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BREEDING THE BLUE-BELLIED ROLLER

by R. C. J. Sawyer

The Blue-bellied Roller *Coracias cyanogaster* is found in Africa from Senegal and The Gambia in the west to Sudan in the east. Including its forked tail, this roller is about 35cm (15in) in length. It is a very beautiful species which has the head, upper mantle and chest different shades of cream. The wings, rump and breast to the under tail-coverts are deep blue, with the under wing-coverts and the tail pale blue. The bill is greenish black and the legs and feet are olive green. The sexes look alike. There is a small but accurate illustration of this species in Mackworth-Praed and Grant's *Birds of West Central and Western Africa*, Vol. 1 (Longmans, 1973), and a large picture of it in J. M. Forshaw and W. T. Cooper's *Kingfishers and Related Birds*, Part 2, Vol. 2 (Lansdowne Editions).

This roller was mentioned in the *Avicultural Magazine* in 1920, 1925 and 1927, when there was a colour frontispiece of it from the painting by Roland Green to illustrate the article by David Seth-Smith. Unfortunately, I do not have these issues, so have been unable to refer to them. My great friend, our late President, Jean Delacour, writing in *Aviculture*, Vol. II, 1931, referred to a Blue-bellied Roller received by London Zoo which was the one mentioned in our magazine. I cannot recall having seen this species prior to being fortunate enough to secure a living example in 1993. This bird lived at first in the range of six flights for tropical birds and later was put out in the original main flight next to the Toco Toucans *Ramphastos toco*. In this flight it caught insects on the wing and was a great attraction with visitors, who admired its delightful combination of colours. When it died suddenly, I wondered if I would ever have another!

To my great delight, in 1996 I acquired two from Colin Surtees, the dealer on Tyneside. These were placed in the Cock of the Rock aviary, in which they have lived alongside birds such as African Pygmy Geese *Nettapus auritus*, Black-necked Stilts *Himantopus mexicanus*, Splendid *Lamprolornis splendidus*, Emerald *L. iris* and Amethyst Starlings *Cinnyricinclus leucogaster*, various sunbirds, Fischer's Touracos *Tauraco fischeri* and Red-

billed Oxpeckers *Buphagus erythrorhynchus*. The rollers were not surgically sexed, but I believed them to be a true pair, on account of one being slightly larger, with more blue on the belly. This has proved to be the male. They are fed an insectivorous mixture to which is added minced (ground) beef and minced ox heart plus livefood in the form of mealworms and waxworms. I am sure they would also take pinkies if they were offered them. They seldom bathe but during light showers of rain enjoy sitting with their wings outstretched. They mix well and do not trouble smaller birds.

It was in July that they nested in the right-hand shelter at the rear of the aviary. They nested in a sloping nest-box of the type provided in most of the aviaries for larger birds. No nesting material was added to the bark chippings in the bottom of the box. I believe that four white eggs were laid and incubated for approximately 18 days. Three hatched and the young fledged at 18 days. Whilst breeding the rollers consumed vast quantities of mealworms, waxworms and minced beef. The pair became very aggressive towards the keepers and dive-bombed them and made it too difficult for them to look inside the nest-box. I was very pleased that they did not attack any of the other birds in the aviary.

The proud parents would perch with their three youngsters, which were paler versions of themselves without forked tails. They soon acquired adult plumage and within six months could be distinguished from their parents only because their tails were still not fully grown. They wintered well, which is always helped if the birds roost inside at night as all five did, remaining together as a group.

In March 1999 they nested again and reared just a single chick. The 1998 birds were perhaps nervous when their parents nested. However, I decided not to separate them as some of the Coraciiformes, e.g. bee-eaters, live together in family groups, and this proved to be the case with the Blue-bellied Rollers. No aggression was shown by the parents but the group was split up when the pair nested again.

In April 1997 several Blue-bellied Rollers were imported and after studying them carefully I selected what I believed to be a true pair. This second pair was put in the waterfall aviary. Amongst their neighbours were Avocets *Recurvirostris avosetta*, sunbirds, jaçanas, Barbary Shrikes or Yellow-crowned Gonoleks *Laniarius barbarus*, Golden-breasted or Royal Starlings *Cosmopsarus regius*, White-throated Bee-eaters *Merops albigollis* and a Giant Hummingbird *Patagona gigas*. Again I was fortunate to have selected a true pair. The pair nested and hatched young only to lose them the first time. However, in 1999 this pair raised two young. I suspect that in the wild this species uses a cavity in a tree or a burrow perhaps in which to nest. As with the first pair, this pair was offered a varied diet but proved to be principally meat eaters. I also saw this pair catch insects on the wing.

This species has a sharp call which can be likened to an 'ah', sometimes uttered several times, otherwise this roller cannot be said to be very vocal. This pair is also sensible enough to roost inside at night, unlike some of the other occupants which now include a group of Pink-necked Fruit Doves *Ptilinopus porphyrea* which exhibit all the stupidity of doves by remaining outside at night and getting wet when it rains and causing me considerable heartache and worry over their well being.

In 2000 only one pair nested and raised a single youngster. This pair consists of a 1999-bred male and the female of the second pair, the male of that pair having died during the winter. It shows that this species is capable of breeding in its first season. This year I hope to establish the precise lengths of the incubation and fledging periods and perhaps measure the eggs. This species seems to adapt well to aviary life. I have heard that other collections have had it go to nest but the birds have not succeeded in raising young. The Racquet-tailed Roller *C. spatulata* has also been kept here and the Lilac-breasted *C. caudata* has been bred successfully here at Cobham. My friend and fellow member Roger Cattermole bred the Racquet-tailed Roller and was awarded the society's medal for the first breeding in Britain and Ireland. The breeding of the Blue-bellied Roller here at Cobham seems to be the first breeding of this species in the UK, and if this proves to be true it will be the 17th first breeding at Cobham.

As described above, the Blue-bellied Roller *Coracias cyanogaster*, has been bred by R. C. J. Sawyer. 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.

AN EXAMINATION OF POTENTIAL REASONS FOR VARIATION IN EGG-LAYING CYCLES OF WATTLED CRANES

by Nicole R. Bohlman

Abstract

This study was conducted to examine possible reasons for the variations in laying cycles of captive Wattled Cranes *Bugeranus carunculatus*. Egg-laying records were collected from the International Crane Foundation, North Carolina Zoological Park, Baltimore Zoo, Miami Metrozoo, Oklahoma City Zoological Park, White Oak Conservation Center and St Catherines Wildlife Survival Center. Correlation tests were run with the egg-laying data and a significant relationship was found between the location of the breeding facility with both the start and end dates of the breeding season. Strong patterns were seen when correlation tests were run against the 'number of eggs laid per season'. 'Season length' and 'number of eggs laid per season' were also strongly correlated. Finally 'number of eggs laid' positively correlated with 'latitude' and with inland sites, and negatively with coastal localities. The results indicate that captive breeding centers in the USA that are located further east have later starting dates (and later end dates) for egg-laying cycles and coastal locations as compared to inland locations also have later starting dates.

Introduction

The Wattled Crane is the largest and rarest of the six crane species that occur in Africa. The total population remained at an estimated 13,000-15,000 during the 1990s, but the trend is towards a general decline due to the loss and degradation of wetland habitats and human disturbance (Burke in Meine & Archibald, 1996). Because of this, captive propagation has become more widespread with about 218 Wattled Cranes in captivity in 1997 (Beall, 1998).

Wattled Cranes have extreme variation in laying cycles both in the wild and in captivity (Urban & Davenport, 1993; Balzano, 1988). It is important for captive breeding facilities to understand this variation for several reasons. They have been known to lay all months of the year in the wild in Malawi, South Africa, Zambia and Zimbabwe. In captivity, their egg-laying season occurs at opposite times of the year when compared with other crane species. For instance, while most cranes' breeding seasons are in spring and summer, Wattled Cranes start laying eggs in October, November and December. It is much more difficult for institutions located in temperate zones to breed in the winter, therefore, it would be beneficial to understand these laying cycles and develop better breeding techniques (S. Swengel pers. comm.).

In captivity, this species is relatively difficult to breed and fertility rates

are low compared to other crane species (Burke in Meine & Archibald, 1996). They also have the smallest clutch size of the world's cranes (Johnsgard 1983). Many of the Wattled Cranes in zoos and other institutions are older birds that have difficulty copulating because of their pinioned wings. For these reasons, artificial insemination (AI) is required. In order for AI to be worthwhile or successful there must also be some predictability in egg-laying patterns. Finding factors that stimulate captive breeding may help to understand both wild and captive Wattled Crane breeding (S. Swengel pers. comm.).

Methods

Records for this analysis were received from the International Crane Foundation, North Carolina Zoological Park, Baltimore Zoo, Miami Metrozoo, Oklahoma City Zoological Park, White Oak Conservation Center and St Catherines Wildlife Survival Center. Included in these records was the date of the first egg laid per female for every year she laid eggs, the last egg that was laid of the season, the season length and the number of eggs laid per season. These were the dependent variables run in correlation tests.

Independent variables in the correlation tests included latitude and longitude of each facility that participated in the study, total annual precipitation and season length for each crane's breeding season. Finally, each institution that participated in the study was assigned a (inland vs coastal) code of one if it was a coastal area and two if it was an inland area. North Carolina Zoological Park was counted as inland because it is far enough from the coast to mitigate most of the effects of a maritime climate. The latitude and longitude were retrieved from the Rand McNally Road Atlas, and the precipitation data was retrieved from the website for the Southern Regional Climate Center.

Data were collected for 21 female Wattled Cranes during the years from 1977-1999. There was a sample size of 96 when correlation tests involved the 'number of eggs laid per season'. With all other correlations the sample size was 112 (for 16 females x egg seasons, data on total eggs laid was not received). Statistical analyses including linear single regression and linear multiple regression were performed on dependent variables vs independent variables.

Averages from each breeding facility were taken for every variable and correlation tests were run. Included in these tests were the average monthly precipitation and temperature (taken for the 30 year period 1961-1990 from the 1998 *World Almanac and Book of Facts*) that corresponded with the average start date of egg-laying at each facility. Systat version 7.0 was used for all statistical analyses. Only tests with $P < .05$ were considered statistically significant and tests with $P < .1$ were considered nearly significant.

Results

Averages of each variable from the individual locations that data was collected from were calculated, and correlation tests were conducted. All the P-values were $>.1$, so none of them were statistically significant.

There were repeated patterns that showed a negative correlation between longitude and both the start and end dates. When 'season length' was tested with the independent variables there were no correlations that showed a $P < .1$. When 'number of eggs laid per season' was tested with the independent variables there were very strong, significant patterns. These patterns showed correlations between 'number of eggs laid per season' with 'season length', 'latitude', 'longitude' and 'inland vs. coastal' (Table 1).

There were two variables that had significant effects ($P < .05$) on the first egg laying dates. 'Longitude' was the most important variable and had a negative correlation with a P-value of .014 in the single regression. In the multiple regression (which included the variables 'latitude', 'longitude' and 'annual total precipitation') 'longitude' also had a negative correlation and a P-value of .023. In this same regression there was an overall P-value of .103, making it nearly significant. The second important variable that correlated with start date was 'inland vs. coastal'. This also had a negative correlation in the single as well as multiple regressions. There was a P-value of .022 in the single regression and in the multiple regression there was a P-value of .038 (Table 1).

'Longitude' repeatedly had a negative correlation when tested with the end date. In the single regression there was a P-value of .025. In the first multiple regression, the end date was tested with 'latitude', 'longitude', 'total annual precipitation' and 'inland vs. coastal'. 'Longitude' had a negative correlation and a P-value of .016 and 'inland vs. coastal' had a positive correlation and a P-value of .152. Since these numbers (longitude vs. inland/coastal) oppose each other, two more multiple regressions were tested. One of these included only 'latitude', 'longitude' and 'total annual precipitation', and the other included only 'latitude', 'total annual precipitation' and 'inland vs. coastal'. In the multiple regression including 'longitude', there was a negative correlation and a P-value of .029 (Table 1).

There were repeated patterns in correlation tests involving the 'number of eggs laid per season'. 'Season length' was the strongest variable having a P-value of 0.00 and a positive correlation. This P-value was the same throughout all of the regressions with 'number of eggs laid'. The overall P-value that was given in the multiple regressions was .00 for every regression. 'Latitude' was a relatively strong variable when tested with the 'number of eggs laid'. When tested in a single regression it had a positive correlation and a P-value of .078, making it nearly significant. When tested in a multiple regression with 'season length', 'longitude' and 'total annual precipitation',

'latitude' was given a P-value of .032. 'Longitude' was given a P-value of 0.00 when tested with 'season length', 'latitude', 'longitude', 'total annual precipitation' and 'inland vs. coastal'. In this same regression, 'longitude' had a positive correlation and 'inland vs. coastal' had a negative correlation and both variables had a P-value of 0.00. Because these variables have opposing effects, two more multiple regressions were conducted. These additional regressions contained 'season length', 'latitude', 'total annual precipitation' and either 'longitude' or 'inland vs. coastal' in each regression. This resulted in both variables having a positive correlation, but only the multiple regression with the 'inland vs coastal' variable was considered statistically significant because it had a P-value of 0.00. When 'inland vs. coastal' was tested in a single regression there was a P-value of .002 (Table 1).

Discussion

Start date

Results suggest that Wattled Crane breeding facilities located further east should expect their cranes to lay their first eggs later than facilities located in the west. Similarly, coastal centres that breed Wattled Cranes should expect their cranes to start laying eggs later than those inland breeding Wattled Cranes.

End date

There is a lot of evidence suggesting that facilities located farther east will have Wattled Cranes with breeding seasons that not only begin later, but will also end later than in breeding centres that are located in the west. However, there is nothing that suggests a later ending date in centres located on the coast rather than inland.

Number of eggs laid per season

This study indicates that more eggs will be laid if there is a longer breeding season. It also indicates that breeding facilities that are located in the north will yield more eggs per season than facilities in the south. There is strong evidence that also suggests that breeding facilities located inland as opposed to coastal will have Wattled Cranes that lay more eggs. The very same regression suggested that the farther east a breeding facility is located, the more likely the Wattled Cranes will lay more eggs. Because these statements are somewhat contradictory, more regressions were conducted. These regressions resulted in the former of the two statements being found to be true and significant.

Table 1. Results of regressions testing a correlation between egg-laying data of female Wattled Cranes in North American zoos and external and environmental factors with significant values in bold type.

INDEPENDENT VARIABLES	DEPENDENT VARIABLES			END DATE			SEASON LENGTH			NO. EGGS LAID		
	N	R	P	N	R	P	N	R	P	N	R	P
Single Regression												
season length		not tested			not tested			not tested			-0.683	0
latitude	112	-0.095	0.32	112	-0.042	0.658	112	0.041	0.665	96	0.181	0.078
longitude	112	-0.232	0.014	112	-0.212	0.025	112	0.008	0.929	96	0.051	0.618
annual total precip.	112	-0.007	0.945	112	-0.006	0.952	112	0.01	0.914	96	0.124	0.229
inland v. coastal	112	-0.217	0.022	112	-0.104	0.275	112	0.089	0.358	96	0.306	0.002
Multiple Regression												
season length		not tested			not tested			not tested			0.647	0
latitude	112	-0.013	0.912	112	-0.088	0.464	112	-0.065	0.597	96	-0.086	0.274
longitude	112	-0.172	0.325	112	-0.423	0.016	112	-0.223	0.211	96	-0.547	0
annual total precip.	112	0.014	0.881	112	0.014	0.879	112	0.001	0.394	96	0.088	0.168
inland v. coastal	112	-0.071	0.722	112	0.286	0.152	112	0.305	0.136	96	0.769	0
overall 'p'			0.179			0.131			0.612			0
season length		not tested			not tested			not tested			0.684	0
latitude	112	-0.038	0.697	112	0.012	0.904	112	0.041	0.68	96	0.165	0.032
longitude	112	-0.223	0.023	112	-0.216	0.029	112	-0.003	0.978	96	0.025	0.744
annual total precip.	112	-0.013	0.989	112	0.019	0.845	112	0.005	0.958	96	0.1	0.182
overall 'p'			0.103			0.169			0.979			0
season length		not tested			not tested			not tested			0.676	0
latitude	112	0.03	0.791	112	0.019	0.875	112	-0.009	0.938	96	0.045	0.582
annual total precip.	112	0.015	0.876	112	0.016	0.87	112	0.001	0.988	96	0.09	0.202
inland v. coastal	112	-0.234	0.038	112	-0.116	0.312	112	0.093	0.417	96	0.256	0
overall 'p'			0.149			0.744			0.836			0

Averages from each facility were calculated for every variable. Included in these tests were the average monthly precipitation and temperature that corresponded with the average start date of egg-laying at each facility. All of these tests had a p-value >.1 and are not significant.

Conclusion

Since the results demonstrate that location of breeding facilities of captive Wattled Cranes influence the beginning, ending and number of eggs laid per breeding season, this is valuable data for breeders of captive Wattled Cranes. While this is useful, this research could be expanded significantly. It would be beneficial to analyse precipitation (preceding the first egg of the season for Wattled Cranes) in a different way than was analysed in this study, and to include temperature in this analysis. It would also be beneficial to conduct an analysis similar to this on a larger scale that would include data taken from every region of the USA and possibly from international captive breeding facilities.

Acknowledgements

I would like to thank the facilities that participated in the study and answered my requests for Wattled Crane egg-laying data, specifically: the International Crane Foundation, St. Catherines Wildlife Survival Center, White Oak Conservation Center, Oklahoma City Zoological Park, Miami Metrozoo, Baltimore Zoo and the North Carolina Zoological Park. I am also grateful to Scott Swengel for his assistance with many facets of this project including statistical analysis and interpretation of the data, and Sara Zimorski for her proofreading skills.

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Nicole R. Bohlman undertook the above research while an Avicultural Intern at the International Crane Foundation, E-11376 Shady Lane Road, PO. Box 447, Baraboo, WI 53913-0447, USA (E-mail: cranes@savingcranes.org). Her present address is:- 234 NW 21st., Apt. 3, Corvallis, OR 97330, USA.

**NOTES ON BEHAVIOUR AND ECOLOGICAL
REQUIREMENTS OF THE ROTHSCHILD'S MYNAH**
Leucopsar rothschildi

*Dedicated to Prof. Dr Jürgen Nicolai on the occasion of his 75th
birthday*

by Walter A. Sontag Jr.

A wealth of literature has been published on this magnificent bird, especially on maintenance and breeding in captivity by aviculturists and zoo staff (e.g. Taynton & Jeggo, 1988; West & Pugh, 1986). Most aspects of its biology, however, in particular its ecology and behaviour in the field, have been dealt with rather poorly (cf. Feare & Craig, 1998). While the Rothschild's Mynah is almost extinct in its natural habitat, which has drastically shrunk, there is presently a well-established captive population including five breeding projects worldwide (those in North America and Great Britain started in 1984, in Europe and Japan in 1992, and in Indonesia in 1993) with currently c. 1,200 individuals (cf. Pagel, 1999). Despite remarkable efforts to reintroduce captive-raised individuals into the last free-living population in the Bali Barat National Park (Pagel, 1999), the re-stocking programme, has generally speaking, failed up to now. In 1999 the situation worsened, when the breeding and pre-release centre in the Bali Barat National Park was attacked twice and four and then 39 (out of 81) individuals were stolen (*Gefiederte Welt* 124:111 (2000)).

Surprisingly, the Rothschild's Mynah, which inhabits dry woodland (Pagel, 1999), is most closely related to a group of typical open habitat starlings comprising some 25 species grouped around the genera *Sturnus* and *Acridotheres*, and including *Leucopsar* (Sontag, 1992). Probably almost all of them perform open-bill probing (see Beecher, 1978 and others), and most of them are found in Asia. Feare & Craig (1998) characterize *Leucopsar* habitat as open woodland with a grass understorey, but detailed studies on space and habitat requirements are largely lacking. Since this species faces extinction in the wild and bearing in mind the purpose of future re-stocking or reintroduction, those working with this species are strongly recommended to offer captive conditions that contain environmental structures and properties characteristic or even necessary for *Leucopsar*. Therefore, I will first report on research dealing with space and habitat aspects in a spacious aviary. The focus is on the (relative) importance of various habitat levels, i.e. ground and higher strata, in an artificial environment that is as natural as possible. Almost nothing is known about potential adaptations of *Leucopsar*

to its natural habitat, e.g. the grade of dependence on living in the woodland, particularly native forest types. Although the present aviary habitat clearly did not represent the full space (strata) spectrum of the natural habitat, the available strata can be considered sufficient for preferential tests: the subjects were able to choose between a number of alternatives at different heights (viz. horizontal aviary areas). I also present notes on particularities in breeding behaviour and deal with intraspecific aggression, a big problem in captive Rothschild's Mynahs.

In order to assess specific habitat requirements, another species belonging to the same group of sturnids was chosen for comparison and kept together with Rothschild's Mynahs, i.e. exposed to the same environment.

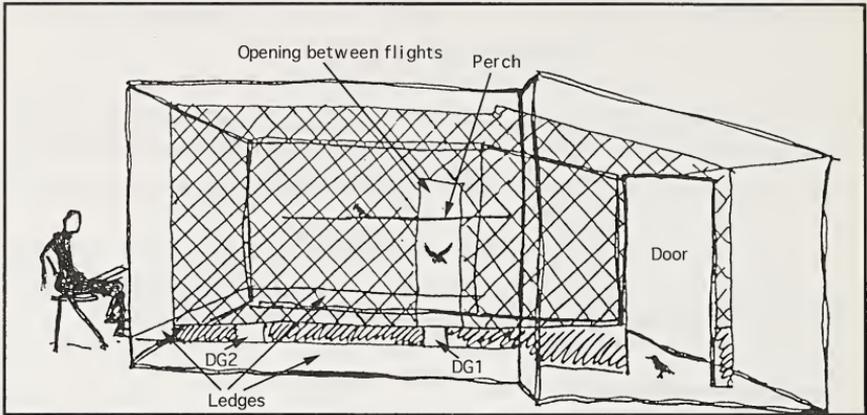
Species for comparison

The Black-collared Starling *Gracupica nigricollis* was the species chosen for comparison. Its distribution ranges from west and central Thailand across Burma and Laos, to southern China (Feare & Craig, 1998); this is geographically and climatically relatively similar to that of *Leucopsar*. Its size is comparable with *Leucopsar* (28cm vs 25cm (11in vs 9³/₄in)). I recorded the Black-collared Starling on open farmland, in wet rice-fields (see p.17), along the roads, in rural or open settlements, but also in farm plantations and trees in a grove in Thailand. I saw this species in association with other sturnids including the Asian Pied Starling *Sturnus contra*, a species that was reported to roost together with Black-winged Starlings *A. melanopterus* and Rothschild's Mynahs in Bali (Ash, 1984). Accordingly, both species under investigation would easily mix with other starlings under natural conditions and housing them together in an aviary appeared appropriate. Aviary size and the small number of individuals kept together provided good conditions for a low level of aggressive interactions. During the course of the study, severe aggression was not observed between species, although *Leucopsar* is known for showing very strong intraspecific aggression (see below).

Housing

The starlings studied were kept in a partly roofed, spacious, richly structured aviary (see p.12) situated in a wooded area at the Institute for Comparative Ethology of the Austrian Academy of Sciences in Vienna. The enclosure was provided with living vegetation and a lot of branchwork. There were ledges along the wire mesh a short distance above the ground. The aviary was subdivided into a larger (5.25m x 4.2m x 2.06m-2.51m (approx. 17ft 3in x 13ft 9in x 6ft 9in-8ft 3in)) and smaller section (5.25m x 2.1m-2.9m x 2.06m-2.51m (approx. 17ft 3in x 6ft 11in - 9ft 6in x 6ft 9in - 8ft 3in)) by wire mesh interrupted by an open door, a central fly-through opening and two small openings (each 25cm (approx. 10in) wide) at floor

Fig 1. Study aviary



DG1 = small opening 1, DG2 = small opening 2

level. The two small openings were some distance from the feeding sites in order to ensure that their use was not skewed by the food presented. Food was offered on the floor and on a shelf in the roofed part of the aviary. The structural variety provided and abundance of environmental conditions in the aviary were intended to reduce aggression.

In this aviary, once a Black-collared Starling nest was built in a branchwork site, and the Rothschild's Mynahs used the nest-box provided, hatching and rearing two offspring from a clutch of three eggs.

Individuals and groups

Three mixed species groups were studied in the following uninterrupted chronological order in 1987: Group 1 consisted of an adult pair of Rothschild's Mynahs and an adult pair of Black-collared Starlings (four individuals in total, excluding the Rothschild's Mynah hatchlings); Group 2 consisted of the same individuals supplemented by the two fledgling offspring of the Rothschild's Mynahs (six individuals in total); Group 3 consisted of the same Black-collared Starlings and the two young (subadult) Rothschild's Mynah offspring (four individuals in total).

The left foot of the old female Rothschild's Mynah was crippled. Surprisingly, this did not appear to affect breeding behaviour and even general utilization of the aviary by this individual. The clutch size of three eggs was in line with the data given and discussed in West & Pugh (1986). However, one egg did not produce a nestling. The two chicks that hatched differed markedly in size (shortly after hatching). This also fits in well with the broad-based findings from the Jersey Wildlife Preservation Trust presented by West & Pugh (*loc. cit.* on average only one young fledged). The same pair of Rothschild's Mynahs also reared two offspring from a brood the year before.

Total ground utilization and complementary aspects

In total, both species spent more time above the ground than on it. However, the Black-collared Starlings generally spent more time on the ground than both the adult and juvenile Rothschild's Mynahs. For instance, in Group 1 the Black-collared Starlings spent more than 40% of an observation-session on the ground in five of 20 sessions while the old Rothschild's Mynahs did so only once. However, remarkable variation in the interspecific ground use difference was found between the three groups, depending on the circumstances (cf. Sontag, 2001). Thus, for example, the adult Rothschild's Mynahs did not spend significantly less time on the aviary floor than the Black-collared Starlings in Group 1 (including the stage when the Rothschild's Mynahs fed their nestlings). The old Rothschild's Mynahs clearly visited the floor and the feeding sites on it to a greater extent when rearing their offspring (19.6% in Group 1 vs. 15.9% in Group 2), while the Black-collared Starlings spent an average of 28.6% of their time-budget on the ground in all groups. Shortly after fledging, the total time spent by the juvenile Rothschild's Mynahs on the ground was between the values of their parents and the interspecific cohabitants, and was not statistically different from either of them (U test). This suggests an increased level of exploratory behaviour by the young Rothschild's Mynahs at this stage.

Moving through the small openings on the aviary floor may better reflect the attractiveness of the bottom part than mere time-budgets on ground use. In fact, a large and stable interspecific difference was established: in all groups both the adult and juvenile Rothschild's Mynahs made use of these passages much less frequently than the Black-collared Starlings (Sontag in prep.), e.g. two (ad. Rothschild's Mynahs) vs. eight (juv. Rothschild's Mynahs) vs. 99 (Black-collared) in Group 2.

Both species were observed to walk on the ground. However, the Black-collared Starling's locomotion tended to be slow and deliberate, somehow resembling that of a chicken. This appears concordant with the above findings, although the frequency of ground-passage use by the Black-collared Starlings showed much variation (e.g. 0-28 times per observation-session in Group 1). This species often rested on the ground or stayed at locations c. 50cm - 70cm (approx. $19^{3/4}$ in - $27^{1/2}$ in) or c. 90cm (approx. $35^{1/2}$ in) above the floor for longer. Moreover, their stays on the ledges near the aviary floor lasted longer than those of the Rothschild's Mynahs (e.g. maximum duration 98 seconds in Black-collared vs. 20 seconds in ad. Rothschild's Mynahs, and 305 seconds in Black-collared vs. 11 seconds in juv. Rothschild's Mynahs; cf. Sontag, 1991). On the other hand, the Rothschild's Mynahs used the upper space of the aviary relatively intensely. The adult male was often observed clinging upside down on the wire of the aviary roof (which was not seen in the slightly handicapped female). This behaviour was never recorded in the Black-collared Starlings.

Table 1. Ground stay duration medians (seconds) of different chronological stages in mixed Rothschild's Mynah/Black-collared Starling groups (see text for details). Stage 1...3: breeding season of Rothschild's Mynahs up to the late nestling period (i.e. Stage 3).

Group	I			II		III
	1	2	3	4	5	6
Adult R. M.	58	56.6	43.1	72.5	83.4	-
Juvenile R. M.	-	-	-	70.5	93	65.5
Black-collared S.	258.1	458	125.5	173.5	519.7	390.5

Frequency of ground visits and cumulative ground use

As shown above, the total time spent on the ground is not the only relevant measure for ground use. Passing through the small openings may better account for the attractiveness of this habitat segment; this approach may be even more powerful when put into relation to the time spent on the ground. Another aspect, the portioning of the ground stays, may shed light on the role of this habitat component for *Leucopsar*. For instance, *Leucopsar* may on occasion take food items from the bottom level or forage in low stratum parts in its natural 'woodland habitat'. Though limited in duration, ground visits may be important for this species, and, if so, should be taken into account for captive individuals.

In fact, the average individual stays of the Rothschild's Mynahs were short compared to those of the Black-collared Starlings. This was true for both the adult and juvenile Rothschild's Mynahs in all three groups studied (cf. Sontag, 1992). Moreover, the duration of the individual ground stays of the Rothschild's Mynahs differed only slightly between the observation-stages and groups as well as between the adults and juveniles (Table 1). As the time-totals on the ground varied widely for this species, a distinct correlation should exist between visiting frequency and overall time spent on the ground. This assumption is correct: a clear correlation is documented in all groups (p.15 graphs A, B, C, D: each point represents the respective pairs of individuals, i.e., adult, young Rothschild's Mynahs, surveyed per observation-session). Conversely, the correlation between ground visit frequency and cumulative time spent on the ground was much weaker in the Black-collared Starlings: based on the limited data, in Groups 2 and 3 a definite connection was even lacking in this sturnid (Group 1: $R^2 = 0.249$, $p = 0.0295$, 19 'sessions'; Group 2: $R^2 = 0.317$, $p = 0.057$, 12 'sessions'; Group 3: $R^2 = 0.256$, $p = 0.093$, 12 'sessions'). Hence, its individual ground stays varied considerably in duration.

The present findings allow the following conclusions to be drawn: Rothschild's Mynahs (1) do use the floor habitat regularly, but (2) obviously

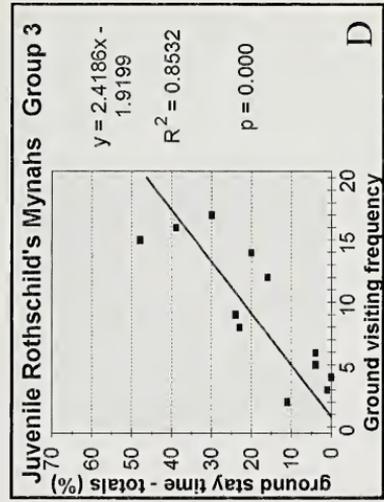
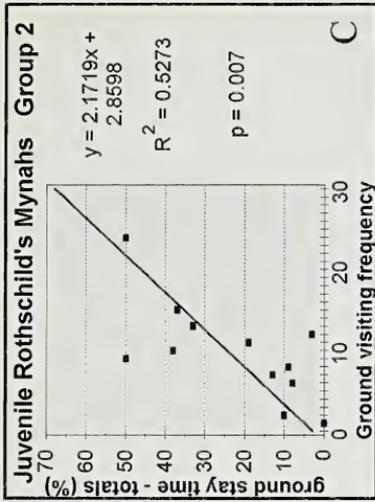
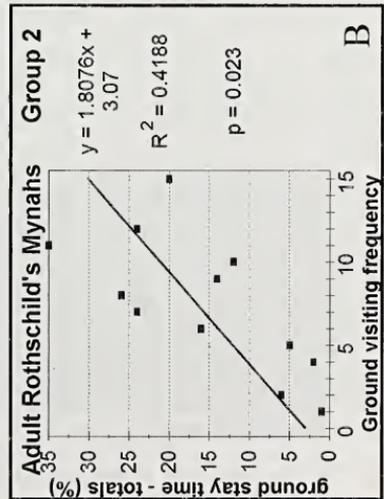
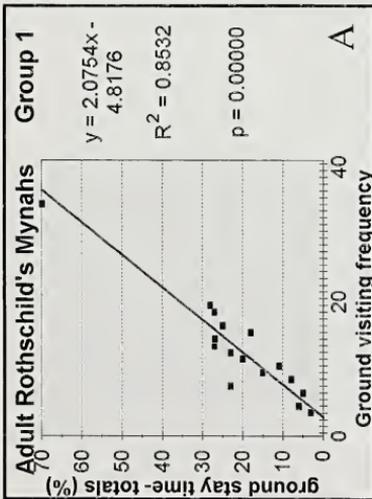


Fig. 2 Ground visit frequency and cumulative time spent on the ground in Rothschild's Mynahs kept together with Black-collared Starlings. Each point represents the respective pairs of individuals (i.e. adult or young Rothschild's Mynahs) surveyed per observation session

this is substantially dependent on the situation (e.g. care of nestlings); (3) their individual ground visits are short but relatively frequent, for instance, both the adult Rothschild's Mynahs and the Black-collared Starlings spent nearly the same amount of time on the ground in 'session 10' of Group 1 (69.4% vs. 67.6%), but the individual ground visits of the former outnumbered those of the Black-collared Starlings by far (31 vs. 5). The above conclusions would fit with the insectivorous diet of *Leucopsar*, which is known to feed on insects such as ants, termites, dragonflies, crickets and grasshoppers (de Iongh, 1983).

Based on the total time and temporal organization of ground use, *Leucopsar* should be regarded as a species that at least moderately uses the ground section of its environment. Therefore aviculturists should offer this species various, well-designed structural strata, including sufficient floor space.

Some notes on breeding behaviour and aggression

What strategies does this largely white species employ to survive in more or less open woodland? How do inexperienced young individuals behave after leaving the nest cavity? My observations on the brood of the adult Rothschild's Mynahs in Group 1 yielded crucial clues to potential specific anti-predator adaptations. As such behaviour by *Leucopsar* appears unreported in the literature, it may represent a special aberrant breeding-case. However, the 'natural-like' way of keeping the birds, the uneventful course of rearing the offspring, and the array and orderly impression of the observations suggest normal behaviour and point to potentially widespread anti-predator techniques. Judging from the limited observations, and in agreement with Marshall (1981) and Schmidt et al. (1976), the female spent more time than the male with the juveniles in the nest-box (Sontag in prep.).

The breeding took place in summer. The second chick hatched only two or three days after the first one. On the 26th day after the hatching of the first chick (i.e. the 27th day including the hatching date), one of the chicks was observed outside the nest-box for the first time; one day later both of them were seen outside the nest. Hughes & Turner (1975) gave 23.4 days as the mean nestling period based on six clutches of one pair and one clutch of another pair (variation 21-26 days). Even this mean value can be regarded as a rather long nestling period compared to other sturnids of the aforementioned complex (i.e. *Sturnus-Acridotheres sensu*) Sontag (see Feare & Craig, 1998) and might represent a strategy against predators.

Most surprisingly, after leaving the nest for the first time the juveniles regularly returned to the nest-box, i.e. they moved between the nest-box and the aviary 'habitat' up to the 31st day after the hatching of the first nestling (32nd day including hatching date). To my knowledge, no such



Photo Walter A. Sontag Jr

A Black-collared Starling with three Common Mynahs *Acridotheres tristis* (arrowed) in the Bang Pra area (Sri Racha, S.E. Thailand) in December 1988

Note: on the complete negative two Black-collared Starlings, three Common Mynahs, one White-vented Mynah *Acridotheres javanicus sensu* (Lekagul & Round, 1991) and an indetermined mynah *Acridotheres* sp. can be distinguished.



Photo Walter A. Sontag Jr

Four Black-collared Starlings in a wet rice-field habitat (Bang Pra area, S.E. Thailand) in December 1988

behaviour has been mentioned in the *Leucopsar* literature. On the 32nd day after the hatching of the first chick (the 33rd day including the hatching date), nest return by the offspring was recorded only in the evening. As Rothschild's Mynahs are conspicuous because of their largely white plumage and juveniles additionally are less experienced, juvenile nest return may be considered as a specific adaptation for predator avoidance. Moreover, fledglings were fed in silence outside the nest-box and apparently begged for food with open bill and raised wings in a silent manner, both of which support the predator avoidance hypothesis.

Morphologically, a dark tinge on the white wing area of juvenile/subadult Rothschild's Mynahs (pers. obs.) may also have a certain protective function against visually orientated predators. In the tropics, white plumage may withstand selective pressure in forest better than in other habitats, and the above mentioned traits may support the plumage's adaptive function. H. Winkler (pers. comm.) stresses that the occurrence of birds with white plumage is more likely in the canopy than in the lower stratum. The findings on ground use (i.e. restricted overall time and activity spent on the ground, short - though frequent - ground stays) appear to be consistent with this explanation.

Aggression is a big problem with captive Rothschild's Mynahs (e.g. Pagel, 1990; Schmidt et al. 1976; pers. obs.), both between adult individuals and against offspring. For example, the female of the pair living in a big, richly planted aviary at Vienna Zoo was found drowned recently probably as a result of aggression by the male (D. Schratter pers. comm.). My own experiences strongly suggest (Sontag, 1996) that the removal of the nest-box diminishes and/or puts off aggressive actions of adult individuals. In order to be on the safe side, this measure was chosen with Group 2, when it was certain that the young Rothschild's Mynahs were no longer returning to the nest-box. It may provide a certain time-gain in protecting the progeny from fatal injuries. Moreover, as long as social contact is maintained, the possibility of learning from adult conspecifics (supposedly of great importance for this sturnid with respect to song-learning and social behaviour) remains. Nonetheless, the adult pair was finally removed from Group 2 because the aggressive potential could not be judged reliably.

A means to lower or control Rothschild's Mynah aggression in the aviary is apparently the combination of (a) sufficient overall space; (b) subdivision of the enclosure into compartments with a number of connecting (closable) openings; (c) the availability of numerous different structural elements at various heights; and (d) the provision of vegetation which provides sight-protection and cover. Moreover, (e) various feeding sites have to be provided well apart from each other and away from the shallow basin for bathing in. After negative experiences with Rothschild's Mynahs in traditional cages and aviaries at the Institute for Comparative Ethology (J. Sieber pers. comm.),

the aviary used in the above study was installed to incorporate the housing conditions outlined above, and in fact no fatal aggression occurred.

Summary

Some aspects of space use by Rothschild's Mynahs were studied. For this purpose Rothschild's Mynahs were compared with another south Asian sturnid, the related Black-collared Starling, with the birds being kept together in different groups under captive conditions. The spacious aviary consisted of two sections connected by various openings. Despite much variation in the overall ground stay time (between observation sessions) the Rothschild's Mynahs generally spend less time on the ground than the other species with which they were compared. Much more strikingly, however, the small openings on the ground (connecting the aviary sections) were passed through far fewer times by the Rothschild's Mynahs, indicating that this species uses the floor less than other starling species. Also, the individual ground stays of both adult and juvenile Rothschild's Mynahs were clearly shorter than those of the Black-collared Starlings. Contrasting with the latter, in all observation groups the ground visit frequency and overall time spent on the ground were clearly correlated positively in (both adult and juvenile) Rothschild's Mynahs: i.e. the more visits, the more total time on the ground. This experimental study clearly supports the assumption that Rothschild's Mynahs are, to a high degree, adapted to living in woodlands or forests. Nevertheless, the findings show that Rothschild's Mynahs use the floor habitat regularly, although this is strongly influenced by the situation (Sontag, 2001). Their individual ground stays are short but frequent.

Some remarkable observations on breeding behaviour are also presented. Surprisingly, after leaving the nest for the first time the juvenile Rothschild's Mynahs of Group 2 regularly returned to the nest-box. Silent feeding outside the nest-box is reported. In addition, strategies to avoid aggressive behaviour under captive conditions are discussed.

Acknowledgements

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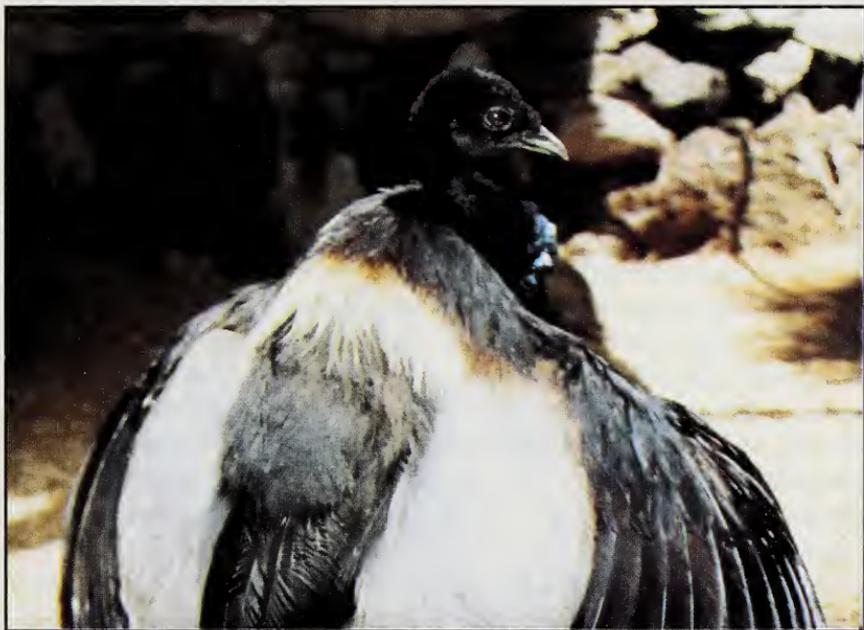
Dr Walter A. Sontag Jr is a zoologist living in Vienna. He has studied the biology of the sturnids (starlings) for more than 25 years, working in part co-operation with the Konrad Lorenz Institute for Comparative Ethology in Vienna. He can be contacted at:- Trubelgasse 19/24, A-1030 Vienna, Austria. E-mail: seidel@pflaphy.pph.univie.ac.at

BREEDING THE GREY-WINGED TRUMPETER

Psophia crepitans

by Rosemary Low

The Grey-winged Trumpeter *Psophia crepitans* is a curiously named bird. Both parts of its scientific name refer to the deep, ventriloquial booming sound which it makes. It belongs to the order Gruiformes, a group which contains a seemingly odd assortment of birds: cranes, rails, the Limpkin *Aramus guarauna*, Sunbittern *Eurypyga helias*, seriemas, bustards and the fascinating Kagu *Rhynochetos jubatus* of New Caledonia. The main factor which they have in common is that they are primarily ground-living birds, some of which have lost the habit of flying.



Rosemary Low

Adult sunbathing. The sexes look alike

There are three species of trumpeters. The Grey-winged is the best known in aviculture. The Green-winged *P. viridis* and the White-winged *P. leucoptera* are rare in captivity. They originate in the Amazon region with the species having long been separated by the great rivers, the Amazon and the Madeira. The Grey-winged inhabits an area north of the Amazon and the Rio Negro in Brazil, Venezuela, the Guianas, Colombia and Peru.

Trumpeters are readily recognisable by their small heads and hunched bodies perched on pale green long legs. They have glossy, velvety black bodies. Some of the feathers on the front of the neck have a broad band of purple/green iridescence. The wing colour varies according to the species. They weigh in the region of 1.1kg (2lbs 6ozs).

These birds are known mainly as attractive zoo exhibits. Few private aviculturists keep them. Trumpeters can become extraordinarily tame and enjoy having their heads and necks scratched. They are inquisitive and seem to enjoy interacting with people, thus they make excellent zoo birds. They can even be allowed to roam free in suitable locations. However, this can be fraught with danger as their lack of fear may result in them being involved in accidents. Zoos have had limited success breeding trumpeters. They can be quite aggressive birds. If more than one adult male is kept together the subordinate bird may be attacked. The best combination seems to be two females and one male. They can also be aggressive towards much larger birds.

In the wild trumpeters live in groups of up to six individuals. They are said to nest in spacious tree hollows. Although they spend much of their time on the ground, they will jump or fly up into trees when alarmed. Nesting on the ground would make the eggs and chicks too vulnerable to predators. However, in captivity they may nest low down, even if a nest-box is available. The clutch usually consists of three white eggs, laid at intervals of two days. They are incubated by the male and female for 27-28 days.

If more than one chick hatches, sibling aggression might be apparent at a very early age. One zoo overcame this problem by presenting one of the two chicks to two males in another enclosure, which reared it as effectively as a true pair would have done. This was probably because they live in social groups in the wild, even when breeding, and adults other than the parents might at times be allowed to look after the young. An alternative to fostering, when the two chicks are small, is to place one on each side of a low fence over which the adults can hop with ease.

When I was Curator of the breeding centre at Palmitos Park, Gran Canaria, I had the opportunity to get to know trumpeters quite well. The adult birds were in the park, at least one at liberty and a trio in an aviary. They were always alert and active except when engaged in one of their favourite pursuits - sun-bathing. Then they could be seen resting with their wings fully outstretched, revealing the large grey area shown in my photo (p. 21).

Young were never reared in the park. Perhaps the close proximity of the public was a disturbing influence when they were incubating. Therefore, the eggs were placed in an incubator in the breeding centre. I discovered that the humidity needs to be kept high or chicks will die just prior to hatching. When the chicks emerged from the eggs (with eyes open and ready to run,

as with all precocial species), I placed them in a brooder in a small paper-lined box to dry for a few hours. When they were dry and strong enough to run about, I would give them a drink of water by holding their beaks in a small shallow container, usually the lid of a coffee jar. They soon learned to drink from this. Their yolk sac nourishes them until then.

The chicks have thick down and do not seem to require a lot of heat after the first few days (the temperature of the room in which they were kept was usually about 27°C (80.6°F)). They are mottled grey, brown and black, with the neck black. The beak is also black and the legs are grey. One newly hatched chick in my care weighed 48g on the day of hatching. Two at the National Zoo in Washington, USA, weighed 41g and 43g on the second day.

As soon as the chicks were up and running I started to feed them, although their parents do not perhaps feed them until the day after hatching. On day one the chicks would feed on small mealworms, small crickets, papaya and egg yolk taken from forceps. I would offer food about every 45 minutes during the day; they were not fed at night. By day four, feeds were given every hour. There was less interest in egg yolk and papaya and more interest in live insects.

In the brooder was a dish containing hard-boiled egg, ripe banana, grapes and papaya, all finely chopped. Also there was a homemade rearing food, consisting of wholegrain bread, raw carrot, hard-boiled egg and low fat cheese finely mixed to a crumbly consistency in a food mixer.

Initially food is pecked from one's fingers or taken from the forceps. After about four days though chicks will pick up food dropped in front of them. From the age of about two days they become wildly excited when offered livefood or meat. Cooked chicken liver or raw minced liver was relished. They pecked furiously at these foods, as so they could not devour them quickly enough.

The first chick I reared was offered freshly killed mice chopped into large pieces. It became wildly excited at the sight of mouse on the menu. The young trumpeters were also known to eat slugs and freshly dead geckos - these lovely little creatures were never killed intentionally but sometimes died if accidentally trapped in a door or window or if caught by my dog. The young trumpeters were even known to eat cockroaches. Fortunately but strangely, the reaction to a piece of cuttlefish bone held in a hand was also one of excitement and vicious pecking. This was good because although a calcium supplement was sprinkled on the food, one could observe this source of calcium being consumed.

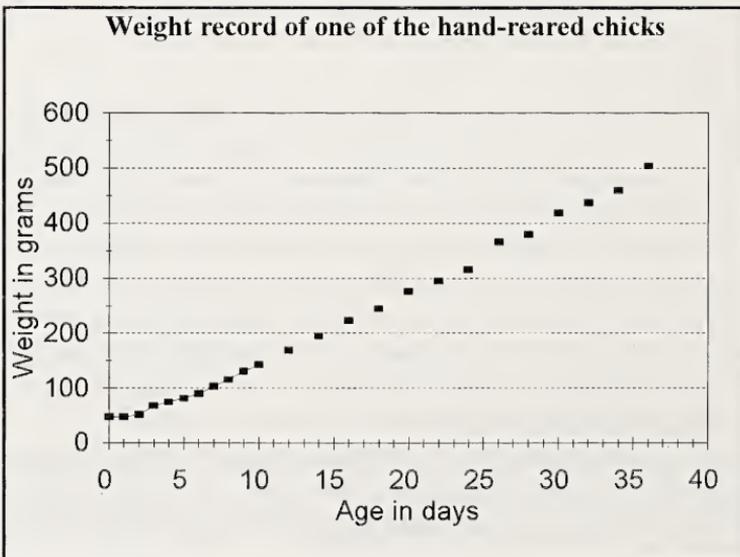
The young trumpeter, whose weights are shown on p.24, hatched in February 1994. On the morning after it hatched it was lethargic, lying down and refusing to feed. I have no doubt this was because it became overheated



Newly hatched chick weighing 45g

Rosemary Low

during the night. By the afternoon it was active, vocal and feeding well, taking crickets, papaya and egg yolk from a pair of forceps. On the sixth day it was removed from the brooder to the floor, with a red lamp. By the following day it was making a loud '*chirruping*' call. It ate a small quantity of banana but 95% of its food consisted of insects: crickets, mealworms and a large earthworm. On the 10th day the heat was discontinued during the day. In the rearing room the temperature was 25°C (77°F).





Rosemary Low

Eight days old and weighing 116g



Rosemary Low

Aged about three weeks

By the 13th day, when it was also eating eggfood and finely chopped soaked figs, it would clean its beak vigorously on a towel after eating fruit. By the next day it would pick up food dropped in front of it but ate very little when I was not present. On the 15th day it '*chirped*' loudly with excitement at the sight of crickets. A few days later chopped mice were greeted with the same enthusiasm. The first flight feathers were erupting and were about 50mm (2in) long. On the 20th day black contour feathers were apparent through the down. On the 22nd day it was starting to hold the wings open, like an adult. At this stage livefood was in short supply but chicken liver and hard-boiled egg yolks were readily accepted. Eggshells were taken with great enthusiasm. A potential problem in rearing young trumpeters is their readiness to sample anything that might or might not be edible. One chick puzzled me because blood was seen in its faeces on three occasions over a period of four days. On the fourth day I discovered the reason when I saw it pecking at the screen door and apparently swallowing small pieces of wire. The problem was solved by covering the lower part of the door.

By the age of about 25 days the soft grey plumes on the wings clearly indicate the identity of the species. The overall appearance is otherwise black. By the age of five months, young trumpeters look very like adults, even having iridescent feathers on the neck. The only feature which distinguishes them as being young birds is the leg colour which is pale but not yet greenish. At this age they also vocalise like adults.

Hand-rearing trumpeters is quite time consuming, especially during the early stages. If it is carried out only to avoid sibling aggression, a better option would be to separate the parents and let each rear one chick or, as mentioned earlier, foster them to other trumpeters. If hand-rearing is carried out because the parents fail to incubate and rear them, consideration should be given to moving them to a larger enclosure with a nesting area which is screened from public view.

BREEDING THE MALI OR KULIKORO FIREFINCH

Lagonosticta virata

by Ian Hinze

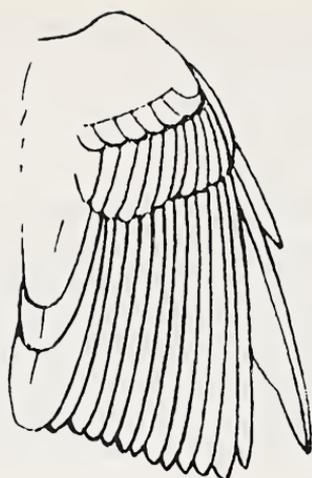
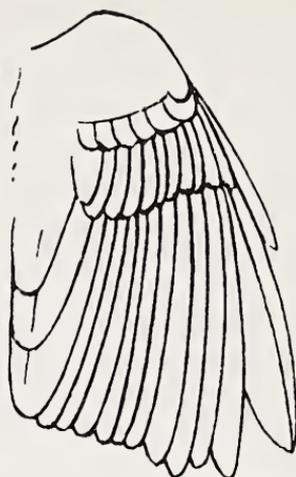
The e-mail message of July 16th 2000 read: 'Clive Barlow has found some Mali Firefinches *Lagonosticta virata* in the UK and suggests you would like to breed them. Clive plans to return to Gambia next month and has no way to keep birds in the UK on a long term basis. A dealer has them and Clive has examined them; we are working on the vocabulary and Clive has an edited tape of their songs and calls which he can let you have. We have tapes of an indigobird that mimics the calls and songs and would like to get begging calls of the firefinch chick to compare with those of the male indigobird.'

The message had come from Prof. Robert Payne of the University of Michigan and the Clive Barlow in question was none other than the co-author of *Birds of The Gambia and Senegal*. At the time I was making sound recordings of Dybowski's Twinspot *Euschistospiza dybowskii* nestlings for Prof. Payne, undoubtedly the world's leading authority on indigobirds and their parasitisation and mimicry of estrildid finches.

Clive Barlow was in England for a month to visit his mother and record the songs and calls of birds in dealers' establishments up and down the country. While visiting one such dealer in Swindon he came upon a cageful of African or Blue-billed Firefinches *L. rubricata* - and was more than a little interested to spot a number of Mali Firefinches amongst them. The male African Firefinch of the race *L. r. polionota* is almost identical to the Mali Firefinch, but the two can be separated beyond any doubt by comparing the outer primaries of the wings. The second outermost primary of *L. r. polionota* is emarginated or blade-like while that of *L. virata* is broad. The proprietor, Neil Eatwell, allowed Clive to separate the Mali Firefinches, seven altogether, and these were placed in a cage of their own.

Knowing how rare this species is in captivity, and knowing of my success with a number of waxbill species and the work I was doing for Prof. Payne, Clive suggested that I be contacted to prevent the birds being dispersed and in order for research to be carried out. Fortunately, I have known the Eatwell family for about 15 years and so Neil needed little persuasion.

So it was that I drove to Swindon from Manchester, and arrived back home with seven of the rarest firefinches available to aviculturists and a sackful of Verse Laga Prestige tropical finch seed, which consists of very small millet on which the birds were being fed. At the time I acquired these Mali Firefinches there were less than 10 skins of this species in all of the world's museums - five of these at Tring. I knew I could not afford to waste

*L. rubricata**L. virata*

After Robin Restall

such a golden opportunity - an opportunity that might never occur again!

The Mali Firefinch, known also as the Kulikoro Firefinch, is endemic to Mali. Prof. Payne (pers. comm.) states that it is found in the west of the country, 15°N on Mts Mandingues (Kita, Boucle de Baoulé), Bamako, Kulikoro and Fiko near the Bandiagara Escarpment. Reports of the African Firefinch in southern Mali may, in fact, be *L. virata* and it is thought it may occur also in south-east Senegal and northern Guinea. In September 2000, when the Mali Firefinch was breeding, Prof Payne did field work in Mali and recorded the daytime temperature at 32°C (90°F) and the night-time temperature at 26°C (80°F). He also informed me that the temperature is much hotter in December. The temperature in my birdroom, which is heated by electric tubular heaters during the day averages 23°C (74°F) and at night 15°C (60°F).

Description

The Mali Firefinch is about 10cm (4in) in length and the sexes differ slightly: the crown is brownish grey, the back and wings are grey brown, the outer primaries are broad and not emarginated, the rump is deep scarlet and the tail is black with the outer margins of the feathers red. The lores are scarlet, the cheeks and underparts from the throat to the belly are, in the male, deep strawberry red and, in the female, pinkish red; the sides of the breast and upper flanks have some very small dull white spots, the centre of the belly is grey, the lower belly and under tail-coverts are black and the thighs are dark grey. The upper mandible is blackish and most of the lower mandible is light blue. The eyes are dark brown and the eye-ring is pink

but, from a short distance away, may appear to be light yellow in some individuals (a trick of the light perhaps? : see also plate 43 of *Finches and sparrows* (Clement et al. 1993)). The legs and feet are bluish grey.

The juvenile is grey with, compared to the adults, duller red on the rump and tail. One to two day old nestlings have dark grey to black skin, a little whitish down on the crown of the head, a black bill and greyish-white gape flanges. The mouth markings consist of five black lines on a slightly pink and greyish palate.

In the field the Mali Firefinch appears as a very small bird with red and dark greyish plumage. It can be distinguished from the Red-billed Firefinch *L. senegala*, the only sympatric firefinch, through both *L. senegala* sexes having red bills and the *L. senegala* female and juvenile having predominantly light brown plumage (Goodwin, 1982).

Status

Prof. Payne (pers. comm.) found *L. virata* to be the most common species in the area in which he was conducting studies, which was a scrubby area of about 40sq miles (100sq km). Because of the difficulty of getting around the region one cannot say for sure how many other sites are as good or what is the size of the global population. In the study area it is estimated there are about 40 pairs per square mile (per 2.58sq km), and because comparable habitat is widespread Prof. Payne believes there could be at least 100,000 individuals of this species in Mali. It is also suspected that, based on satellite photographs that show similar habitat and topography, a comparable large number may be found in eastern Senegal.

The species is not considered to be endangered or threatened, as it occurs over a wide area and is common within that area. About 100 were spotted at two bird dealers, and Clive Barlow had managed to acquire about 50 from another dealer in Senegal only 12 months earlier and took them back to his home in The Gambia. Both sites apparently export a lot but the birds are mislabelled as *L. rubricata* and to compound matters, Senegal also exports the real *L. rubricata*.

Voice

Goodwin (1982) reported that the alarm call is a rattling trill, like that of Jameson's Firefinch *L. rhodopareia* but louder, deeper-pitched and harsher, and sometimes with a suggestion of a 'ch' sound 'welling up' in the middle of a trill, i.e. 'chrrrrrrrr; choorrrrrr; choorrrr; (ch)rrrrrrr(ch)rrrr-rrrr' and variants. Harrison (in Goodwin, 1982) noted that the pitch of his males became higher with the intensity of the calling. Burkard (in Goodwin, 1982) described the alarm call of his pair as a sparrow-like 'tshek' repeated at short intervals.

The contact calls of both sexes are subject to much minor variation,

such as 'kyew, kyah, kew, ztew' (pers. obs.) and can be low-pitched, nasal, slightly harsh and harsh. One of Goodwin's (1982) captive females uttered a long, plaintive 'feeeeeeeeeeeee' and, less frequently, a two-syllabled 'feeee-eeee' as distance contact calls, both of which I have heard uttered from my own females, as well as just a short 'feeee' in reply to the call of a solitary male and which were very similar to the homologous calls of the female *L. rubricata*. Harrison (in Goodwin, 1982) described the nest call of the male as a faint, persistent, clucking note. Goodwin (1982) also heard a soft 'chew' or 'teu' that resembled that of a male Jameson's Firefinch he had observed and which was uttered in similar threat or defiance contexts.

Harrison (in Goodwin, 1982) reported two differing songs from two different males - one 'a long drawn toneless trill' and the other a melodious, high-pitched song of short, loud phrases that were frequently repeated. I have noticed variation in the songs of different males, one emitting sounds not unlike the familiar tinklings of our native Robin *Erithacus rubecula*. A transliteration of the song of the breeding male under review given on occasion would be a fast 'pertipper-tipper-tipper-tip-teeu-teeu-teeu-teeu' or similar. The song appears only to be given with any regularity, when the male is on its own. Paired-up males very rarely sing. A second male in the company of a female gave a long 'tchrrrrrrrr' call which was answered with a short 'tchtrr' from a solitary male. On other occasions a solitary male gave more melodious 'pseup-pseup-pseup' calls.

Habitat, general behaviour and feeding

It is found in rocky sandstone areas with bushes, scrub and grass, and in most habits it is reported to be very similar to other firefinches, particularly Jameson's and the African Firefinch to which it is closely related (Clement et al. 1993; Goodwin, 1982). It feeds on grass seeds and most likely small insects, especially termites (Barlow pers. comm.). My captive birds also love to chew growing grass and the leaves of plants. Compost, in which I breed whiteworm, was rummaged through with the bill and regularly flicked away to get at any hidden worms. Often, birds would take a small clump of the compost in their bills and hastily carry it behind cover. Here they would rummage through it and extricate any worms. I have only yet seen one pair (the breeding pair) perform this behaviour, but it could well be typical of the species in the wild in its pursuit of insects.

Courtship display

The majority of times I observed the courtship display it started with the male flying up to a perch with a piece of dried grass or coconut fibre carried by one end in his bill. The male would then stretch his body almost upright and begin to bob up and down. I never once heard him sing during this display, after which he would jump to the ground and repeat the process

there under cover. The female, if receptive, would squat down and vibrate her tail. Copulation would then take place. Less frequently, I have also observed copulation, which I have timed at taking 16-20 seconds, take place on a perch and, more recently, once on the edge of a water dish. In the main, however, no display at all is given prior to copulation. The male merely follows the female around uttering a regular soft 'tu-tu-tu-tu-tu' call. The female, after allowing a short chase, generally squats down and copulation follows immediately. On one occasion a female performed the courtship display to the male, complete with nesting symbol in her bill, but without copulation following.

Nesting and captive observations

There is no information on the wild nest. My successful breeding pair used an old nest which had been constructed out of hay and coconut fibres by a male Black-faced or Vinaceous Firefinch *L. larvata vinacea*. It was a small globular affair with a side entrance, which I placed on top of the base of an old nest of the Dybowski's Twinspots that had been built in a Boston Fern. I placed the Boston Fern, complete with the twinspot's nest, in the Mali Firefinches' cage before adding the old nest built by the male Black-faced or Vinaceous Firefinch. The male Mali Firefinch merely lined this with short pieces of torn newspaper, which it had obtained by tearing strips from that lining the cage floor, and any feathers it could find.

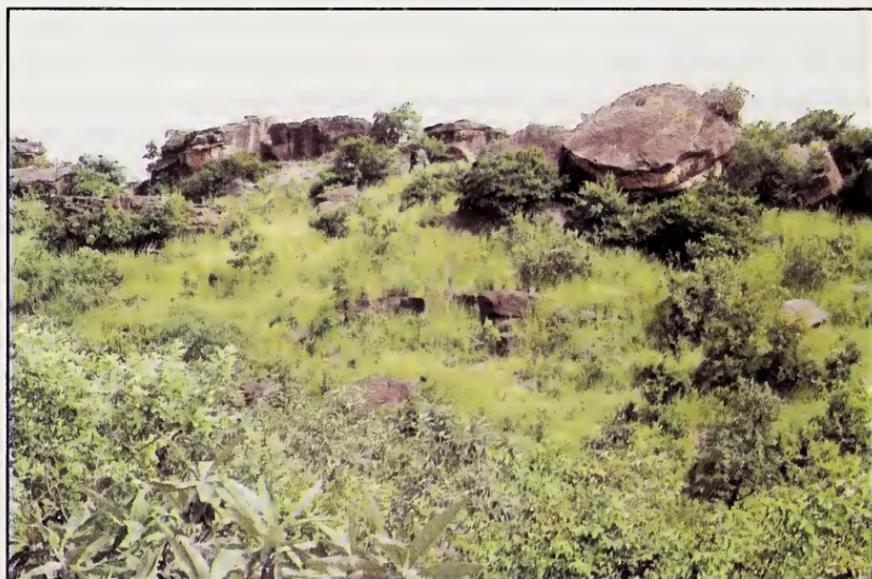
The female laid an egg on consecutive days until the clutch, which numbered three eggs, was complete (it is believed clutches usually number three to four eggs in the wild). Incubation did not begin until the last egg was laid, whereupon the male and female shared the responsibility for 10-11 days (it is believed incubation averages 11-13 days in the wild), whereafter two nestlings hatched. These were brooded by both parents but, sadly, six days after hatching one of the nestlings was found dead on the cage floor. During the brooding of the remaining nestling the parents copulated daily and the female proceeded to lay a further four eggs - her second clutch - alongside the nestling. After fearing for the well-being of the nestling, offering prayers to Jehovah and more than a week of sleepless nights, on entering the birdroom for the second time on the morning of November 14th, I was overjoyed to find a tiny, grey-looking, fledgling sitting contentedly on the cage floor. It was 19-20 days old.

All my own-designed wooden cages are approximately 4ft long x 2ft sq (approx. 1.2m long x 61cm sq). Instead of solid roofs, I use all-wire ones. The reason for this is to enable me to place 3ft (91.5cm) long Arcadia bird lamps (specially designed full spectrum fluorescents) over each cage to guarantee a minimum of 15 hours 'natural' sunlight per day. Under this lighting the natural colours of birds are enhanced, and in the case of the



R. B. Payne

Mali Firefinch captured in the field



R. B. Payne

Rocky habitat of the Mali Firefinch in Tienfala, Mali

fledgling Mali Firefinch its all grey plumage actually contained a very slight suffusion of earth brown or rusty red. The base of the stubby tail was a clearly noticeable rusty red, with the remainder being grey. The legs and feet were grey, the bill black and there was a tuft of greyish-white down still remaining on the crown, which was otherwise covered in tiny pin feathers. The gape marks were creamy white with four papillae, two on each side with one on the top and one on the bottom. They were not directly in line, i.e. one on top of the other, but at more of a 45° angle to each other, the bottom one being more forward than the top. The papillae looked strobe blue with a tiny white dot in the middle. In the corner of the mouth there was also a small rusty brown tubercle.

At 25-26 days of age the youngster was getting about the cage with ease and starting to pick up seeds primarily from the cage floor, although its father also continued to feed it. From the day of its fledging I never once saw the female feed the youngster, she was more concerned with laying a second clutch. Indeed, on one occasion the fledgling accidentally landed on her back while she was perching and was promptly, but gently, scolded. This brought about an immediate response from the male which appeared to pacify his mate with some gentle calls and bill-fencing. He also tightened his feathers, went into a crouched posture and fanned his tail. The following day it became obvious by his occasional stern reluctance to feed the youngster that he was encouraging it to start to fend more for itself. However, the youngster was not truly independent until it was 36-37 days old, at which stage it was still completely grey and had a very short tail.

The parents reared the youngster on whiteworms, defrosted bloodworms offered in shallow water and soaked seed, which consisted of the Verse Laga mentioned earlier and larger mixed millets and canary seed. I have never known any other waxbill take so much soaked seed. I also provided crushed oystershell, limestone and crushed, baked poultry egg shells. This mixture was avidly taken by the female, especially, no doubt to aid her own egg shell production.

To further enhance the health and condition of the birds, and particularly for the benefit of the laying female, I added the Bird Care Company's Daily Essential 2 multivitamins to the drinking water each day, as well as Vydex's Calsure (a calcium supplement) and Entrodex (a probiotic). As nesting birds are particularly prone to mites, I sprayed the entire cage and nest prior to the birds breeding, using Zodiac a spray available from the Bird Care Company. As well as eradicating fleas and mites, it also destroys their eggs and offers protection for up to seven months!

During the writing of this account, the breeding pairs' well-worn nest came apart (though I managed to save the five eggs, which it then contained) and a new nest was built of coconut fibre and hay. The male collected the

material and passed it to his mate, which did virtually all of the building after which egg laying started again. At the same time, in a cage alongside, a second pair also constructed a nest of coconut fibre and hay. I then had two pairs incubating eggs.

I was able to measure six eggs (one from the first clutch and five from the second). The first measured 15mm x 12mm. Of the five eggs from the second clutch, which was abandoned, one measured 15mm x 12mm, one 15mm x 11mm, one 16mm x 11mm and two 14mm x 11mm.

It is too early to say whether or not the Mali Firefinch has tremendous domestication possibilities, but I have certainly found it eager to start breeding. Housing more than one pair or putting two males together is definitely not recommended. Males will viciously attack and undoubtedly kill other males (I rescued one, left almost scalped and motionless, in the nick of time) and observed a paired-up female attack a single male. I would also strongly advise against housing this species with other red coloured small birds, and in particular other species of firefinch, especially at breeding time.

Postscript

On December 21st three fledglings appeared followed by, on December 24th, three from the second pair. This made a total of seven young (including the single youngster from the first brood). At the time of writing (January 2nd) both pairs are nesting again, with the first pair having already laid another three eggs.

References

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Acknowledgements

I would like to thank first and foremost my wife, Claire, and our four children for their priceless patience and understanding while I virtually lived with the Mali Firefinches throughout their breeding; also, Derek Goodwin and Robin Restall for their friendship, support and encouragement and Prof. Robert Payne and Clive Barlow, for not only their friendship but also their having the faith in my abilities as an aviculturist to present me with this wonderfully unique opportunity.

As described above, the Mali or Kulikoro Firefinch *Lagonosticta virata*, has been bred by Ian Hinze. 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.

THE SPRING SOCIAL MEETING

by Stewart Pyper

The 60 members and guests who accepted the kind invitation of Michel and Diane Klat to view their extensive collection at the Old House Bird Garden, Hare Hatch, near Reading, Berkshire, on Sunday March 12th last year, were indeed fortunate to view such a fine collection on what was a lovely, warm and sunny early spring day.

The visit, which was arranged by Raymond Sawyer, showed that an outing to a private collection can result in a good turn-out of members, some of whom had travelled long distances to be present. None more so than Mark Sproule, a Canadian member, who that morning had travelled from Nottingham (quite a journey by train on a Sunday), where he was working on the council's computer system.

Michel and Diane Klat's collection consists mainly of pheasants, curassows and touracos. A further 40 or so pairs of curassows and touracos are on loan to Birdworld, near Farnham, Surrey.

Within the beautiful gardens, most of the pheasants are housed in extremely well constructed aviaries built around four sides of an enclosed fox-proof area. The aviaries, some of which are glass-fronted, to protect the inhabitants during inclement weather, have been designed with the practical aspects of feeding, maintenance and breeding very much to the fore. Most are thickly planted to provide seclusion for the birds, with black bamboo being widely used. All have a covered shelter and most floors are covered with a layer of sand, which is easily raked over.

Two large corner aviaries about 12ft high x 40ft sq (approx. 3.6m high x 12m sq), one of which was being refurbished, house pairs of Great Blue Touracos, the first UK breeding of which took place at the Old House Bird Garden in 1999. The pair were in lovely condition and obviously benefited from the quality of the accommodation, which must have contributed to the successful breeding. It is planned to include zosterops in the refurbished aviary to help control unwanted insects and because it has a water supply, some waders will also be included.

A range of rearing pens for young pheasants are located at the rear of a large paddock, which houses rheas and has a small lake with waterfowl. The original aviaries are situated in what was once a vegetable garden. Many, some of which were being rebuilt, are octagonal in shape.

It was the first UK collection to breed the Vietnamese Pheasant, Berlioz's, Lewis's and Jones's Silver Pheasants, Bornean Crestless Fireback, several subspecies of the Ring-necked Pheasant and was also first to breed the Yellow-knobbed Curassow. The collection includes many rarely seen

pheasant subspecies and also wild-caught Lady Amherst Pheasants. We also saw Satyr, Temminck's, Cabot's and Blyth's Tragopans, and junglefowl.

A large aviary along the perimeter wall also housed a pair of Great Blue Touracos, this pair sitting on a clutch of eggs which it was intended to remove and artificially incubate in the large, scrupulously clean, incubating unit, in which hygiene is paramount.

We were privileged to see a 24-hour old Great Blue Touraco being fed. I had never before seen so many Great Blue and Ross's Touracos. I could imagine the incubation room at the height of the breeding season being an incredible sight. Other touracos in the collection are the White-crested, Black-billed, Livingstone's, Red-crested and Fischer's.

Two Moluccan Cockatoos and two pairs of Keas complete the collection. The latter can be very helpful at night in raising the alarm if a fox manages to get into the garden.

Steve Bishop, the Curator, and a staff of two look after this magnificent collection. They have certainly achieved excellent results and we wish them well in the future. Perhaps Steve will find time to report about the collection in our magazine.

On behalf of all the members and guests who so enjoyed the visit to the Old House Bird Garden, I would like to thank Michel and Diane Klat for their kind hospitality, which concluded with a wonderful tea in the nearby village hall.

THE PRESIDENT'S GARDEN PARTY 2000

by Stewart Pyper

The President's Garden Party was held on Sunday July 16th, again by kind invitation of our President Miss Ruth Ezra and Vice President Raymond Sawyer. In what was not a very good summer, the day was notable for the warm and sunny weather, which provided the 70 members and their guests with ideal conditions to view the birds and garden on what is the social highlight of the society's year. It was the 25th garden party to be held at Chestnut Lodge, the first having been held in 1976.

Various birds had bred including Avocets, Black-necked Stilts, Masked Plovers, Blue-faced Honeyeaters, Blue-bellied Rollers and Green Wood Hoopoes. The breeding of a McClelland's or Rufous-vented Laughing Thrush *Garrulax gularis* - like a larger version of the Yellow-throated species - is probably a UK first breeding. There are two pairs in adjoining aviaries with the pair in the waterfall aviary having fledged a single youngster. Raymond has promised to write a report about this breeding.

A pair of Toco Toucans now share the aviary at the back of the left-hand

side of the original complex. To enable the two to get to know each better, they were housed first in adjoining aviaries and later the dividing wire was removed and replaced later when they had settled down together in the first aviary. Regrettably, one of the Keel-billed Toucans had died a few days before our visit.

A few more South American birds have been available recently and Raymond has obtained what he hopes are some Striped Manakins. They were fit but rather sticky to handle when first obtained but in a short time cleaned up nicely. They are what I would call a murky light green and Raymond has found traces of red on the crown, but it could be two or three years before they moult into adult plumage and he knows for sure that they are Striped Manakins. This is a species I had not seen before. He also has three male Red-capped and a pair of Blue-backed Manakins.

The Garnet Pitta looked lovely as did the various Hooded Pittas. I saw four species of bee-eaters, including the Carmine and White-throated and counted at least three male and two female Spangled Cotingas. The pair in the Tropical House had attempted to build a nest but chose a rather awkward place. Hopefully, next time they will choose a more suitable site. Another pair are in the aviary which used to house the Toco Toucans and share it with a Chestnut-collared Kingfisher, another species I had not seen before. It has a large range which includes Borneo, Sumatra and the Malay Peninsula.

Raymond told us the tale of how the male Beautiful Sunbird had escaped and somehow managed to survive for over three months from February to April before it was recaptured. How it survived is unknown. Perhaps in the summer it could have survived by getting nectar from the wonderful flowers at Cobham, but there were few if any flowers during these months and surely someone would have spotted it! How it survived is quite a mystery to Raymond but he is delighted to have it back safe and sound.

We also admired the tortoises, wallabies and Red Squirrels, as well as the impressive collection of Bonsai and many other beautiful plants, including the large collection of succulents.

During tea Prof. J. R. (Bob) Hodges, an Avicultural Society Vice President, thanked Ruth and Raymond for their wonderful hospitality. He then presented the society's Certificate of Merit to Laura Gardner, representing the Leeds Castle collection, for the first breeding in the UK of the Crowned Hornbill *Tockus alboterminatus* (in 1998). The proceeds of the ticket sales for the garden party which amounted to over £500 (roughly US\$750), were generously donated to the society's funds by our President.

THE SOCIETY'S AUTUMN SOCIAL MEETING

by Stewart Pyper

Despite the fuel crisis during the week prior to the Autumn Social Meeting, about 30 members and their guests visited Twycross Zoo in Warwickshire on Sunday, September 17th, where we were welcomed by Molly Badham, the zoo's owner and co-founder.

Famous for its collection of primates, the zoo also exhibits a variety of other mammals and birds, and in the future intends to expand its bird collection. The present collection includes Scarlet, Blue & Gold and Red-fronted Macaws, Moluccan Cockatoos and two pairs of Thick-billed Parrots, the latter believed to have been obtained from Ken Dolton, an Avicultural Society Vice President. Twycross is one of only four zoos which exhibit this species.

Grey and Palawan Peacock Pheasants, Pink Pigeons, Kookaburras, White-cheeked Touracos, Sulawesi Magpies and Bali Starlings are housed in spacious planted aviaries. There are two enclosures, one housing Emus and the other Double-wattled Cassowaries. Various species of waterfowl are kept, Straw-necked and Scarlet Ibis and a flock of flamingos.

At lunch we were joined by Molly Badham and John Ray the Zoo Manager, who at his home keeps a small collection of cockatoos and other parrots.

In the afternoon the party made its way to Netherseal, to view the private collection owned by Andrew and Audrey Perkins. Touracos are much in evidence and include: Schalow's, Livingstone's, Red-crested, Hartlaub's, White-cheeked, Purple-crested, Fischer's, Green-crested *T. persa persa*, Buffon's *T. p. buffoni*, White-bellied Go-away Bird and Western Plantain-eater.

Other birds in the collection include Satyr and Temminck's Tragopans, Monal Pheasants, a young Green Peafowl, Eagle Owl, Spree Starlings, Black-breasted Thrush, Greater Hill Mynah, Crowned and Demoiselle Cranes, Red-breasted Geese, Grey and Red-billed Hornbills, Spotted Laughing Thrushes, a Fairy Bluebird and a Sulphur-breasted Toucan that is adept at catching table tennis balls.

Andrew and Audrey Perkins have a superb colony of Ring-tailed Lemurs, as well as Black and White Ruffed, White-faced and Red-faced Brown Lemurs, which were enjoying their afternoon meal at the time we saw them. In the newly built Safari Lodge, in which childrens' parties are held, the fine collection of reptiles and tarantulas were admired.

Our hosts kindly provided us with tea and sandwiches before we set off for home.

BOOK REVIEWS

THREATENED BIRDS OF THE WORLD

The realisation that more than 1,800 of the world's bird species are now regarded as threatened is a depressing thought. Even more shocking is that 182 of them are critically endangered with the prospect they may be extinct in 10 years. These are facts presented in the recently published *THREATENED BIRDS OF THE WORLD*.

This A4 hardback volume is weighty in every sense of the word. The subject occupies and merits well over 800 pages, 1,000 of the world's leading experts have contributed to it and each of the 1,186 species is illustrated in colour with maps showing locations and ranges for each of them.

A short introduction to each species' account provides an explanation (wherever possible for in some instances information is scanty) of the reasons for its classification as either critical, endangered or vulnerable. This is followed by a brief but detailed description of the bird, together with a short note about similar species as an aid to correct identification. For many there are brief hints - mainly about how and where they are likely to be seen in the wild, how to imitate calls, etc. The main texts for individual species is presented under five headings: Range and Population, Ecology, Threats, Conservation and Targets. References are numbered in the text and in most instances given in full in the reference list.

Books of this calibre are obviously costly to publish and in this case it is interesting to note that many species' accounts have been sponsored by individuals, charitable institutions or companies. Launched in 1999, the sponsorship scheme was very successful and raised more than US\$385,700 (approx. £257,130) from people and organisations around the world.

Among six forewords which in different ways, highlight the book's message, the one contributed by writer and broadcaster, Sir David Attenborough spells out in a few words the task, facing all who are interested in confronting the problem but points out that losses (of species) need not continue.

He writes: *'Birds are beautiful and fascinating creatures. They have managed to reach, flourish and even breed in some of the coldest, the hottest, the driest and the highest of environments - places that human beings have only reached within recent times and where we can only survive at all with the help of artificial support systems.*

'Yet, as this volume shows us so vividly, despite these remarkable abilities, one in eight species of bird are at risk of global extinction. The threat to the diversity and richness of life has been brought about by the changes that we have made to the face of the earth. Such losses need not continue. We now

have the knowledge to maintain the wonderfully rich and varied bird life that still exists.

'The challenge facing us now is to use this knowledge and apply our skills, our imagination and our resources to dealing with these problems before it is too late. I invite all readers of this volume to join us in our efforts to conserve the world's birds and other wildlife'.

Habitat loss and degradation are cited as the major causes of endangerment in birds, threatening 1,008 species (85%), of which 74% are affected by recent losses of tropical forests. Indeed, unsustainable selective logging is the most significant factor, affecting 367 species. Arable and livestock farming, grazing, human settlement, mining, drainage and filling-in of wetlands are among other common causes. Excessive hunting and trapping have also played their part. It may still surprise some aviculturists to learn that both the Java Sparrow *Padda oryzivora* and Timor Sparrow *P. fuscata* are now classified as vulnerable. The introduction to the former species reads: *'The popularity of this finch as a cage-bird has resulted (and unless stringent action is taken, will continue to result) in a rapid decline in its population and range as a consequence of intense trapping activity, such that it qualifies as vulnerable'.*

Indeed, trapping for the cage-bird trade - particularly of passerine species - is a cause listed all too frequently for the comfort of the more responsible elements in aviculture. Among some of the species thus identified, and taken at random are: Yellow (or Green) Cardinal *Gubernatrix cristata* (E), Red Siskin *Carduelis cucullata* (E), Green Avadavat *Amandava formosa* (V), Straw-headed Bulbul *Pycnonotus zeylanicus* (V), Red and Blue Lory *Eos histrio* (E), Black-winged Lory *E. cyanogenia* (V), Chattering Lory *Lorius garrulus* (E), Lesser Sulphur-crested Cockatoo *Cacatua sulphurea* (C) and Philippine Cockatoo *C. haematuropygia* (C). There are many more.

After emphasising the part the human race has played in the creation of this catastrophic situation ('People drive this extinction crisis...'), the book's opening chapter The Extinction Risk and Opportunities For Action discusses potential solutions including which areas and habitats should be conserved, which issues should be addressed and opportunities for building solutions for birds, biodiversity and people.

This is an important and thought provoking book. It is comprehensive, well designed and of excellent quality.

THREATENED BIRDS OF THE WORLD is published by Lynx Edicions in association with BirdLife International, Passeig de Gracia 12, E-08007 Barcelona, Spain. Tel: +34-93 301 0777/Fax: +34-93 302 1475/Internet: www.hbw.com/ E-mail: lynx@hbw.com Normal price £70.00, special launch price £59.50. Available from Lynx Edicions (postage and packing free) or from good booksellers.

Frank Woolham

WILDLIFE GUIDE TO HAWAII

More than 400 pages of information, advice, descriptions, identification aids and field guide illustrations of as many species of flora and fauna make this one of the latest *Ecotravellers' Wildlife Guides*, a sure-fire must-have for any visitor to Hawaii who has more than sun, sand and surf in mind. Every bird species occurring on the main Hawaiian islands on the Midway Atoll is included.

Stylistically, the guide is a strange blend of the serious and scientific, and popularism. This is no doubt aimed at the diverse and largely American market. For example, the author seems to have a problem with amphibians: he describes one species as 'ugly' and another as 'odd-looking'. It is a mix of essays on conservation, hints and guides, do's and don't's, personal statements and visitor information. The bird chapter is treated straightforwardly, the following one on mammals and the culminating Environmental Close-up essay, less so.

It took me a while to find my way around the book and the key to the illustrations (surely most people's first requirement). Following five introductory chapters, it was finally tracked down to Chapter 6, which is headed *How to use this book!* Unhelpfully, the species pictured on any one plate are not necessarily to scale. There might be a good reason for this, (which does not immediately occur to me) but it can be a problem, especially when almost every short description begins with 'Large', 'Mid-sized' or 'Small'. A bit unnecessary as length is given in centimetres and inches.

The illustrations are a mix of colour photos and high quality paintings which, with the odd exception, are pretty much as good as you will see anywhere. Whenever confronted by a task like this, I always go to the species I know best, to see if they 'sit right' on the page. For me, this is waterfowl (plates 28-30 within 34 plates of birds and mammals by H. Douglas Pratt). I reckon that a common fault in illustrations finds birds with a disproportionately large head (or small body, depending on which way you look at it) and, in truth, this applies here too, for example the Garganey. With the exception of a curiously mincing Mallard, postures are fine. Flicking through the other plates and groups of birds which I know quite well, the large majority seem in proportion with accurate colours. The plates of seabirds in flight are high class.

The Ecotravellers' Wildlife Guide to Hawaii by Les Beletsky is published by Academic Press, Harcourt Place, 32 Jamestown Road, London NW1 7BY and Academic Press, 525 B Street, Suite 1900, San Diego, California 92101-4495, USA (website: www.academicpress.com). It is priced £19.95 in the UK, US\$27.95 in the USA and \$38.95 in Canada.

Dr Richard Meyer

NEWS & VIEWS

FIVE SPECIES BRED FOR THE FIRST TIME

The White-collared Kingfisher *Halcyon chloris*, Black-necked Stilt *Himantopus mexicanus*, Trumpeter Hornbill *Bycanistes bucinator*, Orange-winged Amazon *Amazona amazonica* and Black-headed Caique *Pionites melanocephala* are five species which were bred last year for the first time at Paradise Park, Hayle, Cornwall. The breeding of the White-collared Kingfisher is almost certainly also a UK first breeding. Of the two chicks hatched in April, one died and the other was revived in an incubator and reared by Dale Jackson. For the first time in many years there two pairs of Bali Starlings *Leucopsar rothschildi* reared their own young. Three were raised and are living now in the Tropical House. In his Curator's report in the *Paradise Park Newsletter*, Winter 2000, David Woolcock also records the passing of the park's breeding female St Vincent Parrot *A. guildingii*, which was already an adult when she arrived in 1983.

* * *

GUINATE CURATOR

A. Paul Ockenden has written to point out that he now holds the position of Curator at Guinate Tropical Park on Lanzarote in the Canary Islands, Andrés Marin and Ana Matesanz having vacated the post one and a half years ago. The latter wrote about the park's Piping Hornbills *Ceratogymna* or *Bycanistes fistulator* (*Avicultural Magazine*, Vol. 105, No. 3, pp.97-102). The pair remain in the collection but to date has still not attempted to breed.

* * *

SLIDING TOWARDS EXTINCTION

One in five Australian bird species is sliding towards extinction, with land clearance being the main threat to their survival. This is among the preliminary findings of a survey for Birds Australia, revealed recently as clearing continues in Queensland and New South Wales. Bird Australia's Conservation Manager, Michael Fendley said: 'the natural environment is tilting away from diversity and health towards despair, and our birds are sliding away with it'. He said: 'land clearance kills about 7.5 million birds a year'. Other threats come from overgrazing by sheep and cattle, other agricultural activities, changes in fire patterns, introduced predators and the growing loss of remnant vegetation in cleared areas. Queensland is responsible for about 90 percent of all of Australia's land clearance.

A GOOD YEAR

Last year was a good year for John Harvey, despite it being a rather indifferent summer. Two Blue-breasted Waxbills *Uraeginthus angolensis* were reared. Three, fledged, but one disappeared. The breeding male was at least four years old, having been given to him by his friend Brian Humphries. Ten Indian Silverbills *Lonchura malabarica* were bred, his best result yet with this species. A pair of Red-faced Pytilias *Pytilia hypogrammica* (also known as Yellow-winged Pytilias or Red-faced Aurora Finches), consisting of a 1998-bred male and an imported female, nested three times in a 12ft x 6ft x 6ft high (approx. 3.6m x 1.8m x 1.8m high) aviary with access to a small indoor flight. The first nest, in a finch box, produced two young which on moulting proved to be a male and female. The second nest was a failure but the third, in a wicker nest basket, produced three young. Other occupants of the aviary were pairs of Blue-billed Mannikins *L. bicolor*, Indian Silverbills, Black-faced Firefinches *Lagonosticta larvata vinacea* and Jameson's Firefinches *L. rhodopareia*. A second pair of pytilias abandoned their young after 13 days. His pair of Chinese Painted Quail *Excalfactoria chinensis* which reared young in 1999, were unsuccessful last year.

* * *

TWO-NOTE CALL

The distinctive two-note call of Bulwer's Pheasant *Lophura bulweri* is being broadcast over the audio system at New York's Bronx Zoo Pheasant Aviary as part of the effort to promote mating by the zoo's two males and one female. Breeding success in captivity with this rare Bornean pheasant has been universally poor so concerted efforts are being made to simulate its natural habitat with a view to rectifying this situation.

The calls are broadcast at one-minute intervals from 6.30am - 7.30am and again between 5.30pm - 6.30pm, because Bulwer's Pheasants tend to be more active early and late in the day. The zoo also provides the pheasants with daily rain showers (they breed during the rainy season in Borneo) together with dust baths which is another important activity. According to initial observations, both the males and female increase their activity when the vocalisations are played.

The Bird Department's Assistant Curator, John Rowden has collected information about the mating habits of this species through research at the zoo and fieldwork in Borneo. It has been found that it uses a lek breeding system, whereby the males gather in the same general area and set-up display arenas while remaining visually isolated from each other.

MOSQUITO-BORNE VIRUS

The *Wildlife Conservation Society Annual Report 2000* states that the year was marked by the loss of birds to West Nile virus, and that a great deal of time was spent dealing with the consequences of these losses and finding solutions to the problems created by it. The latter included mosquito-proofing facilities and removing standing water, in addition to which keepers worked with WCS veterinarians in exploring further ways of protecting and treating the Bronx Zoo bird collection should West Nile virus recur.

Despite the setback, birds bred during the year included Crested Wood Partridge *Rollulus roulroul*, White-naped Crane *Grus vipio*, Pink Pigeon *Columba mayeri*, Marianas Fruit Dove *Ptilinopus roseicapilla*, Montezuma Oropendola *Psarocolius montezuma*, Fairy Bluebird *Irena puella* and birds of paradise *Paradisaea* spp. The bird department received the AZA Edward H. Bean Award for long-term breeding of the Red and Lesser Bird of Paradise *P. rubra* and *P. minor*. Offspring of the Lesser were sent to Cologne Zoo in Germany and of the Red to Chester Zoo in England.

The smallest evacuee from the WCS's St Catherines Island Wildlife Survival Center during Hurricane Floyd, was a three-week old Palm Cockatoo *Probosciger aterrimus*, which was being hand-reared and needed to be fed every two hours. Floyd, as he was named, thrived along with his sister, Irene; named after the eighth hurricane of 1999. Wattled and Northern Helmeted Curassows *Crax globulosa* and *C. pauxi* were parent reared for the first time at the center, and a Rhinoceros Hornbill *Buceros rhinoceros* chick was hatched.

* * *

WALK OF LIFE

Lindy Rodwell and the Wattled Crane *Bugeranus carunculatus* captive breeding programme on which she has been working for 10 years in South Africa, where only about 250 remain in the wild, were the subjects of a two page illustrated feature in the *Telegraph Magazine*.

Lindy and her team collect many of the abandoned second eggs, of the two egg clutches, and hatch them and raise the young for reintroduction to the wild. During the first weeks the chicks are kept in pens with a heat lamp, and feather dusters or a stuffed bird for company. They also have access to outside runs, and because in the wild they leave the nest within hours of hatching and walk great distances with their parents, the chicks are kept very active. At 10 weeks old they are moved to a big wetland pen and two women dressed in crane costumes spend eight hours a day with them, behaving like the chicks' parents would, walking them great distances building up their stamina, teaching them how to feed and encouraging them to fly.

After much early experimentation and high mortality, released birds are now integrating successfully with wild cranes and the programme has won a Whitley Award and received a grant of £40,000 (approx. US\$60,000), which has given it a fantastic boost.

* * *

ANOTHER FIRST FOR SAN DIEGO

Last year seven Long-toed Lapwings *Vanellus crassirostris* were bred at San Diego Wild Animal Park. It was the first time this species has been bred in the USA and it is hoped the birds will be successful again this year. At present it is the only American collection which exhibits this African lapwing, which in the wild is almost as adept as jaçanas at walking on floating vegetation as it searches for food. The zoo's pair of Harpy Eagles *Harpia harpyja* hatched another chick in the Bird of Prey exhibit. This prolific pair has produced one or two chicks almost every year for the past six years, two of which have been released into the wild in Panama.

Sparkling Violet-eared *Colibri coruscans* and Oasis Hummingbirds *Rhodopis vesper* are recent additions to the Hummingbird House at the zoo and the Hidden Jungle Rainforest exhibit at the wild animal park. Other additions to the Hidden Jungle exhibit are Northern Spotted *Tangara punctata*, Western Bay-headed *T. gyrola* and Peruvian Blue-necked Tanagers *T. cyanicollis*.

* * *

NUMBERS TUMBLE DOWN UNDER

Further preliminary findings of the Birds Australia survey reveal that the Emu *Dromaius novaehollandiae* population may have declined by more than 50 percent. Those of the Wedge-tailed Eagle *Aquila audax*, Brolga *Grus rubicundus*, lyrebirds *Menura* spp. and Scarlet Robin *Petroica multicolor* may have declined by up to 40 percent. As the expansion of urban areas is a major cause of habitat loss, efforts are being made to determine ways to make gardens more attractive to native birds and encourage them back into these areas.

A minor recovery is occurring in western New South Wales, following a five year campaign to exterminate foxes and feral cats, which wreak havoc among native wildlife. The control programme has resulted in numerous reports of species not recorded there for more than 20 years, including the Banded Lapwing *Vanellus tricolor* and Malleefowl *Leipoa ocellata*. More than 160 Malleefowl bred at Western Plains Zoo at Dubbo, have been released to help boost the population.

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RICHARD HUGHES



Richard Hughes, who (with Andrew Owen) described Hand-rearing the Scarlet Ibis *Eudocimus ruber* (*Avicultural Magazine*, Vol.94, Nos.1 & 2, pp.96-100 (1988)) and who wrote about Hand-rearing the Crimson-rumped Toucanet *Aulacorhynchus haematopygus* at Padstow Bird Gardens, Cornwall (*Avicultural Magazine*, Vol.94, No.4, pp. 183-189 (1988)), died February 17th, days after being struck by one of the elephants he was working with at Chester Zoo. Richard was just 34.

His career began in 1984, when he went to work at Guilsborough Zoo. Later he moved to Padstow Bird Gardens here in Cornwall, where he became head keeper, and then joined the staff at Beale Park, near Reading, Berks. Richard went onto complete an environmental degree at Keele University and set-up a bird-rearing service, hand-rearing parrots. Knowing of this, I asked him to review the video *Hand Rearing Parrots with Rosemary Low and Rob Harvey*. Richard's review was published in the *Avicultural Magazine*, Vol.103, No.2, p.92 (1997).

When Raymond Sawyer was looking for a keeper for the collection at Cobham, I had no hesitation in recommending Richard, who was then working at Chester Zoo. However, when I telephoned Richard to talk to

him about working with the wonderful collection of birds at Cobham, he was very excited about having recently transferred to the elephant section at Chester, and very much wanted to continue working with the elephants and living at home, so he could continue to look after his parrots he kept there.

The accident and his subsequent death came as a great shock. All those I have spoken to have had nothing but praise for Richard, both as a keeper and as a person. Dr Roger Wilkinson described him as 'a lovely person' and Peg Brown at Padstow, said repeatedly, 'you couldn't meet a nicer person than Richard.'

We offer out sincere condolences to his parents (his father Brian is Administrator of the NCA (National Council for Aviculture)), brother and sister, and girl friend, Julie.

Malcolm Ellis

COUNCIL MEETING

A council meeting was held on Sunday, September 17th at Twycross Zoo, Warwickshire.

The following members were present: K. Dolton, Prof. J. R. Hodges, C.J.S. Marler, R.C.J. Sawyer (Vice Presidents), K. J. Lawrence (Chairman), R.H. Grantham, N. Hewston, Mrs D. Holloway, R. E. Oxley, S. Pyper.

Minutes of the previous meeting were approved following the addition of N. Hewston to the list of apologies for absence.

The Hon. Editor sent a written report. The council passed a vote of thanks to him for maintaining the standard of the magazine and improving the frequency with which issues are sent out. He was asked to explore ways of increasing the number of Letters to the Editor suitable for publication in the magazine.

There was no report from the Hon. Secretary/Treasurer, but members of the council were of the opinion that the society remains in a financially sound position.

The Hon. Editor reported that there has been a good response to the society's website (www.avisoc.co.uk). He is to attempt to establish a bird exchange list and investigate the possibility of selling advertising space on the website.

Election of Officers: K. W. Dolton was re-elected a Vice President for a further five year term. G. R. Greed was re-elected Hon. Secretary/Treasurer for a further five year term, and R. E. Oxley was re-elected to the council for a further five year term.

The society's Certificate of Merit was awarded to Birdworld for the first breeding in Great Britain or Ireland of the Southern Helmeted Curassow *Pauxi unicornis unicornis* (*Avicultural Magazine*, Vol.104, No.4, pp.152-156).

PIONUS RESEARCH

As so little is known about the diets, breeding habits and general behaviour of the *Pionus* parrots in the wild, in 1999 a group of *Pionus* keepers and others interested in these small Central and South American parrots founded the Pionus Parrots Research Foundation. Its goals are to conduct, support and fund amateur and professional research on the parrots of this genus and share the information gathered with scientific and avicultural communities and other interested parties.

It funded its first trip in the autumn of 1999. This was to Mindo in Ecuador, to explore the possibilities of studying *Pionus* species in the wild. Such was the success of this preliminary study that another visit to Mindo recently took place. A group of 10 aviculturists, biologists and students from the USA, Costa Rica and Ecuador planned to observe and record data about populations, feeding behaviour, flock behaviour, and locate nest sites, as part of the Bronze-winged Parrot Study. It also hoped to examine what effect flocks of Bronzed-winged *P. chalcopterus*, Coral-billed *P. sordidus* and White-headed *P. seniloides* Parrots have on local agricultural communities. The Pionus Parrot Research Fund needs to raise over US\$7,000 (approx. £5,000) and is seeking donations, which can be as little as US\$5 - US\$20 (approx. £3.50-£14), to help fund its work. If you would like to learn more or make a donation you can contact:- Russell W. Slade, Managing Director, Pionus Parrots Research Foundation, PO. Box 34, Danielsville, PA 18038, USA. Tel: 610 767-8595 (evenings)/e-mail: rshade@fast.net/ website: www.fatparrots.org

* * *

NEW SUBSPECIES

The Red-billed Hornbill *Tockus erythrorhynchus*, over most of its range, has pale yellow or pink facial skin. However, in Senegal, The Gambia and western Mali, where all Red-billed Hornbills are usually regarded as belonging to the nominate subspecies, all adults have black facial bare skin and brown eyes. Studies suggest that these black-faced/brown-eyed birds from the western-most part of Africa belong to a yet undescribed subspecies. It is proposed to name it *T. e. kempi*, in honour of Dr Alan Kemp, who was first to call attention to the existence of these black-faced birds.

* * *

QUAIL NUMBERS DECLINE

Some species of quail, including the Northern Bobwhite *Colinus virginianus* in the east and the Scaled Quail *Callipepla squamata* in the south-west USA, are suffering serious population declines according to Frank Gill of the National Audubon Society, quoted in Birdscope, Winter 2001/ Vol.15, No.1, p.4.



CONTENTS

Breeding the Blue-bellied Roller by R. C. J. Sawyer	1
An examination of potential reasons for variation in egg-laying cycles of Wattled Cranes by Nicole R. Bohlman	4
Notes on behaviour and ecological requirements of the Rothschild's Mynah <i>Leucopsar rothschildi</i> by Walter A. Sontag Jr.	10
Breeding the Grey-winged Trumpeter <i>Psophia crepitans</i> by Rosemary Low	21
Breeding the Mali or Kulikoro Firefinch <i>Lagonosticta virata</i> by Ian Hinze	27
The Spring Social Meeting by Stewart Pyper	35
The President's Garden Party 2000 by Stewart Pyper	36
The Society's Autumn Social Meeting by Stewart Pyper	38
Book Reviews	
Threatened Birds Of The World	39
Wildlife Guide To Hawaii	41
News & Views	42
Obituary - Richard Hughes	47
Council Meeting	48