

HUSBANDRY AND BREEDING OF THE PAPUAN MOUNTAIN PIGEON *Gymnophaps albertisii* AT VOGELPARK WALSRODE

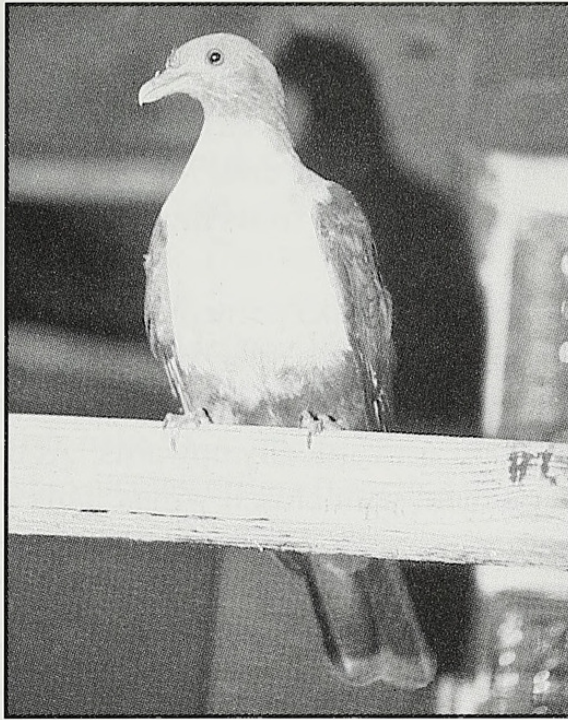
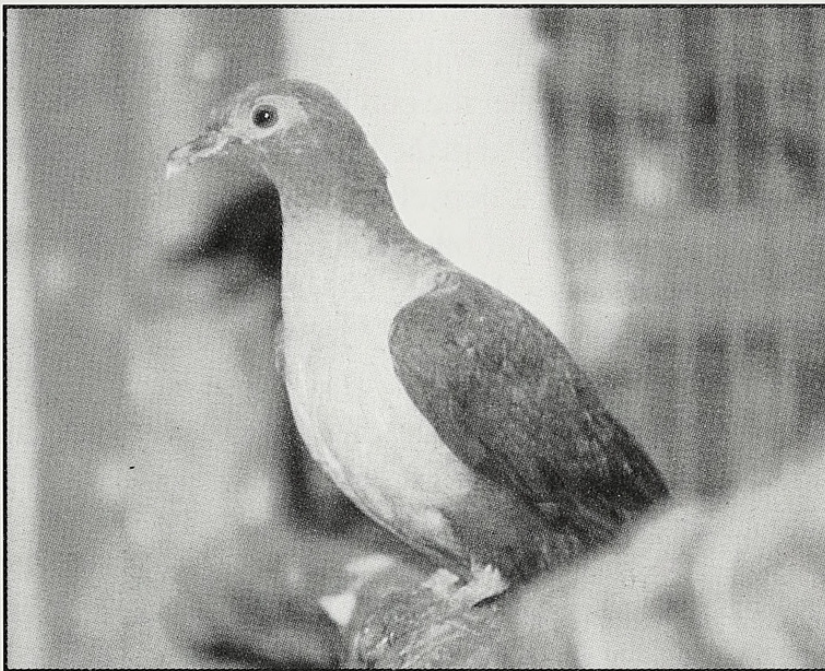
by Martina Müller

According to the 1995 European Endangered Species Breeding Programme Taxon Advisory Group Survey, only three European institutions were keeping a total of 3.5 Papuan Mountain Pigeons *Gymnophaps albertisii*: London Zoo had two females, the French zoo, Beauval two pairs and Vogelpark Walsrode a single pair at that time. No successful reproduction within the previous five years was reported. To our knowledge, there are also some private aviculturists who have this species in their collections but successful breedings seem not to have occurred with these. This is in some ways surprising as this pigeon is a distinctive and interesting member of the large group of fruit pigeons which deserves more attention from the avicultural community.

The Papuan Mountain Pigeon is a medium-sized approx. 35cm (13³/₄in) long streamlined pigeon with a whitish breast and throat contrasting well with the maroon belly and dark grey upperparts. Both sexes show an expanded area of bright red skin around the eyes which relates to the species' other common name of Bare-eyed Mountain Pigeon. Other features are the greyish bill with a pinkish tip and red cere, as well as strong red feet and legs. Females can easily be distinguished from males in having the breast variably suffused with grey and a broader grey edging to the chestnut throat. Juveniles of both sexes resemble females but are duller in colour and lack the red eye-skin and feet. The sex of young birds can be determined on fledging, at which time the breast of the male is already much lighter than that of the female. The adult plumage, with the white breast in males and intensive red orbital skin, bill and legs of both sexes, is attained when the birds are one year old.

Taxonomically, the Papuan Mountain Pigeon forms a superspecies with the Long-tailed *G. mada* and Pale Mountain Pigeon *G. solomonensis*. The relationships of the genus are, however, uncertain. These species seem to be somewhat similar to some *Ducula* spp, such as the Pinon's Imperial Pigeon *Ducula pinon*, in terms of colour and colour patterns. Two races of the Papuan Mountain Pigeon are recognised: *G.a. exsul*, which is found in the north-west Moluccas, is somewhat larger and darker than the nominate race, *G.a. albertisii*, to which this article refers.

Widely distributed throughout New Guinea and the adjacent islands of Yapen, New Britain, New Ireland and Goodenough, this pigeon frequents

*Dieter Rinke***Adult male Papuan Mountain Pigeon***Dieter Rinke*

Whereas the male has a white breast, that of the female is grey

primary forest from sea-level up to 3,350m (approx. 11,000ft), or sometimes even higher. Therefore the birds do not seem to be very sensitive to harsh climatic conditions in Europe, making them suitable for our aviaries.

Little is known about the general habits of the species. It seems to be a shy bird and occurs mostly in the hills and mountains. Commonly seen in groups of 10 - 40, sometimes even up to 80, these flocks fly very fast over lowland forest in the vicinity of hills when their wings produce a 'rushing'

sound in flight. In cloudy mountains these noisy wing-beats sometimes indicate the presence of flocks in flight, even if they cannot be seen. The species seems to be partly nomadic as large numbers visit coastal forests during the rainy season from October until March. The birds forage in the canopy where they take a variety of fruits including figs and drupes of the laurel *Cryptocarpa tessalata*.

The display flight of the male - performed over fairly steep mountainous terrain - has been described as 'spectacular' by a number of observers: from a favoured perching place the bird swoops steeply downwards before, with swift wing-beats, flying almost vertically upwards. At the peak of its climb it pauses and turns, and then, with closed wings, falls rapidly like a stone almost vertically, finally pulling out of the dive and arcing back upwards to its perch.

During the rainy season the birds place their nest, a small platform of sticks, in a tree or a depression in short dried grass on the top of a rock-face, at a height of about 5m (16ft 3in). One white egg forms the clutch. Semi-colonial nesting has sometimes been reported. Usually a silent species, loud booming calls can be noted during the breeding season.

About six years ago Vogelpark Walsrode started to keep Papuan Mountain Pigeons when two pairs arrived at the end of 1993 from the breeding centre on Mallorca. One pair was housed in the pheasantry for exhibition purposes, while the other was placed in a densely planted enclosure in the breeding facility for pigeons (which is not open to the public). This pair remained timid while the two other birds, having daily contact with visitors, became rather tame after a short period of time. This might have been one of the preconditions for breeding the species.

The birds in the pheasantry shared their enclosure with various other species: finches, living in the upper parts of the aviary like the pigeons, as well as ground-dwelling birds such as pheasants. The mountain pigeons showed no forms of aggression towards the other species, however, a pair of Bali Starlings *Leucopsar rothschildii* had to be removed from this enclosure after attacking the pigeons.

The diet for these pigeons does not show any differences compared to the one we use for other big fruit doves and consists of various fruits, depending on the season. In addition, lettuce, oatflakes, soaked dog pellets and sometimes even pieces of freshwater fish are offered since we have noticed that other species of fruit doves, kept in mixed enclosures, also feed on this item. The fruits are cut into pieces of different sizes - from very small up to 1cm (1/2in) cubes. However, the birds' preference is for whole berries like grapes, redcurrants, blueberries, etc.

As the mountain pigeons live in forests at high elevations, they are not very sensitive to the cold during European winters. Therefore, at Vogelpark

Walsrode the birds always have access to outdoor facilities where temperatures can be as low as -10°C (14°F) and of which they often take advantage. A temperature of some 5°C - 10°C (41°F - 50°F) is maintained in the birds' indoor accommodation during winter.

Once the mountain pigeons had settled down, the pair on exhibition began their first attempts at breeding. During the years of keeping the species at Walsrode it has become obvious that compatibility between partners is very important for successful reproduction. If the birds fail to get along well, the territorial male chases the female to the point of exhaustion and as a consequence such birds have to be introduced to another partner.

The male's courtship display differs from that observed in most pigeons: the typical situation, in which the male sits alongside the female, presenting an inflated crop and pestering the female, has not been observed. In this species the male perches on a conspicuous dead tree-limb, clipping his wings strongly and at length, and looking more like a bird-of-prey than a pigeon. The question is whether this behavioural pattern is something like a stylized flight through territory - comparable to the 'wing-whirring' of male pheasants - or if the normal courtship display can only be performed incomplete due to the lack of space in captivity. Interestingly enough, young males display this behaviour shortly after fledging. According to observations made at Walsrode this is a behavioural pattern correlated to the bird's sex; it is never seen in female mountain pigeons.

The first egg-laying occurred here on December 9th 1994, almost a year after the birds' arrival. Unfortunately this egg was infertile. About two months later, on February 15th 1995, a second clutch was found in the nest. After an incubation period of 23 days we found parts of an eggshell under the nest, indicating that a chick had hatched. This was the first breeding of a Papuan Mountain Pigeon at Vogelpark Walsrode.

The newly-hatched chick is covered with very dense, dark reddish-brown down, giving it a somewhat atypical look for a pigeon. When the chick was about one week old, the adult birds left it alone for the first time. At first they did so for only a short period, but some days later they did not return to brood the chick at all. This behaviour did not cause any complications so far as the young bird's development was concerned (even in February!) since it seemed to have a well-developed thermal regulation. About 25 days later the chick, now well feathered, fledged but stayed close to the nest for some days. I should also mention that at one time there was a young pigeon which left the nest after 39 days, which was slow compared to the other chicks hatched at Walsrode. For a further 14 days the juveniles are fed by their parents. At no time did we observe any type of aggression between young and adult Papuan Mountain Pigeons which remained together in one enclosure, even when the parents started to breed again.



Dieter Rinke

The young male's breast feathers are lighter than those of the young female at a comparable age

Eight *Gymnophaps albertisii* have been reared successfully at Vogelpark Walsrode during the past four years and we are now keeping four pairs, of which two are breeding. In order to increase the genetic diversity of our flock, London Zoo sent their two females to Walsrode and one of these has already reproduced. With these promising results we hope to establish a viable population of this interesting pigeon in European collections.

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Martina Müller is Curator at Vogelpark Walsrode, Zoologischer Garten, D-29664 Walsrode, Am Rieselbach, Germany. Tel: (0 51 61) 2015-2017/ Fax: (0 51 61) 82 10/E-mail:office@vogelpark-walsrode.de/Internet:http://www.vogelpark-walsrode.de.

CHESTER ZOO BIRD REVIEW 1998

by Roger Wilkinson

Christmas Day morning at 7.00am 1997 saw members of the bird staff working in the dark to shore up broken windows and net over open roofs resulting from the gales of Christmas Eve. They were soon joined by other members of the Animal Division and Estates Division in emergency repair work that resulted in most missing their Christmas lunches to secure the safety and welfare of stock throughout the zoo. The main damage was to the Tropical Realm building which lost large sections of the roof over the



R. Wilkinson

Yellow-throated Laughing Thrush

hornbill enclosures and reinforced glass skylights over the main free-flight bird areas. Other damage included windows blown out of the Bird House, major damage to the adjacent Bird Arcade roof and fencing of the crane and waterfowl paddocks. Stock losses were mainly of free-flying pigeons and doves which escaped from the Tropical Realm but also included a number of smaller birds.

This storm damage necessitated re-programming expenditure and resulted in not only a completely new and much better roof over the damaged area of the Tropical Realm but also the re-building of the hornbill enclosures

and later in the year also the Congo Peafowl aviary to a much improved standard. However this forced the temporary re-housing of the Great Indian Hornbills *Buceros bicornis* and Rhinoceros Hornbills *B. rhinoceros* precluding any breeding attempts by these in 1998. The Bird Arcade was also re-roofed and temporary repairs made to the Bird House and crane fencing. The Bird House having been built in 1965 as a Temperate Bird House and perhaps given its structure also then seen as a 'temporary' Bird House, had been under review for replacement for at least the last 15 years. Decisions were made for the Bird House to be demolished and the crane areas re-fenced at the end of the 1998 breeding season.

The Bird House has given many visitors pleasure over the last 30 years and been the site for the successful breeding of many species from the first UK breeding of Bare-faced Curassows *Crax fasciolata* in 1966, a year after the building was opened, to our first success with the parent-rearing of a Scarlet Ibis *Eudocimus ruber* in 1998. Lilac-breasted Rollers *Coracias caudata* were also successfully bred there in 1998. Other species of particular interest which have bred over recent years in the Bird House include Blue-crowned Motmots *Momotus momota*, Trumpeter Hornbills *Bycanistes bucinator*, Palawan Peacock Pheasants *Polyplectron emphanum* and Bali Starlings *Leucopsar rothschildi*. The loss of the Bird House has necessitated the relocation of its former occupants either elsewhere in the zoo or to other collections. We are currently building on the site of the old Bird House a new 'Islands in Danger' exhibit. As well as birds this will house invertebrates, fish, amphibians and reptiles selected to include both those threatened in the wild and managed within zoo breeding programmes and those that illustrate particular biological concepts associated with living on islands. The exhibit will include some exciting species including Red Birds of Paradise *Paradisea rubra* from the Wildlife Conservation Society, New York, and Komodo Dragons *Varanus komodoensis* from Miami Metrozoo.

'Always Building' was the motto of Chester Zoo's founder George Mottershead and this was certainly the case for the zoo in 1998. Whilst work continued elsewhere a major redevelopment of the Humboldt's Penguin *Spheniscus humboldti* facility included the demolition of the filtration plant and kitchen area built in 1981, and the building of larger accommodation to house the new water treatment equipment, a new kitchen and keeper area, and refrigerated cold room for fish storage. The pool has been re-landscaped with natural looking rock-work and a waterfall and new rock effect nesting areas provided. The new system which is now installed allows the penguins to swim in salt water where previously they had a freshwater pool. This not only provides a more natural environment for the penguins but also allows the use of a water treatment regime that includes ozone treatment and protein skimming, in addition to sand filtration and UV disinfection. With the new

pumping systems water can now be re-circulated through the water treatment plant with a turnover of one hour, at least twelve times faster than previously.

For winter 1997 and spring 1998 this meant that the penguins had to be re-housed to allow the building work to progress. During this time the penguins were maintained in the Chilean Flamingo *Phoenicopterus chilensis* indoor winter quarters and allowed access to a fenced off outdoor area adjacent to this building. This allowed the birds access to the large but shallow indoor pool and we were pleased to find no health problems resulted from this necessary temporary re-housing. Indeed the penguins settled very quickly and in early spring signalled their intention to breed by excavating nesting burrows in their outdoor pen. Our penguins are included within the EEP (European Endangered Species Breeding Programme) Humboldt's Penguin breeding programme.

Because we have bred so many in previous years our stock is particularly well represented in other European zoos and we have been asked only to breed from new stock provided through the EEP coordinator. In 1997, with the help of Whipsnade Zoo we imported three new penguins from Emmen Zoo, Netherlands. Two of these had paired together and were amongst those penguins that laid eggs in 1998. Whilst the other penguin eggs were removed and not allowed to hatch, those of the Emmen pair were artificially incubated and as a result two fine chicks were hand-reared. These have now been introduced into the recently redeveloped enclosure with the other penguins.

Whilst the Humboldt's Penguins were being housed in the Chilean Flamingo quarters the Chilean Flamingos were mixed over the winter with the Caribbean Flamingos *P. ruber ruber*. These were separated again into single species flocks prior to the breeding season but this disruption to their normal wintering routine may have led to them being later in initiating egg-laying than in previous years. Nevertheless seven Chilean and two Caribbean Flamingos were hatched with the last Chilean chick hatching in October.

Following the damage from the Christmas Eve gales, more unseasonal weather with particularly wet heavy snow in mid-April caused further damage and disruption to the Bird Department. This heavy snow continued settling overnight and not only brought down trees and power lines but severely tested the structure of the aviaries. Damage was caused mainly to the large aviaries where the weight of snow on the nylon netting resulted in these structures giving at their weakest points but some of the old timber and metal mesh structures also suffered. 'Europe on the Edge', 'Condor Cliffs', the Great Grey Owl aviary, Mauritius Kestrel aviary, Red-crowned Crane enclosure and Oakfield parrot aviaries were all damaged.

The Red-crowned Cranes *Grus japonensis* were sitting a clutch of two eggs only days away from hatching. They valiantly sat through the snow storm despite their aviary having suffered major damage with the snow laden

netting roof only just above their heads but abandoned their nest mid-morning allowing us to take the opportunity to catch and clip the full-winged female before transferring the pair to the only available open-topped pen. The pair then surprised us by settling down to lay a replacement clutch and rear two excellent chicks in their new enclosure. Rapid repairs were made to the aviaries and subsequently three of the larger enclosures have been re-netted with modified fixing methods including steel rather than nylon supporting cables. Two West African Crowned Cranes *Balearica pavonina pavonina* were again reared in 1998. As in previous years these were hatched in the incubator and reared by domestic hens. We had hoped to leave an egg or eggs from a second clutch with the parent cranes but this year they disappointed us by not laying until very late in the summer and then only laying a single clutch. We again had infertile eggs from the Wattled Cranes



R. Wilkinson

Red-crowned Crane with chicks

Bugeranus carunculatus and the White-naped Cranes *G. vipio*. The latter may perhaps not be too surprising in view of the male's age: London Zoo acquired him from Mr. Ezra in 1949. Notwithstanding this and our previous lack of success with artificial insemination when we tried it in 1994, several years with only infertile eggs suggest we should attempt this procedure again in 1999. Two Gough Island Moorhens *Gallinula comeri* were hatched and reared by their parents.

Notable breedings in addition to those already mentioned included a female Andean Condor *Vultur gryphus* hatched and reared by its parents in the new 'Condor Cliffs' enclosure. This was the eleventh chick to be reared at Chester since this pair first bred in 1985 but gave us particular satisfaction in being the first chick in the UK to be successfully parent-reared.

In the 'Europe on the Edge' aviary six Waldrapp Ibis *Geronticus eremita* were reared and Little Egrets *Egretta garzetta*, White-headed Ducks *Oxyura leucocephala* and Red-legged Partridges *Alectoris rufa* all hatched chicks in this enclosure. Red-billed Choughs *Pyrrhocorax pyrrhocorax* nested but



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Young Thick-billed Parrot

were unsuccessful. The Griffon Vultures *Gyps fulvus*, newly received from Bristol Zoo, laid but only the female incubated and the egg was infertile. As in previous years the European Black Vultures *Aegypius monachus* both took turns in sitting on their nest but no egg was laid. Later in the summer the opportunity was taken to laparoscope the female and veterinary opinion then suggested that the recent termination of egg-laying may be related to a distortion of her reproductive tract.

Waterfowl bred included Cuban Whistling Ducks *Dendrocygna arborea*, Common Shelducks *Tadorna tadorna*, Marbled Teal *Marmaronetta angustirostris*, Meller's Ducks *Anas melleri*, Garganey *A. querquedula*, Falcated Teal *A. falcata*, Chiloe Wigeon *A. sibilatrix*, Ringed Teal *Callonetta leucophrys*, Mandarin Ducks *Aix galericulata*, Carolina Wood Ducks *A. sponsa* and Smew *Mergus albellus*.

Malay Crestless Firebacks *Lophura erythrophthalma erythrophthalma* laid for the first time at Chester and a female chick was reared. The Blyth's



R. Wilkinson

Malay Crestless Fireback Pheasants

Tragopans *Tragopan blythii* also laid for the first time but although a chick hatched it was weak and did not survive. The Satyr Tragopans *T. satyra* were allowed to sit on their own eggs and reared a single chick. Other pheasants reared included Lady Amherst's Pheasants *Chrysolophus amherstiae*, Golden Pheasants *C. pictus* and Himalayan Monal *Lophophorus impeyanus*. Green Peafowl *Pavo muticus*, Common Peafowl *P. cristatus* and Congo Peafowl *Afropavo congensis* were all bred. The Congo Peafowl hatched and reared chicks as a family group comprising the adult breeding pair and their two full-grown male offspring from 1997. These young males were especially active in defending the chicks from the presumed threat represented by keepers approaching the chicks when entering the enclosure and at least one also brooded the chick. The two Green Peafowl were hand-

reared and represent another species bred at Chester for the first time in 1998.

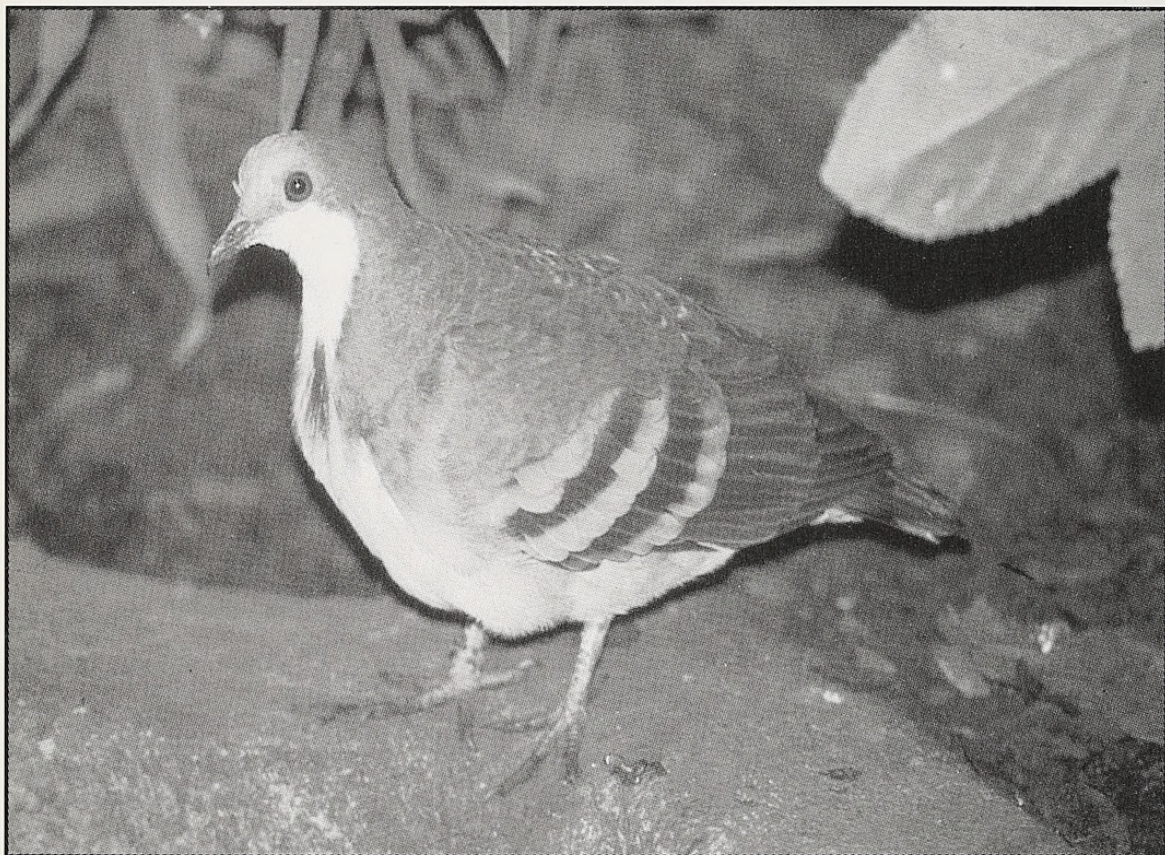
Two Spectacled Owls *Pulsatrix perspicillata* were reared, one by its parents and the other by hand and three Tawny Frogmouths *Podargus strigoides* were bred including the first one to be successfully raised under its parents at Chester. The latter success was due to the keeper's patience in teaching the parents to feed their chick, and taking care to provide supplementary food for the chick when required.

Two Kookaburras *Dacelo novaeguineae* were reared as were three Lilac-breasted Rollers. The African Grey Hornbills *Tockus nasutus epirhinius*, Trumpeter Hornbills and Wrinkled Hornbills *Aceros corrugatus* all attempted to nest. Although the Trumpeter Hornbills had at least one chick in the nest none were reared to independence. The death of our breeding female Wrinkled Hornbill after two unsuccessful nesting attempts in 1998 was a particular blow in that this pair had been so successful in previous years. Following the provision of a natural nest log, clearly to their liking, the Green Wood Hoopoes *Phoeniculus purpureus* reared a female chick on their first breeding attempt, and with that youngster's help in provisioning them, reared two male chicks in a second brood. This was the first time that Green Wood Hoopoes have bred at Chester. Touracos also had a particularly good year with four Violaceous Touracos *Musophaga violacea*, three Schalow's Touracos *Tauraco schalowi*, three Red-crested Touracos *T. erythrolophus* and two White-cheeked Touracos *T. leucotis* reared. New to the collection are a pair of Fischer's Touracos *T. fischeri* but these showed no breeding activities this year.

Amongst the smaller insectivorous passerines we were most successful with one pair of Yellow-throated Laughing Thrushes *Garrulax galbanus* from which a total of five chicks were reared by a combination of parent-rearing and hand-rearing. White-rumped Shamas *Copsychus malabaricus* fledged only a single chick losing other chicks from three successive nests. Similarly the Plumbeous Redstarts *Rhyacornis fuliginosus* made three nesting attempts but the only chick reared was hand-reared and proved to be less than robust. The Azure-winged Magpies *Cyanopica cyanea* reared three chicks. Although the Red-billed Blue Magpies *Urocissa erythrorhyncha* had two nests of chicks none were reared to independence. Birds in the free-flight of the Tropical Realm were more successful, with Scissor-billed Starlings *Scissirostrum dubius* fledging chicks for the first time at Chester and Emerald Starlings *Lamprotornis iris* and Red-eyed Starlings *Aplonis panayensis* again reared chicks. Other birds fledging chicks here included Speckled Pigeons *Columba guinea*, Silver-billed Tanagers *Ramphocelus carbo* and Pekin Robins *Leiothrix lutea*. The Silver-eared Mesias *L. argentaurius* appeared to be cuckolded again when their youngster proved once again to be a hybrid with a Pekin Robin. Two African Pied Starlings

Spreo bicolor were hand-reared from incubator hatched eggs. At fledging these youngsters were caged with a single Fischer's Starling *S. fischeri* which proved ideal in caring for these chicks, feeding them on demand until they became independent.

Luzon Bleeding Heart Pigeons *Gallicolumba luzonica* were bred in the upper aviaries of the Tropical House and two Mountain Witch Doves *Geotrygon versicolor* reared in one of the small enclosures in the Bird Arcade. The Superb Fruit Doves *Ptilinopus superbus* hatched a chick in November but unfortunately this failed to survive. New arrivals were a pair of Mindanao



R. Wilkinson

Luzon Bleeding Heart Pigeon

Bleeding Heart Pigeons *G. criniger* and two Golden Heart Pigeons *G. rufigula*. Crested Bronzewings *Ocyphaps lophotes*, Diamond Doves *Geopelia cuneata* and Mexican House Finches *Carpodacus mexicanus* fledged chicks in the Finch Flight.

1998 was a good year for parrot breeding at Chester. The Mount Apo Lorikeets *Trichoglossus johnstoniae* after several unsuccessful nesting attempts fledged two excellent youngsters. This was the first successful breeding of this endangered lorikeet at Chester and to my knowledge the first UK breeding for over 90 years, the first breeding being that in Mrs Johnstone's collection in 1906. There is now a European Studbook (ESB) for this delightful little lorikeet managed from Loro Parque, Tenerife, so we

may hope it has a better chance of now becoming established in European aviculture. Other parrots bred at Chester in 1998 included four species of Amazons, namely one Red-tailed Amazon *Amazona brasiliensis*, two Lilacine (Ecuador) Amazons *A. autumnalis lilacina*, three Green-cheeked Amazons *A. viridigenalis* and three Cuban Amazons *Amazona leucocephalus*. This was especially gratifying in that all the young were parent-reared on show to the public. This was achieved by the Cuban Amazons by isolating the male after the female had laid and allowing her to rear the chicks unaided. In previous years the male Cuban Amazon had severely attacked the female whilst she was rearing chicks forcing the removal of chicks for hand-rearing. The only parrots hand-reared in 1998 were three Blue-eyed Cockatoos *Cacatua ophthalmica*. Two Red-fronted Macaws *Ara rubrogenys*, two Blue-winged (Illiger's) Macaws *A. maracana*, one Yellow-naped Macaw *A. auricollis*, a Thick-billed Parrot *Rhynchopsitta pachyrhyncha*, a Golden-capped Conure *Aratinga auricapilla*, a Blue-throated Conure *Pyrrhura cruentata*, four Greater Vasa Parrots *Coracopsis vasa*, three Derbyan Parakeets *Psittacula derbiana* and a Yellow-backed Chattering Lory *Lorius garrulus flavopalliatus* were all parent reared in on-show aviaries. We were especially pleased to breed the Yellow-naped Macaws and Golden-capped Conures as these had not previously bred in the collection.

Despite the difficulties resulting from the gales then the snow, 1998 proved to be good for bird breeding with some 70 species of birds reared from a total of *ca.* 80 species hatching chicks. However, it is becoming increasingly difficult to be certain of placing surplus stock in known quality housing and for some successful pairs there is a danger of swamping managed populations with their offspring. As such, we now breed certain species only to order and for other species must carefully consider their role within our collection. We will become increasingly selective in terms of both species and individuals selected for breeding. That is not to say bird breeding is less important but it needs to become even more focused. Supporting this the zoo's plans for winter 1999 include the 'Egg Centre', a new incubation and rearing facility with public viewing and educational interpretation. These new developments and our increasing commitments to field conservation depend on maintaining the recent increase in zoo visitors. Continuing zoo improvements and innovations like 'Islands in Danger' should ensure we continue to get the visitor support we need to be better able to contribute to wildlife conservation and education at the same time as providing a good day out.

Dr Roger Wilkinson is now General Curator: Higher Vertebrates and Research Co-ordinator at Chester Zoo. He was recently re-elected to serve as an Avicultural Society Council Member for a further period of five years.

THE RED-BROWED AMAZON *Amazona rhodocorytha*

by Roger G. Sweeney

The Red-browed Amazon, which measures up to 36cm (approx. 14in) long and commonly weighs about 450g (approx. 1lb), is one of the larger of the mainland species of Amazon parrots. The coloration of this species, particularly that of the head, is extremely attractive. The forehead and crown are bright red. The lores are yellow, sometimes becoming orange as the yellow merges into the red of the forehead. The front area of the cheeks and the throat are pinkish-red, with the rear of the cheeks being blue, fading out to green. The patterns of colour merge together, with those of each individual bird being slightly different. The greatest individual variation occurs in the amount of yellow, which can range from almost none to being quite extensive. In sharp contrast to the beautiful coloration of the head, the plumage of the body and wings is mainly green.

The Red-browed Amazon is endemic to a limited area along the coastal region of eastern Brazil. In the past limited numbers of birds were exported, but in recent decades no further exportations have been permitted under Brazilian legislation which prevents the exportation of this species, that has been placed on Appendix 1 of the CITES Convention. Despite having been in captivity for many years, only a small number of birds from the early importations have reproduced. Until recently the European population comprised these ageing adult birds, the majority of which had not reproduced, and a group of second generation birds bred by private aviculturists, all of which were closely related and already showing an inbreeding coefficient.

An EEP (European Endangered Species Breeding Programme) for this species was initiated in 1994, but a number of problems soon became clear. To begin with a number of the important ageing wild caught birds were confiscated birds held by zoos, which could not move them for the purpose of pairing. The strict conditions of membership of the EEP discouraged private aviculturists from participating, so in 1996 there was a recommendation that private aviculturists should pay an annual fee to take part in the EEP. If progress was to be made it was important that more of the founder birds which had the potential to breed, but which had not done so, were encouraged to breed in order to produce new bloodlines of first generation young, which could be moved more easily and used to form new unrelated pairs.

Loro Parque had held a large group of Red-browed Amazons for over a decade, but these had shown no interest in breeding other than to lay a few infertile eggs at irregular intervals through the years. When I took charge of these birds we began by building a large communal aviary, designed mainly



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