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THE BEHAVIOUR OF *Struthio camelus australis* AT BELO HORIZONTE ZOO, BRAZIL: EVALUATING CAUSES OF BREEDING FAILURE

by Herlandes Penha Tinoco and Ângela Bernadete Faggioli

Introduction

Standing up to 2.7m (approx. 9ft) tall and weighing 100kg-130kg (approx. 220lbs-280lbs) and sometimes up to 150kg (approx. 330lbs) (del Hoyo, 1991), the Ostrich *Struthio camelus* (Aves, Struthionidae) is the largest and heaviest living bird. The Struthioniformes together with the Tinamiformes, Rheiformes, Casuariiformes and Apterygiformes have a flat, raft-like sternum without a keel and are known as ratites (*ratiss* - a raft) (Sick, 1997).

The Ostrich is distributed over much of the African continent and is among the common inhabitants of the great African plains. Generally, it lives in open, semi-arid areas with short grass, where it can find an adequate food supply and has good all-round visibility to facilitate it seeing predators. The Ostrich is omnivorous, its diet consists mainly of plant matter (roots, leaves, flowers and seeds) and it also eats insects and small vertebrates such as lizards and even small tortoises (del Hoyo, 1991). Most of the water it needs is obtained from succulent plants.

Ostrich farming can be a profitable practice, producing feathers (used in carnival costumes, hats and to produce domestic utensils), eggs (providing food, necklaces and other artefacts), fat (for cosmetics, pharmaceutical products and the electronics industry), leather (for shoes and purses) and meat (similar to bovine meat but with less cholesterol, fat and calories (Carrer and Kornfeld, 1999).

The Ostrich has been kept in captivity for millennia and breeds regularly in zoos (del Hoyo, 1991). At Belo Horizonte Zoo breeding was common until a few years ago, when it became a rare event following the arrival of the new male. Nowadays, the female lays only infertile eggs.

Behavioural studies of Ostriches in the wild are common in scientific literature, but studies that describe its habits in captivity are rare. Due to its economic importance, such studies are necessary to improve the bird's

welfare and, consequently, increase its productivity. It is known that captive environments cause significant changes in the behavioural repertoire of the birds, causing reproductive losses and the non-expression of other natural and important behaviours.

The aim of the study was to describe the kinds and frequencies of behaviour displayed by the Ostriches at Belo Horizonte Zoo and attempt to correlate the reproductive failure to behavioural factors.

Materials and methods

Subjects and maintenance

The female, named Savana, was hatched at the zoo in 1998, and the male, named Zumbi, came from an ostrich farm in 2000, when he was approximately three years of age.

They were usually fed dog ration (0.8kg (1lb 12oz)), bird ration (3kg (6lbs 10oz)), horse ration (0.8kg (1lb 12oz)) and pickled cabbage (0.2kg (7oz)), twice a day at 8.00am and 2.00pm. The birds also ate flowers, leaves and fruits that fell from the trees in their enclosure.

Enclosure

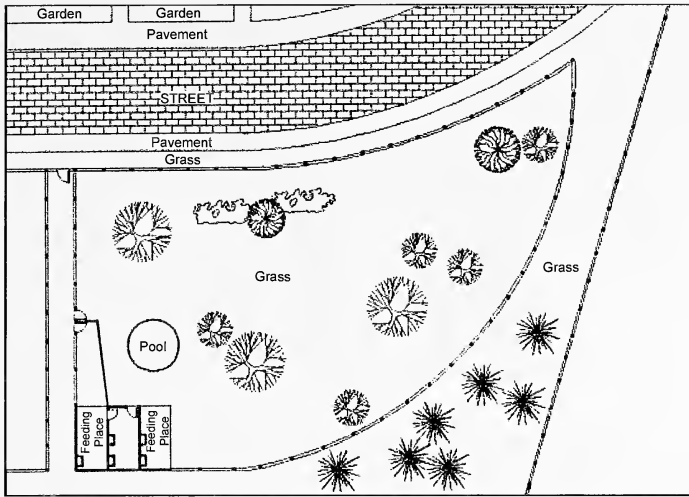
The Ostriches were displayed in a 2,042sq m (approx. 22,000sq ft) open enclosure, confined by a 2m (approx. 6ft 6in) high wire fence, supported by wooden poles. The enclosure was planted with trees, shrubs and grass and had a 3.1m (approx. 10ft) wide freshwater pool. The birds could be viewed from three sides and there was no place that allowed them to hide if they wished to. A small handling area provided shelter (see Fig.1).

Preliminary observations

Six hours of preliminary observations, both in the mornings and afternoons, were made during the last week of September and the first week of October 2001. The behaviours were recorded using the ad libitum method and the results were used to compile an ethogram (Table 1).

Data recording

Twenty hours of observations were made between October and November 2001. They were made three times a week (on Monday, Wednesday and Friday). The scan method was chosen because it allowed the recording of all behaviours of the birds at pre-selected times during the sampling period (Veado and Leite, 1999). The birds were rapidly observed at regular intervals (recording intervals were of one minute) and the behaviour of each individual was recorded. The behaviour of each Ostrich was necessarily recorded by instantaneous sample (Martin and Bateson, 1993). The observations were made from a distance of approximately 20m (65ft), to avoid the possibility of the observer's presence interfering with the birds' behaviour.



Drawing Herlandes Penha Tinoco

Fig. 1. Plan of Ostrich enclosure at Belo Horizonte Zoo.

Statistical analysis

The mean number of observations of all behaviours was calculated for the two Ostriches. Significant differences between the sexes were analysed using the Mann-Whitney U-Test. This is a non-parametric test that compares two independent samples of the same or different sizes, whose scores have been measured on the same ordinal level (Ayres et al. 1998).

Results

The mean number of behaviours displayed by the Ostriches is shown in Table 2. A significant difference was found between the sexes in the number of scans for the behavioural category ETNa ($Z=2.08$; $p<0.04$); the female spent more time eating alone than the male. Similarly, the behaviour FO showed a statistically significant difference ($Z=2.03$; $p<0.02$), being recorded 451 times for the female and 288 times for the male.

The behavioural category OTH was displayed more often by the female, with 150 occurrences recorded, against 106 occurrences recorded for the male. This difference was significant ($Z=1.90$; $p<0.05$). The IV and SW behaviours also differed significantly ($Z=3.46$; $p<0.0005$; $Z=2.04$; $p<0.04$, respectively). These behaviours were recorded 343/13 times for the male and 9/1 times for the female.

The percentage of behaviours displayed by both of the Ostriches is shown in Fig. 2. The birds ate and walked alone more often than together. The male spent more time interacting with people than displaying reproductive behaviours.

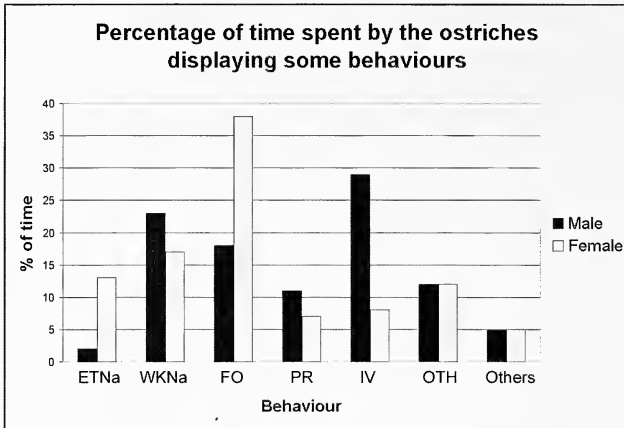


Fig. 2. Abbreviations: ETNa = eating alone; WKNa = walking alone; FO = foraging; PR = preening; IV = interacting with visitors; OTH = other behaviours.

Discussion

Ostriches are very curious birds, easily attracted by objects, especially shining ones. The Ostriches at BH Zoo were also attracted by people and animals walking past their enclosure, which explains why the behaviour 'interacting with visitors' was so high (Fig.3). The male Ostrich spent more time interacting with visitors and keepers than with the female. The male would stop what he was doing, walk towards the person and stand watching them, shaking his wings and sometimes vocalizing (courtship behaviour). According to McKeegan and Deeming (1997) courtship behaviours occupy only a small portion of the Ostrich's time. Human-induced courtship behaviour is a widespread phenomenon (Deeming, 1996). Observations by Bubier et al. (1998) showed that out of 200 adult Ostriches 136 (68%) displayed to humans. This did not occur in this study at BH Zoo. It is not surprising that zoo keeper-directed behaviours increased in frequency when zoo keepers were inside the enclosure because the removal of the physical barrier (i.e. the enclosure fence) facilitated greater interaction. Bubier et al. (1998) observed a male Ostrich apparently taking advantage of female courtship behaviour directed towards humans to mount the female each time she dropped to the ground in response to a human standing nearby. Similar abnormal behaviour was observed at BH Zoo, where the male tried to mount the female and copulate with her when she was displaying to humans and even when she was taking a sand bath.

Chronic stress can have deleterious effects on the levels of a number of hormones and other parameters essential to reproduction. For example, chronic restraint stress in rats results in reduced plasma lutenizing hormone

(LH) levels (Lopez-Calderon et al. 1987) and decreasing pituitary sensitive to lutenizing hormone releasing hormone (LHRH) (Armario et al. 1988). The cyclic release of the lutenizing hormone from the anterior pituitary causes ovulation in females (Sturkie and Mueller, 1976) and the release of androgynous hormones in males (Proudman, 1994). Domestic cats stressed by unpredictable changes in their caretaking routine showed a similar reduced pituitary LHRH sensitivity (Carlstead et al. 1993). Stress-related increases in glucocorticoid secretion may act directly at the testicular level to decrease testosterone secretion (Sapolsky, 1987). The conclusion is that stress may interfere with reproductive behaviours (Ward, 1972).

The presence of zoo visitors as a source of chronic stress may be underestimated for some species (Shepherdson, 1995). Gladston et al. (1984) found clearly deleterious effects on the behaviour of some animals when exposed to zoo visitors, as compared to animals housed off-exhibit. Several authors have also mentioned a number of behavioural effects produced by the presence of the public (Conway, 1977; Denke, 1977; Yaninek, 1977). The sounds of machinery may also be a chronic stressor. This could explain the lack of successful reproduction by the Ostriches at BH Zoo, whose enclosure is next to a busy street. The birds might be so stressed that they are simply not indulging in courtship behaviours.

The main purpose of a zoological garden is to help make the public more conscious of wild and exotic animals and the importance of their conservation for mankind (IUDZG/CBSG(IUCN/SSC), 1993). With this in mind, it would be counterproductive to impede the viewing of the animals by the public. To minimise the deleterious effects of stress caused by human presence, many zoos provide the animals with places to hide. In the case of BH Zoo, where there are few visual barriers in the Ostrich enclosure and a suitable hiding place does not exist, the birds are in almost permanent contact with people. Shrubs such as *Eugenia spregelii* should be planted in the enclosure to provide cover for the birds. The presence of guides and keepers to avoid disturbances (e.g. members of the public shouting) in front of the Ostrich enclosure may also help reduce stress.

The reproductive failure of the Ostriches at BH Zoo could be a result of incompatibility between the two birds (see Fig.2). In this study we did not find any signs of behavioural problems but did find high levels of individual behaviours (there had been fights between the two birds, mainly at the time of the introduction of the male Ostrich into the enclosure). Copulation failure due to behavioural problems is the most obvious cause of infertility in Ostriches. Although Ostriches are gregarious birds, they show certain individual preferences. Incompatibility is common when birds have been unable to select their own mates. Environmental conditions also can result in infertility. High stress levels, the sounds of heavy machinery or equipment,

Table 1. Ethogram of the behaviours observed by *Struthio camelus australis* at BH Zoo.

Behaviour	Abbreviation	Description
Escaping from male	EM	Female escaping from male.
Chasing after female	CF	Male chasing after the female with the wings and tail up.
Eating	ETNt	Ostriches eating fruits or vegetables at the feeder together.
Together	ETNa	Ostrich eating ration, fruits or vegetables at the feeder alone.
Alone		
Courting* Human	CORh	Bird courts humans (visitors, keepers).
Bird	CORb	Male courts female or female courts male.
Walking	WKNt	Birds walk through the enclosure, one beside the other or one behind the other.
Together	WKNa	Bird walks through the enclosure alone.
Alone		
Shaking wings	SW	Bird shakes its wings alternately.
Preening	PR	Bird standing arranging its feathers with its beak.
Sand bath	SNB	Bird sits on its heel and starts to shake its wings and drop sand over its body.
Foraging	FO	Bird eats grass, leaves, flowers, fruits, seeds and small stones from the ground.
Interacting with visitors	IV	When one or both birds notes someone in front of the enclosure, and they approach the visitor or keeper and start to walk, chase and even vocalising to the person.
Fighting	FGT	The birds positioned in front of each other, with their necks puffed and the wing-tips and tails raised skywards, start to kick and peck each other.
Copulating	COP	The female sits and places its neck on the ground; the male mounts the female. The male begins to grunt and groan and repeat his neck and wing movements.
Others	OTH	Other behaviours noted such as standing observing the area or pecking the wire.

Courting* Male: flops down on the ground, opens his wings and tail and begin to shake each wing alternately and move his tail up and down, his head and neck sway from side to side and beat rhythmically against his flanks (del Hoyo, 1991). Female: holds her wings forward and down, flapping them backwards and forwards whilst holding her head close to the ground and opening her beak repeatedly to make a clapping sound (del Hoyo, 1991).

Table 2. Mean number of behavioural observations of the Ostriches at BH Zoo, shown by sex (\pm standard error, $\alpha=0.05$).

Behaviour	Sex		$\chi^2_{n=20, gl=1}$	p-value
	Male	Female		
Escaping from male (EM)	0.60 \pm 0.24	-	0.00	1.00
Chasing after the female (CF)	-	0.60 \pm 0.24	0.00	1.00
Eating together (ETNt)	1.45 \pm 0.52	1.45 \pm 0.52	0.00	1.00
Eating alone (ETNa)*	1.55 \pm 0.60	7.80 \pm 2.02	2.08	0.04
Courting humans (CORh)	0.25 \pm 0.16	0.10 \pm 0.10	0.53	0.60
Courting bird (CORb)	-	0.05 \pm 0.05	0.27	0.79
Walking together (WKNt)	0.45 \pm 0.16	0.45 \pm 0.16	0.00	1.00
Walking alone (WKNa)	14.35 \pm 2.69	9.95 \pm 1.75	0.87	0.39
Shaking wings (SW)*	0.65 \pm 0.18	0.15 \pm 0.15	2.04	0.04
Preening (PR)	7.00 \pm 1.94	4.35 \pm 1.23	0.78	0.44
Sand bathing (SB)	-	0.40 \pm 0.21	1.08	0.28
Foraging (FO)*	11.15 \pm 1.49	22.45 \pm 3.46	2.03	0.02
Interacting with visitors (IV)*	17.15 \pm 3.18	4.75 \pm 1.33	3.46	0.0005
Fighting (FGT)	-	-	-	-
Copulating (COP)	0.05 \pm 0.05	0.05 \pm 0.05	0.00	1.00
Others (OTH)*	5.30 \pm 2.27	7.50 \pm 1.67	1.90	0.05

*Indicates behaviours significantly different between the sexes.

predator presence and the transfer of birds from one enclosure to another can also interfere with normal sexual behaviour (Tully and Shane, 1996).

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A HISTORY OF THE GENUS *Picathartes* IN CAPTIVITY, 1948-2002

by Marvin L. Jones

<i>Picathartes gymnocephalus</i> (continued from Vol.1.109, No.4, pp.167-173 (2003))				
0.0.2 hatched	24 Sep 1971	Amsterdam Zoo	0.0.1 died	5 Jul 1973
Dekker IZY 13, pp. 120-121			cd intestinal inflammation	Copenhagen Zoo
0.0.2 disposition unknown		Amsterdam Zoo	0.0.1 died	11 Aug 1973
still living 2 May 1972			cd intestinal inflammation	Copenhagen Zoo
			0.0.1 died	4 Nov 1973
			cd unknown	Copenhagen Zoo
0.0.1 recd	?	Busch Gardens, Tampa	0.0.1 died	19 Jan 1974
recd	20 Oct 1971	NZP-Washington	cd tuberculosis	Copenhagen Zoo
died	8 Nov 1972	NZP-Washington	0.0.1 died	15 Jul 1974
			cd unknown	Copenhagen Zoo
0.0.2 hatched	31 Dec 1971	Amsterdam Zoo	0.0.3 disposition unknown, still living 23 Dec 1975	
Dekker IZY 13, pp. 120-121				
0.0.2 disposition unknown		Amsterdam Zoo	*2.2.1 recd	12 Jul 1972
still living 2 May 1972			wb, est. 1971, Kumasi, Ghana, from Zeehandelaar	San Antonio Zoo
			0.0.1 died	15 Jul 1972
			cd unknown	San Antonio Zoo
<i>IZY</i> census 1972: Amsterdam Zoo 1.1.5 (cb 0.0.4); Antwerp Zoo 0.0.1; Bronx Zoo 0.0.3; Brookfield 1.1.0; Cincinnati Zoo 0.0.2 (there is no record of these birds at Cincinnati today); Copenhagen Zoo 0.0.8; Frankfurt Zoo 1.0.3; Los Angeles Zoo 0.0.1; Memphis Zoo 0.0.3; Philadelphia Zoo 0.0.4; Rotterdam Zoo 0.0.1; San Antonio Zoo 0.0.6; Walsrode Bird Park 0.0.9; NZP-Washington 0.0.7; Wassenaar Zoo 0.0.2			1.0.0 died	26 Mar 1981
			1.0.0 died	24 Oct 1984
			cd unknown	San Antonio Zoo
			0.1.0 died	17 Mar 1988
			0.1.0 died	23 Jun 1988
			*0.0.1 hatched	9 Aug 1972
0.0.8 recd	Jan 1972	Copenhagen Zoo	0.0.1 died	18 Aug 1972
wb, from Borglum			cd unknown	Frankfurt Zoo

Possibly arrived with the 2 Nov specimen, zoo inventory shows 0.0.3 recd in 1972, but no file card for these two currently in zoo. Inventory also shows that 0.0.2 died but which two is unknown. Inventory shows 0.0.2 living Dec 1972. cd infection associated

IZY census 1973 (effective from 1973 the census was supposed to reflect data as of 1 Jan of the cited year): Amsterdam Zoo 1.1.4 (cb 0.0.3); Antwerp Zoo 0.0.6; Baltimore Zoo 0.0.1; Bronx Zoo 0.0.3; Brookfield Zoo 1.1.0; Copenhagen Zoo 0.0.8; Frankfurt Zoo 1.1.1 (but also said two were captive hatched; but not which two); Memphis Zoo 0.0.3; Philadelphia Zoo 0.0.3 (Inventory for 1 Jul 1973 showed 1.0.2); Rotterdam Zoo 0.0.2; San Antonio Zoo 0.0.11; NZP-Washington 0.0.6 (0.0.1 on loan from Los Angeles); Wassenaar Zoo 0.0.3

0.0.2 hatched 14 Sep 1973 Memphis Zoo
0.0.2 died 18 Sep 1973 Memphis Zoo

0.0.1 recd ? Rotterdam Zoo
Inventory for 31 Dec 1973 shows one died that year, but not which one.

IZY census 1974: Amsterdam Zoo 1.1.4 (cb 0.0.3); Antwerp Zoo 0.0.2; Bronx Zoo 0.0.2; Brookfield Zoo 0.0.2; Copenhagen Zoo 0.0.4 (if this list was as of 1 Jan the correct number would be five, but if as of 19 Jan the correct number was four); Fort Worth Zoo 1.1.0 (none were ever kept at Fort Worth, this was an error); Frankfurt Zoo 1.1.0; Koln Zoo 0.0.1; Memphis Zoo 1.2.0; Philadelphia Zoo 1.0.2; Rotterdam Zoo 0.0.1; San Antonio Zoo 0.0.11; Walsrode Bird Park 0.0.8; NPZ-Washington 2.2.0 (one on loan from Los Angeles)

*0.0.2 hatched 29 Apr 1974 Frankfurt Zoo
0.0.1 died 4 Jul 1982 Frankfurt Zoo
0.0.1 recd 23 Aug 1984 Vienna Zoo
died 28 Sep 1987 Vienna Zoo

0.0.1 hatched 10 Aug 1972 Frankfurt Zoo
0.0.1 died 15 Aug 1972 Frankfurt Zoo
cd infection associated

0.0.2 recd 31 Oct 1972 Wassenaar Zoo
wb, West Africa, from van den Bijl, Busum
0.0.1 died 27 Dec 1972 Wassenaar Zoo
0.0.1 died 10 Jan 1973 Wassenaar Zoo

0.0.1 recd 2 Nov 1972 Rotterdam Zoo
wb, from Dijk, Tilburg, note on file card says it was kept in the Bird House from 1978-1982 date of removal from collection unknown

2.3.1 recd 16 Dec 1972 Antwerp Zoo
wb, from Borglum, Farum, Denmark
0.1.0 died 24 Dec 1972 Antwerp Zoo
cd aspergillosis

1.0.0 died 26 May 1973 Antwerp Zoo
cd inflammation of intestine, microfilaria
0.1.0 died 19 Oct 1973 Antwerp Zoo
cd inflammation of intestine
1.0.0 died 9 Nov 1973 Antwerp Zoo
cd inflammation of intestine
0.1.0 died 5 Aug 1976 Antwerp Zoo
cd unknown

0.0.1 died 15 Mar 1977 Antwerp Zoo
cd degeneration of heart and bleeding in heart

0.0.2 recd ? 1972 Rotterdam Zoo

A series of applications to import up to 30 specimens for US zoos were made in 1975. The birds were at the compound of Mr Borglum in Liberia and were to be distributed in the USA by the firm of George Kroesen of Schaumburg (outside Chicago), Illinois. The birds were initially offered in Feb 1975 and it was indicated that if the US zoos did not expedite their permits the birds might be sent to other collections, e.g. in Europe. Two pairs were to go to Philadelphia Zoo, two pairs to San Diego, two pairs to NZIP-Washington, two pairs to Denver Zoo, two pairs to Los Angeles Zoo and two pairs to St Louis Zoo, and four pairs to Audubon Park Zoo, New Orleans. The AAZPA Conservation of Wildlife Committee (of which I was a committee member at the time) was alerted to this. It was decided that NZIP would put in for one permit and when the birds arrived they would be transferred to the appropriate collections.

A permit was granted by the US Department of the Interior Fish and Wildlife Service (which called the birds White-winged or White-headed Rockfowl) to the NZIP to import 28 birds 23 Jul 1975, and Philadelphia Zoo was given one on the same date for four birds. St Louis Zoo was given permission, in a permit dated 6 Oct 1975, to take 2.2 from NZIP but to take possession of them in Illinois. New Orleans was given permission to acquire eight birds from NZIP on 20 Nov 1975 and San Diego to take 2.2 in interstate commerce.

However, as all of this was far past the deadline that was given earlier in the year none of the birds were imported into the USA.

IZY census 1975: Amsterdam Zoo 1.1.3 (cb 0.0.2); Antwerp Zoo 0.0.2; Brookfield Zoo 0.0.1; Copenhagen Zoo 0.0.3; Frankfurt Zoo 0.1.2 (cb 0.0.2); Koln Zoo 0.0.1; Memphis Zoo 1.2.0; Philadelphia Zoo 0.1.2 (Philadelphia Zoo Inventory 1 Jan 1975 & 31 Dec 1975 showed 1.0.2); Rotterdam Zoo 1.0.0 (Rotterdam Zoo Inventory 1 Jan 1975 & 31 Dec 1975 showed 0.0.1); San Antonio Zoo 0.0.11; Walsrode Bird Park 0.0.11; NZIP-Washington 0.1.1

0.0.7 recd 11 Dec 1975 Copenhagen Zoo
 from Borglum
 0.0.1 died 11 Dec 1975 Copenhagen Zoo
 0.0.6 exact disposition unknown. These birds were mixed with the three remaining from Jan 1972 (see p. 9) and as none were banded it was impossible to determine which was which.

*0.0.3 recd 16 Dec 1975 Koln Zoo
 wb, f from G van den Brink, Soest
 0.0.3 loan 23 Feb 1982 Rambouillet Zoo
 0.0.3 1 Dec 1996 Rambouillet Zoo
 changed from loan to donation, trade or sale from Koln
 0.0.3 final disposition unknown

1.1.2 recd ? 1975 Vienna Zoo
 wb, source unknown
 0.1.0 died ? 1975 Vienna Zoo
 0.1.0 recd 18 Dec 1975 Vienna Nat. Hist. Museum
 *1.0.0 sent 31 Aug 1984 Frankfurt Zoo
 died 1 Sep 1986 Frankfurt Zoo
 cd infection associated

0.0.1 died ? 1985 Vienna Zoo
 0.0.1 recd 7 Feb 1985 Vienna Nat. Hist. Museum
 0.0.1 died ? 1986 Vienna Zoo
 0.0.1 recd 22 Dec 1986 Vienna Nat. Hist. Museum
 (see note overleaf (p. 12))

(Dr Herbert Schifter, retired Curator of Birds at the Museum of Natural History, Vienna, Austria, in a letter dated 31 Mar 2004) has provided the following information: Vienna Zoo (Wien-Schönbrunn) received four *P. gymnocephalus* 16 Dec 1975, from the dealer Gebrium (according to Schönbrunn data bank). One had died before or on arrival and therefore was not entered on the Schönbrunn data bank. This bird (sex unknown) was given to the museum 18 Dec 1975. Of the remaining birds (all males), one lived until 4 Jan 1985 and on its death was given to the museum. Another was given to the museum 18 Dec 1986. 1.0.0 was sent to Frankfurt Zoo 31 Aug 1984 and in exchange Schönbrunn Zoo received 0.1.0 14 Aug 1984 which lived until 28 Sep 1987 and was the last specimen kept there. Although the birds lived in quite a large planted aviary, no breeding activity occurred. Ed.)

IZY census 1976: Amsterdam Zoo 1.1.2 (cb 0.0.2); Antwerp Zoo 0.0.2; Brookfield Zoo 0.0.1; Copenhagen Zoo 0.0.8; Denver Zoo 1.1.0; Frankfurt Zoo 0.1.2 (cb 0.0.2); Köln Zoo 0.0.4; Philadelphia Zoo 1.1.0; Rotterdam Zoo 1.0.0; San Antonio Zoo 0.0.8; Vienna Zoo 0.0.3; NZP-Washington 0.0.2

0.0.1 recd	?	Copenhagen Zoo
0.0.1 died	10 Jan 1976	Copenhagen Zoo
cd aspergillosis		
0.0.1 recd	?	Copenhagen Zoo
0.0.1 died	30 Mar 1976	Copenhagen Zoo
cd unknown		
0.0.1 recd	?	Copenhagen Zoo
0.0.1 died	2 Apr 1976	Copenhagen Zoo
cd diagnosis impossible		

0.0.1 recd	?	Copenhagen Zoo
0.0.1 died	22 Jun 1976	Copenhagen Zoo
cd unknown		

There did not appear to have been a *IZY* census for 1977

0.0.1 recd	?	Copenhagen Zoo
0.0.1 died	7 Apr 1977	Copenhagen Zoo
weak for a long period, cd unknown		
0.0.1 recd	?	Copenhagen Zoo
0.0.1 died	7 Sep 1977	Copenhagen Zoo
cd intestinal inflammation/tapeworms		

IZY census 1978: Amsterdam Zoo (cb 1.1.0); Antwerp Zoo 0.0.8; Copenhagen Zoo 0.0.2; Denver Zoo 1.1.0; Frankfurt Zoo 0.1.2 (cb 0.0.2); Köln Zoo 0.0.4; Memphis Zoo 1.1.0; Philadelphia Zoo 1.0.0; Rotterdam Zoo 0.0.1; San Antonio Zoo 2.2.4; Vienna Zoo 0.0.3; Walsrode Bird Park 0.0.1

0.0.6 recd	10 Jan 1978	Copenhagen Zoo
from Borglum, mixed with two remaining specimens, exact disposition unknown		
0.0.1 recd	?	Copenhagen Zoo
0.0.1 died	12 Mar 1978	Copenhagen Zoo
cd pneumonia		
1.0.12 recd	14 Mar 1978	Antwerp Zoo
wb, from Borglum, Monrovia, Liberia		
0.0.1 died	17 Mar 1978	Antwerp Zoo

- fair amount of sand in intestine
 0.0.1 died 22 Mar 1978 Antwerp Zoo
 cd unknown
 1.0.0 died 6 Jul 1978 Antwerp Zoo
 cd unknown
 0.0.1 died 16 Jul 1979 Antwerp Zoo
 cd unknown
 0.0.1 died 23 Sep 1982 Antwerp Zoo
 vestigial infestation
 0.0.1 died 28 Sep 1982 Antwerp Zoo
 degeneration of kidneys
 0.0.1 died 11 Nov 1985 Antwerp Zoo
 gout and degeneration of kidneys
 0.0.5 recd 11 Apr 1978 Rotterdam Zoo
 from Antwerp, Rotterdam said they were from Senegal (this species does not occur there) and were very young on arrival and had been hand-reared
 0.0.1 died 11 Dec 1979 Rotterdam Zoo
 0.0.1 died 4 Sep 1980 Rotterdam Zoo
 0.0.1 died 19 Aug 1981 Rotterdam Zoo
 0.0.1 died 20 Aug 1981 Rotterdam Zoo
 despite the fact that the remaining bird from Antwerp laid an egg 15 Jul 1982, Rotterdam never changed its listing from sex unknown to female. The disposition of this bird is unknown
 0.0.1 recd ? Copenhagen Zoo
 0.0.1 died 31 Mar 1978 Copenhagen Zoo
 inflammation of intestine/oviduct
 1.0.4 recd 18 Apr 1978 Antwerp Zoo
 wb, from Borglum, Monrovia, Liberia
 0.0.1 died 10 Nov 1978 Antwerp Zoo
 intestine filled with sand, inflammation of intestine
 0.0.1 died 12 Nov 1978 Antwerp Zoo
 cd unknown
 0.0.1 died 26 May 1979 Antwerp Zoo
 massive e.coli culture in intestine
 1.0.1 recd 19 May 1978 Rotterdam Zoo
 from Antwerp, Rotterdam said they were from Senegal (this species does not occur there) and were very young on arrival and had been hand-reared
 0.0.1 died 19 May 1980 Rotterdam Zoo
 1.0.0 loan 23 Aug 1984 Frankfurt Zoo
 1.0.0 5 Mar 1991 Frankfurt Zoo
 changed to donation or trade?
 1.0.0 died 22 Jan 1995 Frankfurt Zoo
 cd unknown
 0.0.1 recd ? Copenhagen Zoo
 died 16 Nov 1978 Copenhagen Zoo
 suspected pseudotuberculosis
IZY census 1979; Amsterdam Zoo (cb 0.0.1); Antwerp Zoo 0.0.5; Copenhagen Zoo 0.0.5; Denver Zoo 1.1.0; Frankfurt Zoo 0.1.2 (cb 0.0.2); Köln Zoo 0.0.4; Memphis Zoo 1.0.0; Rotterdam Zoo 0.0.8; San Antonio Zoo 2.3.0; Vienna Zoo 0.0.3; Walsrode Bird Park 0.0.1; NZP-Washington 0.0.1
 0.0.1 recd ? Copenhagen Zoo
 0.0.1 died 19 Aug 1979 Copenhagen Zoo
 proventricular worms

- *0.1.0 hatched 12 Sep 1979 San Antonio Zoo
 0.1.0 died 25 Jan 1988 San Antonio Zoo
 cd unknown
- IZY* census 1980: Amsterdam Zoo 0.0.1; Antwerp Zoo 0.0.3; Copenhagen Zoo 0.0.4; Denver Zoo 1.1.0; Frankfurt Zoo (cb 0.0.2); Koln Zoo 0.0.4; Memphis Zoo 1.0.0; Rotterdam Zoo 0.0.7; San Antonio Zoo 2.4.0 (cb 0.1.0); Vienna Zoo 0.0.3; Walsrode Bird Park 0.0.1; NZP-Washington 1.0.0
- 0.1.0 recd/hatched? Amsterdam Zoo
 *0.1.0 loan 30 May 1980 Frankfurt Zoo
 died 4 Sep 1987 Frankfurt Zoo
 cd unknown (Frankfurt indicated it thought it was a wild-hatched specimen, but made no estimate of its age)
- 0.0.1 recd ? Copenhagen Zoo
 0.0.1 died 6 Aug 1980 Copenhagen Zoo
 inflammation of the oral cavity and intestine
 0.0.1 recd ? Copenhagen Zoo
 0.0.1 died 6 Nov 1980 Copenhagen Zoo
 cd unknown
- IZY* census 1981: Antwerp Zoo 0.0.3; Copenhagen Zoo 0.0.2; Frankfurt Zoo 0.0.3 (cb 0.0.2) (0.0.1 loan from Amsterdam Zoo); Rotterdam Zoo 0.0.5; San Antonio Zoo 3.4.0 (cb 0.1.0); Vienna Zoo 0.0.3; NZP-Washington 1.0.1 (loans from Memphis and San Antonio Zoos)
- 0.0.1 recd ? Copenhagen Zoo
 0.0.1 died 30 May 1981 Copenhagen Zoo
 inflammation of the intestine
- *0.0.2 hatched 2 Nov 1981 San Antonio Zoo
 0.0.1 died 29 Nov 1981 San Antonio Zoo
 cd unknown
 0.0.1 died 8 Apr 1984 San Antonio Zoo
 cd unknown
- IZY* census 1982: Antwerp Zoo 0.0.3; Copenhagen Zoo 0.0.1; Frankfurt Zoo 0.0.3 (cb 0.0.2) (0.0.1 loan from Amsterdam Zoo); Rotterdam Zoo 0.0.3; San Antonio Zoo 1.4.1 (cb 1.1.0); Vienna Zoo 0.0.3; NZP-Washington 1.0.1 (loans from Memphis and San Antonio Zoos)
- 1.0.0 recd ? Jan 1972
 or 11 Dec 1975
 or 10 Jan 1978 Copenhagen Zoo
 1.0.0 loan 30 Jun 1982 Frankfurt Zoo
 reported to ISIS by Frankfurt as being a female, but shown later as having sired a chick at Frankfurt
 1.0.0 died 31 Mar 1993 Frankfurt Zoo
 cd unknown
- IZY* census 1983: Antwerp Zoo 0.0.1; Frankfurt Zoo 0.0.3 (cb 0.0.1); Rotterdam Zoo 1.1.1 (Rotterdam Zoo Inventory 1 Jan 1983 showed 0.0.3, during the year 0.0.1 died, leaving 31 Dec 1983 1.1.0); San Antonio Zoo 2.5.0 (cb 0.2.0); Vienna Zoo 0.0.3; Walsrode Bird Park 0.0.1
- *0.0.1 hatched 6 Aug 1983 San Antonio Zoo
 0.0.1 died 3 Sep 1983 San Antonio Zoo
 cd unknown

*0.0.1 hatched	6 Oct 1983	San Antonio Zoo	*0.0.1 hatched	2 Aug 1984	San Antonio Zoo
0.0.1 died	7 Oct 1983	San Antonio Zoo	0.0.1 died	7 Aug 1984	San Antonio Zoo
cd unknown			cd unknown		
*0.0.1 hatched	7 Oct 1983	San Antonio Zoo	*0.0.1 hatched	28 Oct 1984	San Antonio Zoo
0.0.1 died	7 Oct 1983	San Antonio Zoo	0.0.1 died	9 Dec 1984	San Antonio Zoo
cd unknown			cd unknown		
*0.0.1 hatched	11 Nov 1983	San Antonio Zoo	*0.0.1 hatched	29 Oct 1984	San Antonio Zoo
0.0.1 died	16 Nov 1983	San Antonio Zoo	0.0.1 died	16 Nov 1984	San Antonio Zoo
cd unknown			cd unknown		
<i>IZY</i> census 1984; Antwerp Zoo 0.0.1; Frankfurt Zoo 0.0.3 (cb 0.0.1); Rotterdam Zoo 1.1.0; San Antonio Zoo 2.5.0 (cb 0.2.0)					
0.1.0 recd	?	Rotterdam Zoo	<i>IZY</i> census 1985; Antwerp Zoo 0.0.1; Frankfurt Zoo 1.1.1 (loans from Amsterdam, Copenhagen and Rotterdam Zoos); Köln Zoo 1.1.1; San Antonio Zoo 1.4.0 (cb 0.2.0); Vienna Zoo 0.0.3		
0.1.0 died	1984	Rotterdam Zoo	*0.0.1 hatched	9 Aug 1985	San Antonio Zoo
*0.0.1 hatched	26 Jun 1984	San Antonio Zoo	0.0.1 died	6 Sep 1985	San Antonio Zoo
0.0.1 died	29 Jul 1984	San Antonio Zoo	cd unknown		
cd unknown			*0.0.1 hatched	3 Oct 1985	Frankfurt Zoo
*0.1.0 hatched	13 Jul 1984	San Antonio Zoo	the parents were birds on loan from Copenhagen and Amsterdam Zoos		
0.1.0 died	11 Mar 1998	San Antonio Zoo	0.0.1 died	9 Oct 1985	Frankfurt Zoo
cd unknown			cd environmental or behavioural conditions		
This was probably the last <i>Picathartes gymnocephalus</i> in captivity					
*0.0.1 hatched	15 Jul 1984	San Antonio Zoo	<i>IZY</i> census 1986; Frankfurt Zoo 1.1.2 (cb 0.1.0) (loans from Amsterdam, Copenhagen and Rotterdam Zoos); San Antonio Zoo 1.4.0 (cb 0.2.0); Vienna Zoo 0.0.2		
0.0.1 died	23 Jul 1984	San Antonio Zoo			
cd unknown					

UNDER THREAT

As a result of loss and degradation of its forest habitat, it is estimated that fewer than 10,000 *Picathartes gymnocephalus* remain in the wild, confined to Guinea, Sierra Leone, Liberia, Côte d'Ivoire and Ghana. A five-year action plan aims to more accurately estimate the size of the population, its distribution and trends, and stabilise or increase the number of birds by reducing human activities at the main breeding sites.

Similar objectives have been set for *P. oreas*, which is confined to Nigeria, Cameroon, Equatorial Guinea and Gabon. It is similarly threatened and, like its congener, has an estimated current population of fewer than 10,000 birds.

IZY census 1987: Frankfurt Zoo 0.0.2.; San Antonio Zoo 1.3.0 (cb 0.2.0); Vienna Zoo 0.0.1

*0.1.0 hatched 10 Mar 1987 San Antonio Zoo
0.1.0 died 1 Jan 1989 San Antonio Zoo
cd infection associated

IZY census 1988: Frankfurt Zoo 1.1.0 (loans from Amsterdam and Copenhagen Zoos); San Antonio Zoo 0.4.0 (cb 0.2.0)

IZY censuses for 1989, 1990, 1991 (last IZY censuses):
Frankfurt Zoo 1.1.0; San Antonio Zoo (cb 0.1.0)

References

- Webb, C. S. 1949. Some notes on the Grey-necked Picathartes. *Avicultural Magazine* 55:149-155.
Webb, C. S. 1953. *A Wanderer in the Wind The Odyssey of an Animal Collector*. Hutchinson, London.

Marvin L. Jones, Registrar Emeritus, Zoological Society of San Diego, last November celebrated his 75th birthday. He wrote his first article for the magazine in early 1954. It was about Köln Zoo and was written when he was serving with the US Army in Germany.

BREEDING THE WHITE-EARED BULBUL

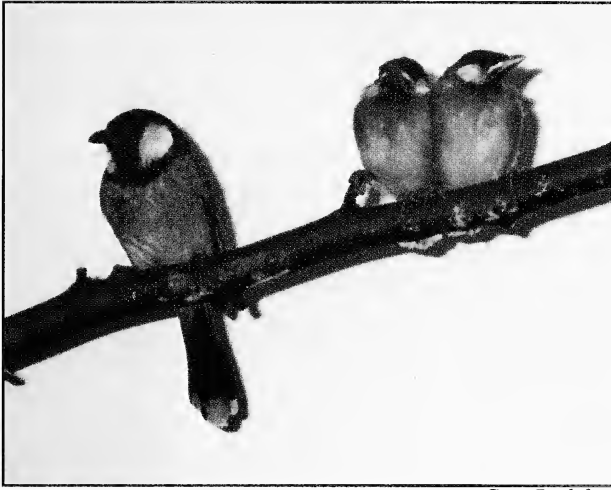
by Gary Bralsford

Having in the past bred the Red-whiskered Bulbul *Pycnonotus jocosus* and had near misses with the Chestnut *Hypsipetes castanotus* and White-headed *H.leucocephalus*, I decided to have a pair of bulbuls in my collection again for the 2003 breeding season. I looked around for a few weeks until I saw that a dealer in nearby Doncaster had a few different species for sale: Red-whiskered, Finchbill *Spizixos semitorques*, White-headed, Chinese *P. sinensis* and White-eared *P. leucogenys leucotis* or *P. leucotis* (see below). I watched the White-eared and they were very graceful in their flight patterns, very much like butterflies and glided a lot in flight. There were about a dozen (12) of them all together in the flight and trying to sex them was nearly impossible. I decided to pick three birds; one with large white cheek patches and two with a little less white on the cheeks.

My birds have hardly any crest to speak of, white cheek patches and an otherwise black head (see photo). Whistler (1941) and Woodcock (1980) treated this bird as a subspecies of the White-cheeked, calling both the White-cheeked Bulbul, *P. l. leucogenys* and *P. l. leucotis*. The latter is described as being found in light woodland, gardens, the neighbourhood of towns and villages, scrub and mangrove. Grewal, Harvey, Pfister (2002), however, treat it as a full species, calling it the White-eared Bulbul (White-cheeked Bulbul) *P. leucotis*, a common breeding resident of the plains of Pakistan and north-west India, that also occurs in western Asia. It eats berries and other fruits and will take insects and nectar, and in captivity will take a coarse softbill food such as Bogenia or Nutriluxe Red.

My birds were put in a flight in my shed. The flight measures 8ft long x 4ft wide x 6ft high (approx. 2.4m long x 1.2m wide x 1.8m high) and all three birds were released into it at the beginning of March. I had fixed up several nest-boxes and wicker baskets, and hung up two wallflower baskets and two hanging baskets all of which were filled with indoor plants. I had also put wicker nest pans in each basket. The bulbuls settled down and came into breeding condition fairly quickly. Soon afterwards I noticed a few feathers scattered on the floor and on watching the three bulbuls, noticed two had paired-up, isolating the other one. I removed the odd one, which proved to be a male, that as soon as it was caged began to have singing contests with the male in the flight.

Having decided that the two in the flight were a true pair, I provided lots of coconut fibre and horse hair in salad racks hung on the flight walls. The female started carrying nest material to one of the wicker baskets and within three days had finished making a nest. No eggs were laid in it, instead the



Gary Bralsford

The female with two of the three chicks (August 7th 2003).

female started to build another nest in a half-open nest-box fixed to the back wall. I was a little worried by this, as the box was close to the next flight in which my Red-crested Cardinals *Paroaria coronata* had a nest with three eggs. The bulbuls laid four eggs in the half-open box at the end of April and the female did most of the sitting, with the male taking his turn at night. They sat for 14 days.

All but one of the eggs hatched, the fourth was fertile but the chick was dead in the shell. I provided waxworms, crickets and white skinned mealworms. All went well until the fifth day, when I found one chick dead on the feeding platform, followed by another the next day and the third on the seventh day. All three had full crops but around their beaks there was bruising and blood, as though the parents had tried to force feed them. I came to the conclusion that the chicks had died from e.coli or something similar and had been removed from the nest after they had died rather than having been thrown out of the nest because the parents had become bored or because the diet I had provided was inadequate.

The parents went back to nest three weeks later after I had moved the nest-box to the side of the flight away from where the cardinals were nesting. The bulbuls laid another four eggs and again sat for 14 days. All four eggs hatched. One chick died on the second day and the other three were all reared to maturity. This time I provided the parents with waxworms and crickets but decided against giving them mini mealworms, instead I provided buffalo worms and I think these did the trick and led to the successful rearing of the chicks.

The pair went to nest a further three times and I eventually ended up with six young bulbuls, which I fitted with size K rings. I believe bulbuls

are a species of softbill that we in aviculture could breed in sufficient numbers to maintain self-sustaining populations. I have recently found an unrelated female, so this breeding season I will try to breed from two pairs of White-eared Bulbuls.

With restrictions on the import of birds from Asia and other parts of the world, we need to specialise in particular species. As I mentioned in my account of breeding the Chestnut-backed Thrush *Zoothera dohertyi* (*Avicultural Magazine* Vol.109, No.4, pp. 150-153 (2003)), I have chosen mostly Asiatic softbills. Among those I specialise in are bulbuls. They are relatively easy to cater for both with regard to their diet and housing, with the best birds to begin with being species such as the Red-whiskered and the Chinese. If you keep one pair to a flight, you have a better chance of breeding bulbuls. I tried showing bulbuls but found that their bouncy personalities were a disadvantage when showing them. Bulbuls will not settle down quietly for long periods, in addition to which they are soft feathered (like the closely related leafbirds *Chloropsis* spp.) and will often damage their tail feathers.

I hope more aviculturists will keep bulbuls. Here in the UK, Asian softbills will often start breeding in March and may have three or four clutches. They are likely to start to moult in late July into August, and if you are planning to show current-year-bred birds, they should look great by early September.

References

- Grewal, B., Harvey, B., Pfister, O. 2002. *A Photographic Guide to the Birds of India Including Nepal, Sri Lanka, The Maldives, Pakistan, Bangladesh & Bhutan*. Christopher Helm, London.
- Whistler, H. 1941. *Popular Handbook of Indian Birds*. Third Edition Revised and Enlarged. Gurney and Jackson, London and Edinburgh.
- Woodcock, M. 1980. *Collins Handguide to the Birds of the Indian Sub-Continent including India, Pakistan, Bangladesh, Sri Lanka and Nepal*. Collins, London.

Surprisingly perhaps there appears to be no record of Pycnonotus leucogenys leucotis or Pycnonotus leucotis having previously been bred in Great Britain or Ireland. If you know of an earlier breeding please inform the Hon. Secretary.

BREEDING THE RED BIRD OF PARADISE AT CHESTER ZOO

by Roger Wilkinson, Wayne McLeod, Darren Langford
and Paul Morris

The Red Bird of Paradise *Paradisaea rubra* occurs only on the islands of Waigeo, Batanta, Saonek and may possibly also be found on Gemien off the north-west coast of Papua (the Indonesian governed western half of New Guinea; formerly Irian Jaya). The Red Bird of Paradise lives in lowland forest and is considered near-threatened in the wild because it has a very restricted distribution and is currently threatened by both habitat destruction and trapping (BirdLife International, 2000). Birds are trapped for their skins and from recent reports are also entering the illegal wild bird trade.

History of birds of paradise at Chester Zoo

Chester has a long history of working with birds of paradise. In May 1965 a consignment from Sir Edward Hallstrom of 29 birds of paradise of 10 different species was received at Chester Zoo. This consignment comprised of four Princess Stephanie's Astrapias *Astrapia stephaniae*, four Ribbon-tailed Astrapias *A. mayeri*, five Magnificent Birds of Paradise *Cicinnurus magnificus*, pairs of Superb Birds of Paradise *Lophorina superba*, Raggiana Birds of Paradise *P. raggiana* and Blue Birds of Paradise *P. rudolphi*, two male Carola's Parotias *Parotia carolae*, four male Lawes' Parotias *P. lawesii*, three Brown Sicklebills *Epimachus meyeri* and one Loria's Bird of Paradise *Cnemophilus loria*.

A further consignment of birds of paradise, also from Sir Edward Hallstrom, was received in December 1966. Birds then received were three Raggiana Birds of Paradise, two male Blue Birds of Paradise, pairs of Ribbon-tailed Astrapias, Lawes' Parotias, Superb Birds of Paradise and Brown Sicklebills, as well as five more Magnificent Birds of Paradise and one Carola's Parotia.

An avicultural highpoint in this period was the successful fledging of the Superb Bird of Paradise in June 1968 (Timmis, 1968, 1970). One of the female Brown Sicklebills built nests but no eggs were laid (Timmis, 1972). A male Lawes' Parotia was transferred in 1970 to Tierpark Berlin. In February 1971 four of the remaining 11 birds of the Hallstrom consignments were stolen, leaving Chester with three Lawes' Parotias and only single examples of four other species.

In 1972 Chester Zoo acquired a female Red Bird of Paradise and in 1973 received a second female Red Bird of Paradise and two Wilson's Birds of Paradise *C. respublica* from Rotterdam Zoo. One of the Wilson's Birds

of Paradise was returned to Rotterdam in 1975 in which year a male Red Bird of Paradise arrived at Chester from Rotterdam Zoo.

Whereas several of these birds had died shortly after arrival here a few survived longer. One Brown Sicklebill received in 1965 or 1966 remained in the collection until September 1973 when it was transferred to Rotterdam Zoo. By 1977 Chester Zoo no longer held any birds of paradise.

International zoo cooperation

Concerns over both the acquisition and husbandry of birds of paradise indicated that if Chester Zoo was to work again with birds of paradise then this must be as a partner with other collections in a coordinated breeding programme and that husbandry concerns first needed to be addressed.

Very few birds of paradise are kept in zoos and the *Red Bird of Paradise Studbook* and world centre for breeding this species are based at Bronx Zoo, New York. It has built a reputation for the successful and sustained propagation of several species of birds of paradise. This is because it has researched the husbandry needs in terms of diet (iron storage disease or *haemosiderosis* is known to be a problem with the Paradisaeidae), provides off-show breeding facilities dedicated to these birds and has invested in staff time and effort to work-up protocols for husbandry and rearing. It also concentrates on working with larger numbers of a few species and links this to on-site conservation support in New Guinea. It is a model to be emulated.

Preparations for receiving the Red Birds of Paradise

Preliminary discussions with Don Bruning, Chairman of Ornithology at the Bronx Zoo had established his willingness for Chester Zoo to receive captive-bred birds of paradise from New York. This was dependent on the continued successful breeding at the Bronx Zoo and on Chester Zoo's agreement to commit to work cooperatively with these birds and to provide purpose built on-show and off-show facilities.

A visit to New York in 1996 enabled Roger Wilkinson, then Curator of Birds at Chester Zoo, to see first hand the bird of paradise facilities at the Bronx Zoo. The planned demolition of Chester Zoo's old Bird House and replacement with the new Islands in Danger complex provided the opportunity to advance the possibility of featuring Red Birds of Paradise as a major exhibit in this new complex and developing the additional off-show back-up breeding area.

Discussions between Mark Pilgrim who was responsible for the new development at Chester and Kurt Hundgen who was responsible for the care of birds of paradise at the Bronx Zoo enabled the design of Chester's on-show and off-show facilities to benefit from the experience gained at the Bronx Zoo. The off-show area includes five interconnecting aviaries and



Roger Wilkinson

**Red Bird of Paradise male, September 2002, at five years of age,
still lacking red flank plumes.**



Roger Wilkinson

Female feeding one of the chicks ca. four weeks of age.



Roger Wilkinson

Chick ca. four weeks of age.



Roger Wilkinson

Two chicks together ca. four weeks of age.

has its own kitchen. The on-show facility in Islands in Danger was also designed as a breeding facility and has three adjoining areas providing the possibility of holding two males and a breeding female. Chester Zoo joined the Bird of Paradise Species Interest Committee (BOPsic) with the intention of continuing international cooperation with other members.

Arrival of Red Birds of Paradise

In May 1999, Chester Zoo received its current pair of Red Birds of Paradise on breeding loan from the Bronx Zoo. Both birds were bred there, the male in February 1998 and the female in May 1998. Wayne McLeod and Darren Langford travelled to New York where they gained experience by working with the bird staff at the Bronx Zoo before accompanying the birds of paradise on their journey to Chester. Both birds settled in well in the off-show facilities and in April 2000 were transferred to their present aviaries in the Islands in Danger exhibit complex.

Husbandry and aviary accommodation

The Islands in Danger complex was built in 1999-2000 on what had been the site of the Temperate Bird House following the demolition of the latter. This indoor exhibit was specifically designed to hold birds and reptiles from tropical islands and to include interpretation materials explaining why many of these forms are now endangered.

The site includes large display and off-show areas for Komodo Dragons *Varanus komodoensis*, a series of large aviaries housing the Red Birds of Paradise and other birds from New Guinea and a large aviary holding St Lucia Parrots *Amazona versicolor*.

The New Guinea section includes three adjoining aviaries specifically designed to hold the Red Birds of Paradise and a fourth larger mixed species aviary that accommodates a range of birds including Victoria Crowned Pigeons *Goura victoria*, White-naped Pheasant Pigeons *Otidiphaps nobilis aruensis*, Golden-heart Pigeons *Gallicolumba rufigula*, Papuan Lorikeets *Charmosyna papou* and White-collared Kingfishers *Halcyon chloris*.

The building is maintained at a minimum temperature of 20°C (68°F). The temperature in this naturally well lit area may increase in the summer months and fans can be utilised to prevent it becoming overheated. The aviaries are well planted with a range of tropical species and misters ensure that humidity is maintained for plant growth. The three aviaries for the birds of paradise reach up to 4.4m (approx. 14ft) high and together occupy an area of ca. 100sq m (approx. 1,000sq ft). Although all three areas are available for the birds of paradise, during the breeding reported below only two of these areas were occupied by them. The birds of paradise are highly intelligent and most inquisitive and we soon learnt that our planting scheme

needed to accommodate this. The beautiful flowering orchids that initially graced these aviaries proved irresistible to their attentions and the flowers were soon individually demolished petal by petal.

The pair later shared its accommodation with a pair of Green-naped Pheasant Pigeons *O. nobilis* but this arrangement was changed after the birds of paradise were found to be responsible for destroying the eggs of the ground nesting pheasant pigeons.

The Red Birds Paradise at Chester Zoo are fed a diet of fruit (chopped apple, pear, banana and whole blueberries) dusted with Zeigler's low iron bird of paradise pellets. Because of concern that birds of paradise in captivity have a propensity for being affected by iron storage disease, foods such as oranges, tomatoes and sultanas that are rich in Vitamin C are not fed to them because of concern that these may result in increased iron uptake.

Breeding of Red Bird of Paradise

Birds of paradise take many years to attain full breeding plumage and the male at Chester Zoo, which at the time of breeding was just over five years of age, had only recently acquired tail streamers and otherwise remained in immature plumage. The male and female which up until then had been living together were separated at the beginning of March 2003, as it is known that males may interfere with breeding attempts by destroying nests built by females. The female was later observed nest building after which she was allowed short daily visits April 10th-April 14th to join the male in his quarters before returning afterwards to her own breeding aviary. The female initially placed twigs on the top of a horizontal log just under 1m (approx. 3ft) from the ground, before finally choosing a wall-mounted partially open-fronted box at a height of ca. 3m (approx. 9ft 9in) above the ground. The box measured ca. 20cm long x 18cm wide x 18cm high (approx. 8in long x 7in wide x 7in high) with the front open above the 7cm (2½in) high lip. The female filled this with dry palm leaves and stripped palm fibres.

Two eggs were laid, the first on April 15th and the second two days later. Notwithstanding his lack of breeding plumage our male proved his fertility when the first chick hatched May 1st and the second chick hatched one or two days later. The female reared the chicks on a diet of insects (mainly waxworms and locusts) and fruit, being especially partial to blueberries. Both chicks fledged May 18th. Although both continued to be fed and cared for by their mother one of the two chicks was found dead on June 7th when five weeks of age. Post mortem failed to reveal a cause of death. The second chick thrived and was still being fed by its mother on July 20th. On August 3rd the youngster was seen feeding itself on blueberries. Over the incubation, nestling and fledgling periods, although in visual contact, the female and chick(s), had remained physically isolated from the breeding

male. September 21st, the doors between the female's enclosure and the male's enclosure were opened for two hours to allow supervised interaction between the male, female and youngster. The male showed much excitement on being allowed access to the female's enclosure and although initially some quarrelling between the adults was observed there was no serious aggression. The male later returned to his own enclosure and free access was again permitted the following day. With no negative interaction between the male and juvenile and it being thought that because of its large size it might be a male, it was decided to house this bird with the breeding male, leaving the female on her own in preparation for a second breeding attempt.

Discussion

Birds of paradise take many years to attain full breeding plumage and the male at Chester, which at the time of first breeding was just over five years of age and had only recently acquired tail streamers and otherwise remained in an immature plumage. The male and female which up until prior to the breeding had been living together were separated at the beginning of March 2003, as it is known that males may interfere with breeding attempts by destroying nests built by females. The female was observed nest building and then allowed short daily visits April 10th-April 14th to join the male in his quarters and returned afterwards to her own breeding aviary. She laid two eggs, the first on April 15th and the second two days later. Notwithstanding his lack of breeding plumage our male proved his fertility when the first chick hatched on May 1st and the second chick hatched one or two days later. The female reared the chicks on a diet of insects (mainly waxworm larvae and locusts) and fruit, being especially partial to blueberries. Both chicks fledged May 18th and although soon able to fly both were fed and cared for by their mother for a protracted period.

This breeding was especially significant in that it is the first time that the Red Bird of Paradise has been bred in the UK. It is also unusual and very satisfying in that the female, with no previous experience of hatching and rearing chicks, successfully fledged two young on her first breeding attempt and that one of these was reared to independence. We of course hope that this was the first of many breedings of this important and most attractive species at Chester Zoo.

Acknowledgements

The breeding of the Red Bird of Paradise was the culmination of many years of planning by staff at Chester Zoo and the fulfillment of a personal dream to work with these most charismatic birds. Thanks are especially due to Don Bruning and Kurt Hundgen of the Bronx Zoo for agreeing to and facilitating Chester Zoo's participation in the international breeding

programmes for this bird of paradise. Special credit must be given to the bird keeping staff and curatorial team at Chester for planning and providing the conditions in which this successful breeding occurred.

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COLLATED DATA ON THE BROWN TWINSPOOT *Clytospiza monteiri*

by Neville Brickell

The Brown Twinspot has the alternative name of Monteiro's Twinspot, though the latter name is rarely if ever used these days. Joachim João Monteiro (1833-1878) was a Portuguese mining engineer who collected natural history specimens in Angola from 1860-1875 (Beolens and Watkins, 2003).

Description

Length approximately 10cm-13cm (4in-5in). Adult male: head and sides of neck slate grey; nape, mantle, back and wings dark brown; rump and upper tail-coverts reddish orange; tail blackish brown. Chin and upper throat grey, with a triangular red spot in the centre of lower throat; breast, belly and remainder of underparts chestnut brown, spotted and barred with white. Eyes red-brown or dark red; eyelids pale blue. Bill black with blue base; legs and feet red-brown. Adult female: lacks red on the throat, instead the female has a whitish median stripe. Juvenile: similar to adult female but with greyish throat and warmer brown unspotted underparts; rump and upper tail-coverts pale red. Young males appear to have the grey of the head and the chestnut of the breast somewhat darker than young females according to Neff (1975), and apparently corroborated by differences in unsexed juveniles in British Museum collection. Nestling: three-day old nestlings have been recorded as having dark skin and quite profuse pale down. Their mouth markings consist of five black spots on a yellow palate, with a black band, narrowing centrally, across the flesh-coloured tongue and a black crescent inside the lower mandible. The swollen bilobed gape flanges were described as white by Neff (1975), who included good photographs of nestlings and a juvenile in his 1977 paper.

Distribution and status

South-eastern Nigeria, Cameroon, southern Chad, Central African Republic, south-west Sudan, Uganda and western Kenya, also northern and central Democratic Republic of Congo (Zaire), Congo, southern Gabon and north-west Angola. Generally uncommon but in some places locally common. In pairs or small family groups.

Habitat, feeding and general habits

Favours moist thickets, tall grass, undergrowth (lantana) and overgrown cultivation. Described as nervous and shy and therefore keeping close to

cover, but in captivity when feeding nestlings becomes quite brazen when livefood is being offered (Pinchin pers. comm.). Feeds on the ground taking mostly grass seeds, but also some cultivated millet. Also consumes insects, particularly termites, and is known to take spiders. In captivity it will take canary seed and various millets such as yellow and red manna and Japanese millet. It also takes grass seeds, mostly those of Guinea Grass *Panicum maximum*, as well as taking spray millet and soaked seed. The preferred greenfood is chickweed and it will take ant pupae, whiteworms and mound termites when it is breeding (Brickell and Konigkramer, 1997; Goodwin, 1982; Immelman et al. 1963; Neff, 1975, 1977). A successful softfood recipe prepared by Pinchin consists of equal parts of ProNutra (high protein breakfast cereal), Nestum (infant breakfast cereal), powdered soya beans and canned dog food, beef being preferred. This is fed to them daily throughout the year.

Voice

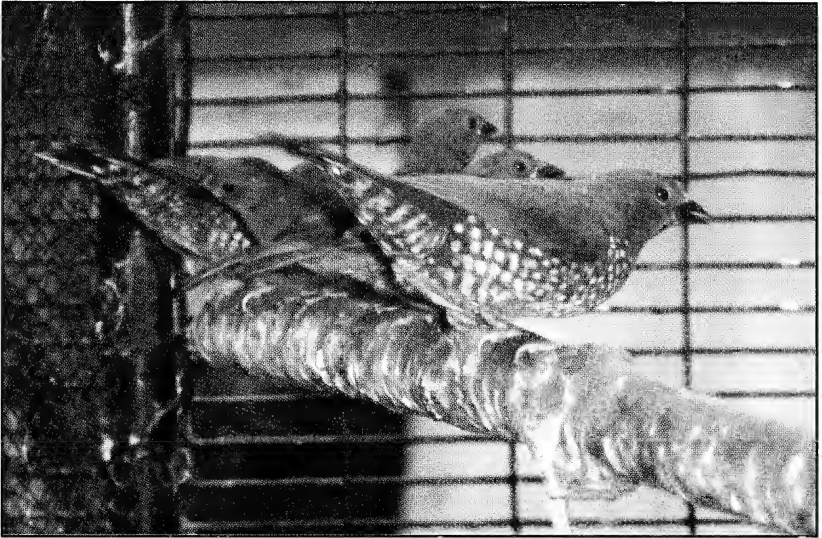
Goodwin (1982) described the close contact call as a repeated “vay, vay, vay...”, which intensified and tends to be uttered in longer series as a distance contact call. The alarm call is described as a hard sounding, *Sylvia*-like “teck” or “tack” (Clement et al. 1993). Stevenson and Fanshawe (2002) state it has an incredibly varied, long rambling song which includes mimicry, and its call is an explosive nasal and clipped “cht cht...” Harrison and Dormer (1962) thought its voice has little to commend it and is very reminiscent of the crackling of bishop birds *Euplectes* spp.

Courtship display

Harrison and Dormer (1962) described the display as in all respects identical to that of Peters’s Twinspot *Hypargos niveoguttatus*, except that the movements of the male are far more jerky and less graceful. Neff (1977) implied that, at least in some cases, display may occur without nesting material in the bill or that it may be held only at the beginning of the display.

Nesting

The Brown Twinspot has been found using the old nests of the Bronze Mannikin *Lonchura cucullata* and other species, which it relined with hair, feathers, soft vegetable material and, in all cases, some cast snake skin (Chapin, 1954). Mackworth-Praed and Grant (1973) stated it was believed to reline the old nests of various weavers but also referred to Myers’ description of nests, presumably built by the twinspots themselves, being little more than small domed grass structures in the forks of trees. Observations of captive twinspots have revealed that this species builds mostly amongst any available foliage positioned in secluded spots. Neff



Neville Brickell

Adults and young owned by George Pinchin.



Neville Brickell

Three of a clutch of four young Brown Twinspots bred by George Pinchin in South Africa.

(1975) reported that in one case a nest-box was utilised. Various materials may be used in the construction of the nest, these include broad blades of green grass and wheat, while Pinchin (1998) listed Teff Grass *Eragrostis tef* and Guinea Grass. Neff (1975) recorded the nest as being lined mostly with feathers, while Pinchin (1998) stated mattress coir was preferred. Both sexes

are involved in nest building, with the male carrying nest material and playing a greater part in the construction and the female confining herself to working on the inner chamber. The side entrance hole is screened at all times by soft grass inflorescences or a large feather.

Usually four to six eggs are laid which are incubated by both sexes. The eggs hatch after about 12-13 days and the young fledge after 18-21 days. Four successful breedings have been recorded in South Africa by George Pinchin. His pair was housed in an aviary measuring 1m wide x 3m deep x 1.8m high (approx. 3ft 3in wide x 9ft 9in deep x 5ft 10in high), with half the roof covered with clear fibre glass sheeting. Beneath the shelter roof the strongly scented Khaki Weed *Tagetes minuta* was tightly packed to provide possible nest sites.

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BREEDING SUCCESS WITH THE BROWN TWINSPOOT *Clytospiza monteiri*

by Andy Chaney

The Brown Twinspot is seldom seen in UK aviculture. When it is available it tends to be just an odd pair or a single bird that has been brought in with a consignment of other estrildids. With this in mind, I consider myself rather fortunate that early in 2002 I was offered two pairs and four odd males. The offer came from Graham Lee, a breeder of parrot finches *Erythrura* spp. and the Violet-eared Waxbill *Uraeginthus granatina*, of whom I had read about and who seemed to be having more than his fair share of success. I had kept birds for 20 years, from when I was aged 11, and was just returning to birdkeeping after an absence of five years. I wanted to specialise in estrildids but was unsure as to which species I wanted to keep. Graham was a great help to me and I probably learnt more from him in a few weeks than I had learnt in all my previous years of birdkeeping. I will always be grateful to him for the many hours he spent on the telephone passing on information which Graham modestly told me was information passed on to him by breeders on the continent (mainland Europe). Nonetheless, it is still to his credit that he took the time and effort to visit these breeders and develop his own variation of the so-called continental system.

Graham explained that he would be going into hospital and along with the Brown Twinspots, offered me three pairs of Grey-headed Olivebacks *Nesocharis capistrata* and six pairs of Violet-eared Waxbills. I made arrangements to collect the birds and on my arrival there was very impressed by Graham's set-up. An interesting feature of Graham's birdroom was that it had no windows, instead it had sections of polycarbonate sheeting in the roof. The benefits of this are twofold: not only does it allow more light into the room but it also means there is extra space along the internal walls. This idea was brought back from the continent by Graham and would be beneficial for whichever types of birds are kept.

Needless to say that on returning home with the birds I was eager to pair them up. However, I decided to give them a couple of weeks to recuperate during which they were caged individually as advised by Graham, who has noted how birds of the same sex can be aggressive towards each other. This also seemed to be the advice from the little information I could find in books.

Once the birds had settled in, the two females were paired to the two best males. They were housed in cages measuring 100cm x 50cm x 50cm (approx. 3ft 3½in x 1ft 7½in x 1ft 7½in). From Graham's experience I knew they would accept half-open-fronted nest-boxes and placed one at

each end of the cages. The nest-boxes, which were facing inwards, measured 12.5cm x 12.5cm x 12.5cm (approx. 5in x 5in x 5in), with 12mm ($\frac{1}{2}$ in) mesh on the bottom of the boxes to allow the air to circulate and prevent the nests from sweating. The boxes were half filled with clean hay and a variety of other nesting materials including coconut fibre (both the natural and white bleached types), bleached sisal and feathers were placed on the floor of the cages.

Both pairs were soon entering the nest-boxes and although they were not seen carrying nesting material, I was hopeful they would soon have eggs. However, the birds appeared to be very shy and after watching them closely during the next couple of weeks, I came to the conclusion that the nest-boxes were being used only as a retreat when I entered the birdroom. I tried placing new nesting material in the boxes and although the birds showed an interest in moving this, they made no real attempt at nesting.

I decided I would have to try something different. Since my visit to Graham I had been intending to build some bigger cages measuring 1m x 1m x 1m (approx. 3ft 3in x 3ft 3in x 3ft 3in) and that seemed to be the right time to do it. The birds were placed in the new cages at the beginning of August 2002 and by the middle of that month one pair was observed taking nesting material into a wicker nest basket. White feathers were used to line the nest and a single large white feather was used to cover the entrance hole. August 24th the first egg was produced and during the next three days a full clutch of four eggs was laid.

With the thought in my mind that so far as I was aware this twinspace had never before been bred in the UK, I decided to place the eggs under Bengalese. I did this in the hope that after the Brown Twinspots had been allowed to sit on dummy eggs for 13 days they would hopefully lay again, and thankfully this proved to be the case. Of the four eggs which were placed under Bengalese, only one was fertile and to my delight the egg hatched September 11th. The chick was very similar to a Bengalese chick, except that the white markings on the mouth were slightly larger. The chick developed well and fledged October 3rd. It was left with its foster parents until it was six weeks of age and had been seen feeding itself for a week. By the time it had started to moult, a white spot was developing on its throat, indicating that it was a female, which was just what I needed to help my future breeding plans for the Brown Twinspots.

The second pair also produced eggs and during the next couple of months, a total of seven young were reared to independence. All were reared using Bengalese and of the seven, six turned out to be females. It was rather ironic that whilst the Bengalese were rearing the twinspace, some Bengalese eggs that I had placed under the twinspace had also hatched and the chicks were approximately a week old before I noticed them. These were

successfully reared by the twinspace and will be used as foster parents.

Although in an ideal world I would like to have all my young parent-reared, I feel it is essential, at least in the short term, to breed as many of these birds as we can, so we have as large a stock as possible with which to work. Once this has been achieved then parent-rearing can be tried.

The softfood mix I use is the one advised by Graham. It consists of 5kg (approx. 11lb) plain Cédé (canary), to which I add two packets of Jordan's wheat germ (with folic acid), 500g (approx. 1lb 1oz) mixed herbs, $\frac{1}{2}$ tin Protifar (made by Neutricia, it is available from chemist shops/pharmacies, and is used to increase the protein level of the softfood) and three level teaspoons of Spirulina.

Once this basic mix has been made it can be stored in an airtight container and the appropriate amount can be taken out when required. I originally used the freshly squeezed juice of an orange to moisten it but I now use a nectar mix. Any excess nectar is then diluted and given to the birds once or twice a week in fountain drinkers. I have found that quite a few estrildids seem to appreciate nectar, though care needs to be taken as some nectar mixes can go off fairly quickly especially in hot weather. The nectar mix recipe I use was given to me by a very experienced birdkeeper, who is a fellow member of Plymouth Foreign Bird Club. It consists of one dessertspoonful of acacia blossom honey, approximately $\frac{1}{8}$ teaspoon of Marmite (yeast extract) and three or four grains of pollen, to which I add about half a cup of boiling water. It is stirred until the ingredients have dissolved and left to cool before use. Any excess is then further diluted by filling the cup with cold, boiled water and this is given in the drinkers.

On top of the moistened softfood I put frozen pinkies and buffalo worms (which have been allowed to thaw out for at least 20 minutes), giving four or five of each per pair per day. In addition the birds also receive a basic seed mixture. This consists of 50% waxbill/estrildid mix and 50% Australian finch mix, which provided them with a good variety of seeds. I used to use the Voskes mixes but due to the difficulty in obtaining these I now use Versele-Laga. I provide ad-lib in fountains, siskin mix to which I add weed seeds, both of which are available from Rob Harvey Specialist Feeds. I also offer ad-lib in separate dishes, oyster shell grit, pink pigeon minerals (powdered form) and a small amount of fonio paddy.

Unfortunately, for a variety of reasons, 2003 was not a very good year for me in the birdroom. I have now moved house and constructed a new birdroom, and having been fortunate enough to purchase another three pairs and four male Brown Twinspots, I am optimistic about my chances of success this coming breeding season.

Having also been successful with the Grey-headed Olivebacks and Violet-eared Waxbills (albeit using Bengalese), I am convinced that the secret to

the successful breeding of estrildids lies in the feeding and keeping the birds in a controlled environment, i.e. in cages in a birdroom. The trouble with keeping mixed collections in outside aviaries is that you (and the birds) are very much dependant on the British weather, in addition to which you usually find that only two or three of the dominant pairs will breed successfully. That said, there is no better way to watch your birds than in an outside aviary on a warm summer day; just do not expect breeding success on a regular basis. Obviously all birds are not the same, within the same species as well as between different species, some experimentation with diet may be needed to persuade some individuals or pairs to reproduce or, as Graham puts it, to find what "flicks the switches"! The urge to reproduce is a natural instinct and provided with the right conditions I believe that most, if not all birds, can be relied upon to act on this instinct.

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As described above, the Brown Twinspot Clytospiza monteiri, had been bred by Andy Chaney (albeit using Bengalese). This is probably the first successful breeding of this species in Great Britain or Ireland. Anyone who knows of a previous breeding is asked to inform the Hon. Secretary.

LIVING COASTS

by Paul Bouden

Living Coasts is an enormous aviary of a striking, modern design located on the quayside overlooking Torbay, the largest natural harbour in England. It is a new venture by Paignton Zoo Environmental Park, dedicated to life on the shoreline.



Living Coasts, Torquay, Devon.

The aviary is divided into sections inside and, although the birds can fly into any area if they wish, at the time of my visit (November 2003) they seemed content to remain in the area designed to meet their requirements.

The first exhibit is the Penguin Beach which houses groups of Gentoo Penguins *Pygoscelis papua* and African Penguins *Spheniscus demersus* which have access to a landscaped beach and a saltwater pool with a wave machine. Although Living Coasts had only been open for a few months the African Penguins already had chicks in their nest burrows. It was interesting to observe the behavioural differences between the two species, the African Penguins spent most of their time on the land whilst the Gentoo could be seen swimming at speed in the pool.

The second section is the Auk Cliff which consists of an artificial cliff, incorporating nesting ledges, and a deep pool, also with a wave machine. The stars of this section are the Pigeon Guillemots *Cephus columba* which, together with the Long-tailed Ducks *Clangula hyemalis*, can through huge acrylic windows be viewed swimming underwater. This presents an interesting chance to compare the different swimming styles of the two

species, the guillemots 'fly' through the water using their wings for propulsion whilst the Long-tailed Ducks use their wings only for the initial dive then use their feet to swim and steer. There are also five Tufted Puffins *Fratercula cirrhata* which are rather less active than the guillemots but will make up for this with their spectacular breeding plumage.

Visitors then move past a display of Black Rats *Rattus rattus* to the Wader Estuary where a large pool is bordered by beaches and planted areas providing suitable nest sites for the species on display, these include: Pied Avocet *Recurvirostris avosetta*, Black-necked Stilt *Himantopus mexicanus*, Common Redshank *Tringa totanus*, Ruff *Philomachus pugnax* and Black-tailed Godwit *Limosa limosa*. Wading birds form a significant ornithological group but are not often represented in avicultural collections. It was an impressive sight to see a mixed flock of up to 80 waders flying from one side of the pool to the other in response to the shrill piping alarm calls of the Redshanks. It is to be hoped that the Ruffs will demonstrate their unusual lek displays in the spring. This area was also the main hang-out for the gulls and terns, these include Inca Terns *Larosterna inca*, Common Terns *Sterna hirundo* and Red-legged Kittiwakes *Rissa brevirostris*.

The last bird exhibit is the Sea Duck Pool, which like the other exhibits, uses seawater pumped in from Torbay. The water is passed through a filter to remove large objects and debris but plankton can pass through to help create a more naturalistic environment with extra feeding opportunities as the zooplankton matures into small crabs and fish, etc. The ducks on display have adapted well to saltwater even though they were reared on freshwater. There were some fears that their salt glands might not have been able to cope but these fears were unfounded and the ducks are in superb condition. Species on display include Common Eider *Somateria mollissima*, Spectacled Eider *S. fischeri*, King Eider *S. spectabilis*, Black (Common) Scoter *Melanitta nigra*, Barrow's Goldeneye *Bucephala icelandica* and more Long-tailed Duck.

The displays are rounded off by a group of four South American Fur Seals *Arctocephalus australis*. To help visitors appreciate and understand Living Coasts there are also interactive displays and educational material. All in all it is a wonderful show of a previously neglected but fascinating area of aviculture that will provide many ideas for anyone wishing to investigate something different.

THE PRESIDENT'S GARDEN PARTY 2003

by Christopher Brack

The President's Garden Party was held on Sunday July 13th, again by kind invitation of our President Miss Ruth Ezra and Vice President Raymond Sawyer. Not being a professional aviculturist (but a mammal keeper at a German zoo), it was with some trepidation that I agreed to write this account of the garden party. Stewart Pyper rather sprung it on me, saying "You will do it won't you", just before leaving.

It was the first time Ulrike and myself had attended an Avicultural Society social event and throughout the day both of us were made to feel very comfortable and relaxed. Raymond very kindly met us at the railway station and we arrived at Chestnut Lodge at the same time as Chairman Christopher Marler and Richard his Curator.

After meeting Miss Ezra we were treated to a tour of Chestnut Lodge which was a delight. The paintings were stunning, I especially liked the study of the now extinct Pink-headed Duck in its typical erect-necked posture. Miss Ezra's father, Alfred Ezra, through his brother Sir David Ezra in Calcutta, received five of these ducks in 1925 and 10 more in 1929, several of which in 1925-1938 visitors to Foxwarren Park were privileged to see. Presented to Raymond on behalf of the society by the late Ken Lawrence (then Chairman) in 1999, a spectacular painting depicted 15 species all bred



Christopher Brack

Raymond (left) and John A. Ellis, Curator of Birds, Zoological of London.



Christopher Brack

Christopher Marler announcing the award of the society's medal to P. J. Cleeton for the first UK breeding of the House Crow.

for the first time in the UK at Chestnut Lodge. A black and white photo showed a very young David Attenborough and Raymond, with Raymond's Twelve-wired Bird of Paradise, which had just won the award for the Best Foreign exhibit at Olympia in the 1950s.

England was enjoying a heatwave at the time of our visit and out in the garden it was sweltering hot. I had never before seen so many men wearing Panama hats! A lot of the birds had taken refuge from the heat, though not a group of Red-billed Choughs, which remained active despite such hot weather. Raymond has had some of them since the 1980s. The aviaries all

looked immaculate. We watched Carmine and White-throated Bee-eaters catching mealworms in flight, tossed to them by Raymond, who pointed to John A. Ellis, Curator of Birds, Zoological Society of London, sitting on a bench watching and with a wry smile said: "He's eyeing up my bee-eaters." I later learnt that John wanted some for the Bird House at London Zoo, and was trying to persuade Raymond to part with some.

A beautiful pair of Purple-throated Fruitcrows silhouetted against the green lawn, the male with his dazzling iridescent purple throat, was a definite highlight to be savoured. I failed to see Raymond's '*johnstoni*' - his Scarlet-tufted Malachite Sunbird - which was hiding away because of the heat. The heat though did not seem to be bothering the African Pygmy Geese. The male Purple-breasted Cotinga *Cotinga cotinga* looked fantastic.

Growing in the tropical house was a fantastic Cycad, which judging by its size, must be at least 100 years old! Raymond nurtured it back to life after acquiring it in a desolate state. In the Japanese-style courtyard, surrounded by bonsai, two pools contained Koi Carp. Another of Raymond's loves I particularly wanted to see were the two Aldabran Giant Tortoises hatched at Chestnut Lodge - a European first. Unfortunately, one had died, but Roy Girdler showed me the other, which was heavy and was a real handful. Jan Louwman has since told me that a French private collector also bred this species last year.

Towards the end of the afternoon 95 members and their guests, along with the tame Stanley, Paradise or Blue Crane, gathered on the lawn to enjoy the delights of a wonderful tea. Following which, Chairman Christopher Marler announced the award of the society's medal for the first UK breeding of the House Crow *Corvus splendens* to P. J. Cleeton, which was presented to him by the President Miss Ruth Ezra. Christopher then wound up the proceedings by thanking Miss Ezra and Raymond for their warm hospitality. All too quickly the wonderful afternoon came to an end.

* * *

THE PRESIDENT'S GARDEN PARTY 2004

This year the President's Garden Party will be held on Saturday July 10th, again at Chestnut Lodge, Cobham, Surrey. You are advised to book early to avoid disappointment.

BOOK REVIEWS

BIRDS OF THE WEST INDIES

Birds of the West Indies by Herbert Raffaele, James Wiley, Orlando Garrido, Allan Keith and Janis Raffaele is a nice neat, attractive, easy-to-use 226-page paperback guide, as I discovered when after some 15 minutes I was eventually driven to using a razor blade to cut through the cling film-like cellophane it came sealed in.

The primary and laudable goal of this guide is stated to be to promote an interest in birds among the local people of the Caribbean islands. Adding that it is only when people appreciate and respect their wildlife that they come to protect it. The West Indies are taken to include all the islands of the Bahamas, Greater Antilles, Virgin Islands, Cayman Islands, Lesser Antilles, San Andrés and Providencia. Omitted are Trinidad and Tobago and other islands off the north coast of South America. Though Trinidad and Tobago appear contiguous to the Lesser Antilles, their origins, and consequently their birdlife, are entirely different.

Birds of the West Indies has 94 colour plates (not 92 as stated on the back cover and in the press release). The principal illustrators are Tracy Pedersen and Kristin Williams, supported by Cynthia Fisher, Don Radovich and Bart Rulon. There are roughly seven to eight species per plate, some have less, some have more, and the fairly brief field guide-type species accounts are on the page opposite the appropriate plate, as are small, colour-coded, distribution maps for selected species.

The 564 species covered in the guide include resident species that breed in the West Indies, North American migrants that winter there or pass through on migration and a number of introduced species, amongst them the Collared Dove, Village Weaver, Pin-tailed Whydah, Orange and Yellow-crowned Bishops, Red Avadavat, Black-rumped and Orange-cheeked Waxbills, Java Sparrow, Indian Silverbill and several mannikins. Also included are several species considered by some to be extinct, but which the authors feel might be rediscovered after having gone undetected for many years. Not included are at least 15 species of parrot said to have become extinct in the West Indies during historic time! One, the Cuban Macaw, plus a subspecies of the Hispaniolan Parakeet or Conure and of the Puerto Rican Parrot, are on the list of Extinct and Extirpated West Indian birds included in this guide, which also has lists of those Critically Endangered (which include the Puerto Rican, St Vincent and Imperial Parrots), Endangered or Threatened.

Helm Field Guides, Birds of the West Indies, is published in the UK by Christopher Helm, an imprint of A & C Black Publishers Ltd., London. Price £16.99

Malcolm Ellis

WHOSE BIRD?

If you have ever wondered who Fischer was, or Jackson, Von der Decken, Lady Amherst after whom the pheasant is named, or any of the many other people after whom birds are named, the answers are likely to be found in *Whose Bird? Men and women commemorated in the common names of birds* by Bo Beolens and Michael Watkins. "In a series of delightful vignettes we are introduced to a cast of intriguing characters: heroic adventurers, library-bound boffins, aristocratic patrons, mysterious lover, fortunate schoolboys, respectable scientists and caddish charlatans" each of whom has achieved immortality through having one or more birds named after them.

Altogether 2,246 birds according to the cover, 2,235 according to the publisher's press release, and an astonishing 1,124 individuals are included in this 400-page paperback. Even then there are some notable omissions, the authors have failed to discover the identity of Pesquet, after whom Pesquet's Parrot is named and surprisingly perhaps did not learn of Lilford's Crane until it was too late for it to be included. I was able to come up with a number of birds from my days at London Zoo, amongst them Baillon's Aracari, Heine's Hummingbird, Schrank's, Petre's and Mrs Wilson's Tanagers, which the authors missed and will include in any future edition. Daniel Shearing, who typesets the magazine and whose father was Curator for Alfred Ezra at Foxwarren Park, came up with Ezra's Sunbird *Aethopyga nipalensis ezrai*.

These like a good many of the names to be found in this book have over the years fallen into disuse while others, I suspect, were never in common usage. Nonetheless, it is a fascinating book useful for reference purposes or merely to 'dip' into from time to time and read about the travels of many of the early naturalists and explorers and others who have birds named after them. There is D'Arnaud, Duyvenbode, Fischer (Georg, Gustav and Johann), Goffin, John and Lady Gould, Hartlaub, Leadbeater and many others including Jackson, Von der Decken and Lady Amherst. Lady Ross's or Ross's Turaco I learnt is named after Lady Ann Ross (who kept one in captivity on St Helena for 10 years), the wife of Rear-Admiral Sir James Clark Ross after whom Ross's Gull, as well as the Ross Sea and the Ross Ice Shelf (but not Ross's Goose) are named. Our late President, Jean Delacour, has three birds (a fireback pheasant, a broadbill and a grebe) named after him, there was even Ellis' Sandpiper *Prosobonia ellisi*, now sadly extinct!

Whose Bird? Men and women commemorated in the common names of birds (ISBN 0-7136-6647-1) by Bo Beolens and Michael Watkins, foreword by Ben Schott, is published by Christopher Helm, an imprint of A & C Black Publishers Ltd., London. Price £17.99.

Malcolm Ellis

NEWS & VIEWS

IMPORTANT NEW ARRIVALS

Towards the end of 2003, Dr Lorenzo Crosta travelled from Loro Parque, Tenerife, to São Paulo Zoo, Brazil, to exchange Loro Parque's infertile old male Spix's Macaw *Cyanopsitta spixii* for a new male. São Paulo Zoo holds seven Spix's Macaws. Out of a choice of three possible males, the male with the most developed testes was taken back to Loro Parque to join the female bred there several years ago.

Other important new arrivals at Loro Parque included three pairs of Purple-bellied Lorries *Lorius hypoinchrous* from a Danish breeder and three young examples of the Ouvean subspecies of the Horned Parakeet *Eunymphicus cornutus uvaensis* from a German breeder. Both are said to be the only examples of their species on public exhibition in Europe.

* * *

FROM AN UNLIKELY SOURCE

Last year two Red-crested Cardinals *Paroaria coronota* were successfully fledged at Audubon Zoo, New Orleans, two Red-billed Leiothrix or Pekin Robins *Leiothrix lutea* were fledged at Houston Zoo, a further two (out of three) were fledged at North Carolina Zoo and two Red-crested Cardinals were fledged in the free-flight aviary at Detroit Zoo. What is particularly notable about these breedings is that the parents were caught the previous year in Hawaii, where these species are amongst a number of introduced species which thrive there.

In October 2002, staff from Audubon, Brookfield, Louisville, North Carolina and Toledo Zoos travelled to Hawaii to collect Red-crested Cardinals, Red-billed Leiothrix or Pekin Robins and other introduced species such as Japanese White-eyes *Zosterops japonica* and Shamas *Copsychus malabaricus*, which are recommended for zoological exhibition by the Regional Collection Plan of the AZA (American Zoo and Aquarium Association) Passerine TAG (Taxon Advisory Group). Over a period of four weeks, a total of 162 birds were collected from the wild in and around Honolulu. These were later shipped to 14 North American zoos. A great deal of experience was gained, as well as vital information that will be useful on any future collecting trips.

* * *

BEE-EATER WEBSITE

William Wilson is researching bee-eaters in captivity and is interested in obtaining information about these birds. He is currently constructing a website on the subject. It can be viewed at: www.merop.co.uk

JUNGLEFOWL BREEDING PROGRAMME

In India, Delhi Zoo is planning a breeding programme for the Red Junglefowl *Gallus gallus*, in the hope of eventually being able to reintroduce this species back into areas from which it has disappeared. Because of interbreeding with domestic fowl, the zoo will have to be especially careful to ensure that the birds it breeds from are of a pure strain. Such birds are still to be found deep in the forests well away from villages.

* * *

DO YOU KEEP BLUE-BELLIED ROLLERS?

The Blue-bellied Roller *Coracias cyanogaster* has been kept in UK collections over the past few years, with several successful breedings and then a steady decline, so that by early 2003 only a handful of birds were left. Then last autumn several Blue-bellied Rollers were imported into the UK in an attempt to establish a viable breeding group. A total of 18 birds, 5.5.8 are now held in six collections including London Zoo, Cotswold Wildlife Park, Marwell Zoological Park, Suffolk Wildlife Park, Leeds Castle and that of Ben Potterton in Norfolk. Elsewhere this West and Central African species is also maintained by breeders in the Netherlands and France and is managed in US collections by Tim Snyder at Birmingham Zoo, Alabama, who maintains a studbook of 78 birds in 19 collections.

If you currently keep Blue-bellied Rollers or have experience of keeping them, Ben Potterton, Blacksmiths Cottage, Langmere Road, Langmere, Nr. Diss, Norfolk IP21 4QA, UK, Tel:01379 740982/E-mail:Benpotterton@aol.com, would like to hear from you.

* * *

HELP NEEDED TO SAVE MADAGASCAR WETLANDS

BirdLife International is appealing urgently for donations to help save the Madagascar wetlands. The island of Madagascar probably has a higher proportion of endemic species than any other large landmass on earth. This includes about 120 endemic bird species. Nearly three-quarters of Madagascar's most threatened birds are wetland species and their habitat is being destroyed. Two of them - the Madagascar Pochard *Aythya innotata* and the Alaotra Grebe *Tachybaptus rufolavatus* - may already be extinct. The last Madagascar Pochard was found entangled in a fisherman's net in 1991 and no others have been found since. Last seen in the late 1980s, the grebe may have become extinct as a result of gillnet fishing and falling prey to an introduced carnivorous fish.

Donations can be sent to the Madagascar Appeal, BirdLife International, Wellbrook Court, Girton Road, Cambridge CB3 0NA, UK. Tel: +44(0)1223 279853/Website: www.birdlife.org

ADJUTANT AND RARE MACAW BRED IN USA

The *Wildlife Conservation Society Annual Report 2003*, records how last year the Ornithology Department at Bronx Zoo, successfully hatched and reared three Adjutant Storks *Leptoptilos dubius*, a record-setting event for a North American zoo. The success came after it was earlier discovered that these stork chicks require twice the amount of calcium as other chicks, so each fish and mouse fed to the three chicks was injected with a high-calcium formula.

Funded by New York City Department of Parks - America's Only Parrot - an exhibit housing Thick-billed Parrots *Rhynchopsitta pachyrhyncha*, is due to open this spring at the WCS's Queens Zoo. The birds will be prepared for release into the wild and used to introduce visitors to the work of WCS field scientists. Queens Zoo Director Robin Dalton and Central Park Zoo Assistant Curator Yula Kapetenakos have taken part in research projects in Mexico to study this parrot in its natural habitat.

The WCS's offsite St. Catherines Survival Center, Georgia, has the only captive group of Blue-headed Macaws *Ara couloni* in the USA, and last year celebrated the first captive breeding of this species in North America. The WCS is developing a programme with field biologists in Peru to investigate the ecological requirements of this little known macaw which lives in small, scattered groups in the western Amazon Basin, eastern Peru and north-western Bolivia.

A new bird facility at St. Catherines Survival Center, the Yoke Aviary, has 11 interconnected enclosures which currently house Vulturine Guineafowl *Acryllium vulturinum*, Crestless Fireback Pheasants *Lophura erythrophthalma* and Buff-crested Bustards *Lophotis (Eupodotis) gindiana*.

You can visit the WCS website at: www.wcs.org

* * *

MAJOR NEW THREAT TO ST VINCENT PARROT

It was reported in *Cyanopsitta* No.71, December 2003, that a proposed project to cut a road from east to west across the mountainous spine of the island of St Vincent, could pose a major new threat to the St Vincent Parrot *Amazona guildingii*. Financed by a loan and a grant from the government in Taiwan, the proposed road would open-up the central forests which until now have been difficult to access. Experience suggests that people will colonise areas opened-up by the road, causing disturbance and leading to an increase in the poaching of young parrots from their nests.

The most recent census in 2002, estimated that the present population on the island numbers 519 birds, compared to an average of 532 from the five censuses undertaken between 1988-1999. Thirty are held in captivity at the Calvin Nichols Wildlife Complex in the botanical gardens and another

29 are in private hands. At the Calvin Nichols Wildlife Complex, a pair fledged one chick in 2001, two pairs each fledged a chick in 2002 and two pairs each produced two chicks in 2003.

A number of others are held in captivity outside of the island, at least 78 of them outside of the St Vincent Parrot Conservation Consortium (SVPCC).

* * *

FLYING FREE

Five California Condors *Gymnogyps californianus*, three females and two males from San Diego Wild Animal Park, six condors from Los Angeles Zoo and one from The Peregrine Fund's World Center for Birds of Prey, Boise, Idaho, a total of six pairs, are being sent to Oregon Zoo's new California Condor Conservation Center. More than 80 California Condors are now flying free in the skies above parts of California, Arizona and Mexico, and it is hoped to reintroduce this species into the skies above Oregon, from which it has been absent for nearly 100 years. For more information you can visit: SanDiegoZoo.org/wap/condors

* * *

LONGEST-LIVED FLAMINGO

In 1962, when Lake Natron, northern Tanzania, their main East African nesting place was full of water, an estimated 1,100,000 Lesser Flamingos *Phoeniconaias minor* nested at Lake Magadi, southern Kenya. However, the legs of thousands of the chicks hatched there became encrusted with soda and a rescue had to be undertaken.

In 1997, one of the 8,000 young Lesser Flamingos ringed (banded) during the rescue was found dead in Western Sahara over 6,000km (approx. 3,800 miles) to the west, providing the first evidence of a link between the large East African population and the smaller West African population. Then on July 13th 2003, another of the rescued birds, ringed October 30th 1962, was found dead at Lake Bogoria, Kenya. Aged approximately 40 years and nine months, it is believed to be the longest-lived Lesser Flamingo ever recorded.

* * *

BREEDING STORM'S STORK

In *Zoonooz* January 2004, Michael Mace, Curator of Birds, San Diego Wild Animal Park, described how in 1995, Malaysia's Zoo Negara sent four Storm's Storks *Ciconia stormi*, thought to be two to three years of age, to the Zoological Society of San Diego. One pair is housed at San Diego Zoo and the other pair at San Diego Wild Animal Park.

It was a few years before the birds showed any interest in nest building.

Then the pair housed off-exhibit at the park's bird breeding complex started to develop deeper facial colouring, a sign that breeding could be imminent. The female laid one egg every other day until she had a clutch of four chalky white eggs. Because of the species' rarity the eggs were removed and placed in an incubator. They hatched after 29 days and the chicks were sent to the zoo's Avian Propagation Center, where keepers fed, monitored and cared for the chicks, which a few months later were transferred back to the wild animal park. Following this initial success the pair has been allowed to raise its own young. To date, seven Storm's Storks have been added to the captive population through the park's breeding programme for this Endangered stork.

Only an estimated 300 remain in the wild, most of them in Indonesia, with possibly 150 of these in Sumatra. This species is also found in Peninsular Malaysia, Kalimantan (Borneo) and possibly southern Thailand.

* * *

END OF YEAR REPORT

In 2003, Burgers' Zoo, Arnhem, the Netherlands, bred 14 Hooded Pittas *Pitta sordida*, seven Green-naped Pheasant Pigeons *Otidiphaps n. nobilis*, two European Sea Eagles *Haliaeetus albicilla*, a King Vulture *Sarcorhamphus papa*, a Eurasian Griffon Vulture *Gyps fulvus* and, for the first time, a European Black Vulture *Aegypius monachus* was successfully raised by its parents. A female Roadrunner *Geococcyx californianus* was also successfully raised by its parents. Marc Damen believes this may be the first time in Europe that Roadrunners have succeeded in rearing their own young. A Wrinkled Hornbill *Aceros corrugatus* died shortly before fledging.

Species added to the collection during 2003, included Little Bitterns *Ixobrychus minutus*, Chukar Partridges *Alectoris chukar*, Crested Tinamous *Eudromia elegans*, Greater Prairie Chickens *Tympanuchus cupido* and Guira Cuckoos *Guira guira*. The cuckoos have already reared five young.

* * *

KEN DOLTON 1925 - 2003

On December 13th 2003, I lost my dear friend Ken Dolton and the society lost a greatly valued and popular Vice President. Ken and I shared many interests - birds, tortoises, fish and plants - and a very similar sense of humour. I am devastated to have lost yet another dear friend. Ken and his wife Mo (Mona) were frequent visitors to Cobham. Also, we made three visits together to Florida, where we had the most wonderful times as guests of fellow Vice President The Rev. Ramon Noegel and Greg Moss, visited Bern Levine at Parrot Jungle, Miami, and Disney's Animal Kingdom, where although

obviously extremely busy preparing for the grand opening, Grenville Roles was outstanding and so kind entertaining us during our day there.

We also visited many zoos in Europe and the USA as part of a group which included Ken's close friend, Dominique Tropeano, owner of Colchester Zoo, who also remembers Ken's wonderful sense of humour. He remembers Ken's love, respect and understanding of animals and plants, and how knowledgeable he was about them. He also remembers how Ken would never mince his words, as far as Ken was concerned black was black and white was white. Together with his common sense and knowledge of the building industry, all these would, he believes, have made Ken an excellent zoo director.

Ken joined the Avicultural Society in 1953, he was elected to the council in 1980 and became a Vice President in 1994. The society had been invited to view his collection four times with the most recent visit being on August 31st 2002, which was his and Mo's 55th wedding anniversary. Mo always accompanied him to the society's meetings and social events.

Ken had kept birds for over 60 years. He loved his birds and was still acquiring stock up until a few weeks before he died. Ken specialised in parrots and the collection he had assembled at Parklands, ranged from Hyacinth Macaws to Budgerigars and from Leadbeater's Cockatoos to Thick-billed Parrots. Awarded the society's medal for the first breeding in the UK of the Thick-billed Parrot, Ken was proud of having built up the stocks of this species in the UK. He was also awarded the society's medal for the first UK breeding of the Yellow-naped Amazon. For his breeding of Duyvenbode's Lory, Ken received the society's Certificate of Merit, having just been beaten to the medal by Rosemary Low and Bob Grantham.

Although specialising in parrots, Ken also kept a large selection of waterfowl, including several species of swans and also kept cranes. Like myself, he had albino wallabies and tortoises, and had assembled the largest collection of tortoises in the UK. He also had a large collection of fish. A noted horticulturist as well, Ken was proud of his plants and especially proud of his orchard with all the varieties of apple tree native to Worcestershire.

Ken was very much a family man and on behalf of our President Miss Ruth Ezra, fellow officers of the society and the membership, I have extended our deepest sympathy at the sad loss to his widow, Mo, and family (who plan to maintain the collection).

Raymond Sawyer

BLUE AND GOLD MACAW RETURNS TO TRINIDAD

Almost 40 years after they were last seen in the wild there, Blue and Gold Macaws *Ara ararauna* have been returned to Trinidad's Nariva Swamp, designated a protected area under the Ramsar Convention on Wetlands in 1992. With help from the Wildlife Section of Trinidad's Forestry Division, the Centre for the Rescue of Endangered Species of Trinidad and Tobago, and Cincinnati Zoo & Botanical Garden, the first birds, a small flock of 14 wild-caught Blue and Gold Macaws from Guyana were in 1999 and 2000 reintroduced into the 15,000 acre (approx. 6,000 hectare) swamp on the east coast of the island. More than half of them have survived and to date the nine adults have produced 12 chicks.

Last December, to improve genetic diversity, zoo officials helped to release a further 20 macaws.

* * *

NEW WATERBIRD AVIARY

A new waterbird aviary measuring some 250m (approx. 820ft) in circumference x 45m (approx. 148ft) at its highest point, was built during the winter at Longleat, near Warminster, Wilts. The aviary houses 40 Chilean Flamingos *Phoenicopterus chilensis*, Sacred Ibis *Threskiornis aethiopicus*, Ringed Teal *Callonetta leucophrys*, North American Wood Duck or Carolina *Aix sponsa* and whistling ducks *Dendrocygna* spp. Unlike in most collections, the flamingos will be full-winged and there will be the possibility of seeing them flying.

Longleat, which has been successful breeding pelicans, now has 16 Pink-backed *Pelicanus rufescens* and eight Eastern White *P. onocrotalus*. It also has a solitary male Spot-billed *P. philippensis*, thought to be the only one in the UK, for which the park would like to find a mate.

* * *

CONGRATULATIONS

Members will wish to offer their hearty congratulations to President Miss Ruth Ezra and Vice President Raymond Sawyer, on their marriage on Wednesday April 14th, and offer them their very best wishes for their future happiness together.



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