 shows that the male spent 40% of the time on the nest, which was never left unattended. Nest building (Table 2) was mainly done by the bird on the nest, or by both birds after a changeover. Egg turning movements were performed by both birds. Only two successive egg turning sequences in one incubation session were observed (movements occurring within five minutes being considered part of the same sequence), at intervals of 55 (female) and 61 minutes (male).

Incubation period

The last egg was laid on 18th May, and the first egg had hatched by 14th June. This period, which was watched for a total of 44·2 hours was analysed in two parts, each containing one continuous watch, from 06.00 to 20.00.

The nest was never left unattended during incubation. During the first part the male was on the nest for 13% of the time (Table 1), but in the second part, this increased to

Table 1. Time spent on the nest by female and male.

	Duration of observations (mins)	Percentage of total sitting		Range of duration of complete sittings (average)	
		♀	♂	♀	♂
Laying period	440	60	40	62	42–120 (81)
Incubation period (first part)					
Days 1–14	1243	87	13	144–230 (180)	25–40 (35)
Incubation period (second part)					
Days 15–26	1410	63	37	76–210 (127)	40–105 (76)

37%. The range (and average) of the sitting times of the male also increased.

It is unlikely that the male actually incubated the eggs, only retarded heat loss. In sitting he fell forward to hit the side of the nest with his breast, then rocked sideways, usually pushing against the inside rim with each braced leg alternately. The eggs were apparently not shuffled up among the breast feathers as with the female. Before sitting she often ruffled her breast feathers with her bill, then sank vertically on to the nest before shuffling rapidly. Her wings drooped to the sides of the nest, and sometimes she filled any gaps with nest material. As with the captive Bewick's Swan, the female was on the nest in the cooler parts of the day, early morning and evening, when full incubation was needed.

Nest building

Both birds built during a changeover on the nest, but the male made many more building movements off the nest, including removing material from the nest foundations and piling it elsewhere, than did the female, who mostly built while incubating. A similar tendency for building by male and female in these contexts was noted in captive Bewick's Swans, and in wild Whistling Swans (Scott 1977).

Eggs were turned much more by the female than by the male as also occurred with captive Bewick's Swans (Table 2). The mean interval of ten successive turnings by the female in the first half was 63 minutes, and of 14 successive turnings in the second half, 46 minutes. The Whistling Swan's eggs were turned less frequently than in the Bewick's Swans, whose eggs were turned on average every 36 minutes.

Nest relief ceremony (Figures 1, 2 and 3)

A most striking feature was the alteration in behaviour, especially of the male in nest changeovers. On 14th May, the male was on the nest, when the female moved beside it and preened. The male then stood and poked in the nest. The female bobbed her head very gently three times, looked around, and then walked off into the water. The male appreared to turn the eggs, then sat. Two minutes later the female walked to the nest and preened. The male stood, poked in the nest, walked on to the edge, and nest-built. About a minute later the female sat, and they both nest-built for another four minutes.

Later the same day the female stood and poked in the nest. The male at once climbed on the edge 'and the female moved off. She passed nest material for two minutes as she went to the edge of the island. The male sat, and arranged nest material for four minutes, as well as poking in the nest and shuffling.

By 4th June, the behaviour of both male and female was very different. The female no longer waited for the male to be nearby before leaving the nest. She stood, poked all round the inside rim of the nest, as if covering the eggs, and walked off to the water. The male then swam across to the island, and got on to the nest. He had been there for 66 minutes when the female approached from behind. The male threatened her twice with open-bill. She then pecked him on the neck, and he got hold of her breast. When she grasped the top of his bill, he rose to free himself, and sparring followed for another ten seconds. The intensity then increased with the male reaching over to peck the female's back. She did the same to him but yielded. The dispute continued for another 24 seconds, during which time the female grasped the male's neck very firmly, but again yielded. When the male reached over to the female's back again she attempted to strike him with her wings. The pair quarrelled on for another 25 seconds, pushing against each other firmly with their breasts. Finally the male attacked the female with open wings, and she turned away, although with an open-bill threat.

The male then inspected the nest. The female tried to also, but was pecked, and the argument was resumed. However, each was

Table 2. Nest building and egg turning activities by female and male.

	% time spent nest building		Range of time (minutes) between turning eggs	
	♀	♂	♀	♂
Laying period	7	20	55	61
Incubation period (first part)	11	12	5–145	8
Incubation period (second part)	7	8	9–183	7, 8, 12

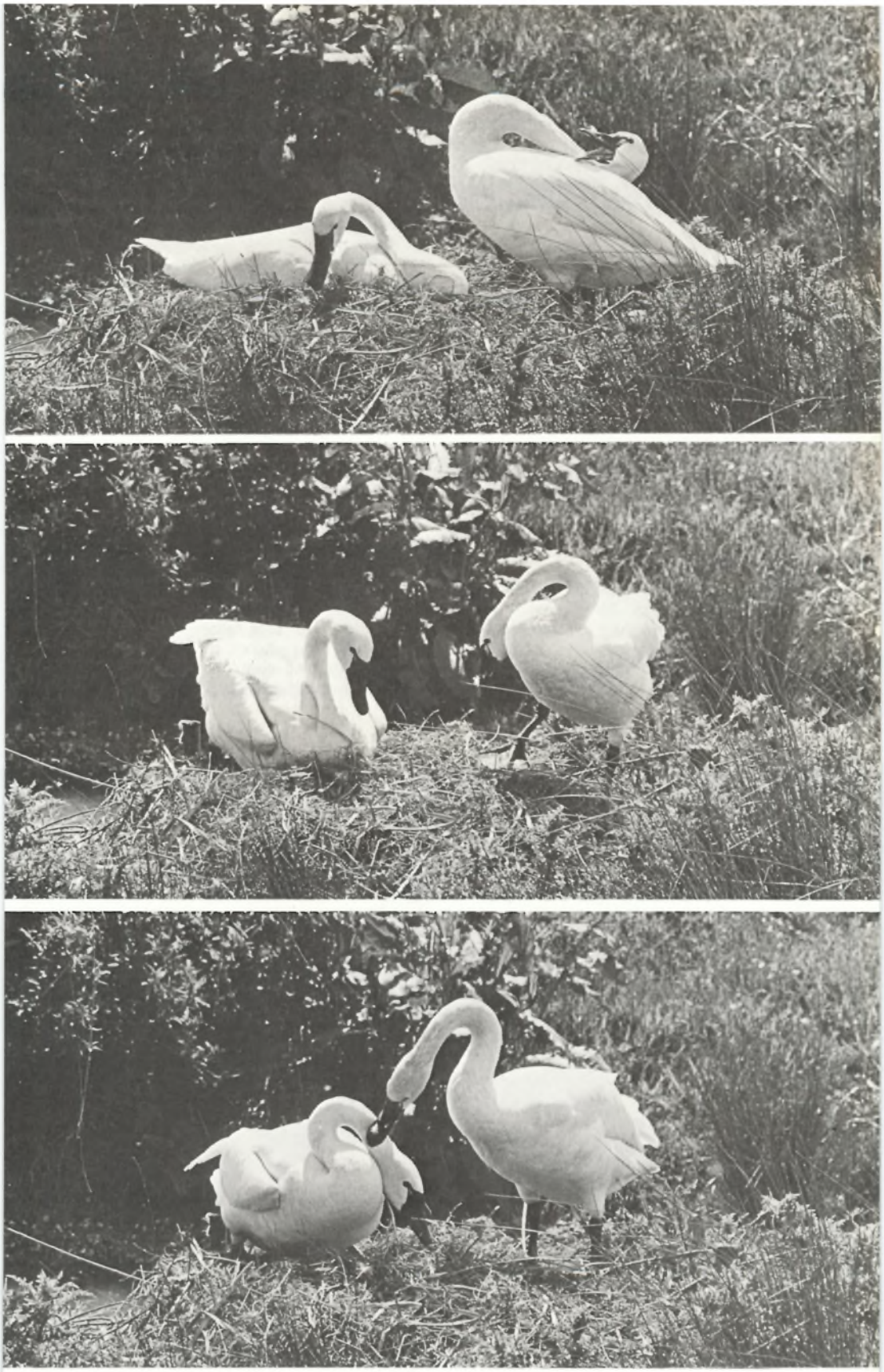

Figure 1–3. Nest relief: (1) female preens, male nest builds; (2) female moves on to nest, male rises; (3) female hurries up reluctant male. Early in incubation there is only mild aggression.

by now on opposite rims of the nest, and the male finally walked off, passing nest material as he went. The female poked briefly in the nest and sat quickly. The sequence lasted 90 seconds, and was filmed for this analysis.

Defence

Defence was undertaken by the male (Figure 4). On one side of the pen was a pair of Whooper Swans *Cygnus c. cygnus* with an unsuccessful nest, and on the other side two yearling Whistling Swan siblings. The male Whistling Swan was frequently provoked by one or both Whoopers calling aggressively, and he would dash to threaten them at the fence (Figure 5). The young Whistling Swans only provoked him by their presence, and did not respond when threatened.

Hatching

Incubation times of Whistling Swans have been reported as 35–40 days (Delacour 1954), 32 days (Banko & Mackay 1964) and 31 days (Wenting 1973). The shortest incubation period recorded for a Bewick's Swan (Evans 1975) was 29 days.

However, at 09.44 on 14th June, the 27th day, a cygnet was seen in the nest. This was the only egg to have hatched and, as three more might hatch, the cygnet and the two clear eggs were removed, the cygnet being hand-reared in the company of a Bewick's Swan cygnet.

The next day at 06.45 'kuk kuk' contact calls, as made between a female Bewick's Swan and her cygnets, were heard as the female Whistling Swan turned the eggs. Only one more egg had hatched, and so the other two were removed. (The cygnet was dead in one; the other egg was addled.) However, the female continued to behave as if she still had eggs, titivating the inside of the nest, and indeed as late as 11.44 was seen making egg turning movements. The empty shell indeed looked very like a whole egg (Figure 6).

At 18.36 the cygnet first entered the water. The male and female was already there, but they did not call the cygnet in, as had the female Bewick's Swan who made all the contact calls and was predominantly followed. The Whilstling Swan cygnet, however, was seen following just the male on the first day, who on the next two days was heard making contact 'kuk kuk' calls. This chick was successfully reared by the parents.

Figure 4. Male guarding incubating female.

Figure 5. Male threatens (with ground stare) adjacent Whooper Swans.

Figure 6. Female and cygnet on nest. Note similarity of empty shell to a whole egg.

Discussion

Nest building among captive Whistling Swans is reported to be done solely by the male (Gebauer in Delacour 1954), or by the female (Wenting 1973), while in the wild the female is said to nest build, probably assisted by the male (Palmer 1976). The Slimbridge swans behaviour suggests that nest building is indeed a shared activity, the male doing more than the female during laying, thus allowing her extra feeding time.

Tom Barry has seen Whistling Swan males of several pairs on the nest in the wild (Palmer 1976), as have Scott (1977) and Bartlett & Bartlett (1975), Banting (1975). Gebauer reported the captive male and female changing places on the nest during hot weather as often as every 15 minutes. Wenting (pers. com.) reported that a captive male did not get on the nest when the female was off; this was 'guarded' by a female former offspring. In three pairs of captive Bewick's Swans the male sat on the nest during incubation (Evans 1975).

The male Whistling Swan (and the closely related Bewick's Swan) has therefore been reported on the nest during incubation in several, quite diverse cases, and one may postulate that perhaps this is the rule rather than the exception. The importance of a close bond with the nest is reflected in the failure of nests in the wild which have been untended for long periods (M. Wotton, pers. com.). Out male's early enthusiasm, and his reluctance to leave the nest, may have reflected his peculiar earlier domination by a more aggressive male.

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Summary

The incubation behaviour of a pair of captive-breeding Whistling Swans *Cygnus c. columbianus* was studied. The male shared in nest building and sat on the eggs while the female was off feeding.

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