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Edited by
MARY HARVEY

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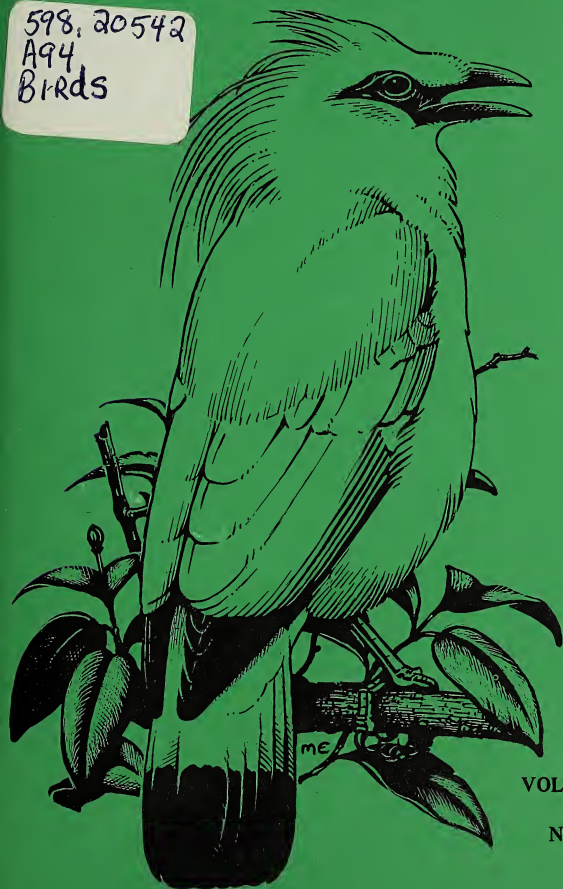
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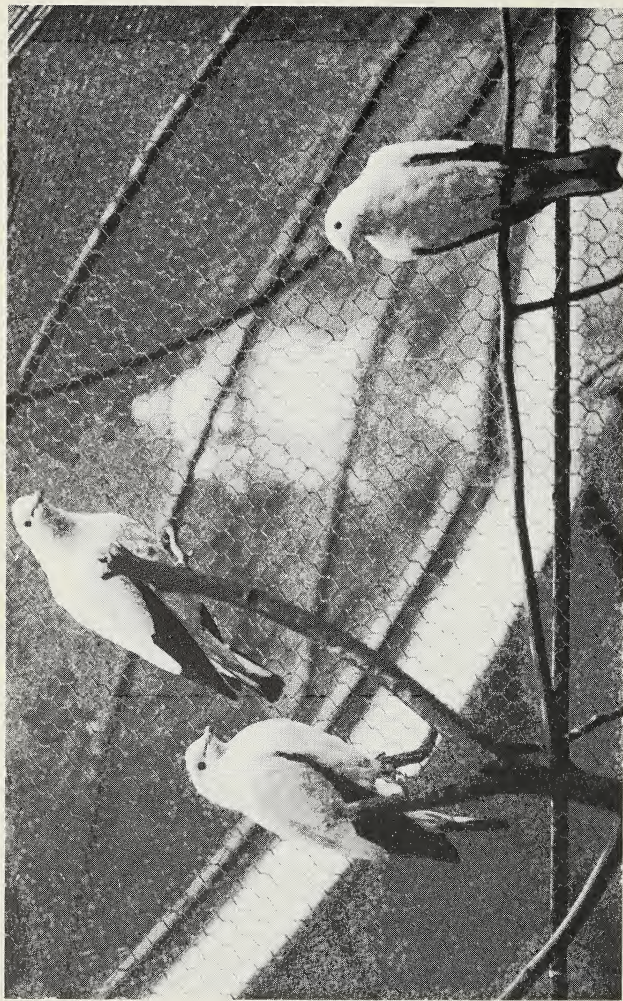
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THE AVICULTURAL MAGAZINE welcomes original articles that have not been published elsewhere and that essentially concern the aviculture of a particular bird or group of birds, or that describe their natural history. Articles should be preferably typewritten, with double spacing, and the scientific names as well as the vernacular names of birds should be given. References cited in the text should be listed at the end of the article. Line drawings should be in Indian ink on thick paper or card; photographs which illustrate a particular point in the article will be used where possible and should be clearly captioned.

ADDRESS OF EDITOR

Mary Harvey, Windsor Forest Stud, Mill Ride, Ascot, Berkshire, SL5 8LT, England.



Pied Imperial Fruit Pigeons at Waddesdon Manor

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JANUARY-MARCH 1983

BREEDING THE PIED IMPERIAL FRUIT PIGEON

Ducula bicolor

AT THE NATIONAL TRUST, WADDESDON MANOR, BUCKS.

By I.M. HADGKISS and K. MITCHELL

The Pied Imperial Fruit Pigeon is a very striking bird with its white and black plumage providing sharp contrast. It is predominantly white with the primaries, primary coverts, outer secondaries and part of the tail, black. Derek Goodwin (*Pigeons and Doves of the World*, 1967) describes its distribution as from the Andamans and Nicobars, eastwards to the Philippines, Moluccas and islands west of New Guinea. Although first seen at the London Zoo in 1867, it would appear that this species has not been regularly imported.

The pair we have at Waddesdon Manor has been in the collection for eight years and no display or breeding activity had been seen until this year. We think it is possible that the use of a nutritional supplement (Intervets SA37) on the food since January 1982 may have been the factor that brought the birds into breeding condition. These birds have always been very set in their ways regarding diet. Approximately half inch cubed fruit is taken but other foods such as mixed corn, mincemeat, hard-boiled egg and coarse softbill food are ignored. Despite the availability of live food we have never seen them eat mealworms or locusts. Food dishes in the form of hang-ons are fixed to the wire at perch ends as these birds seem loathe to land on the ground, and they are only rarely seen at the pool drinking.

They are housed in a large aviary measuring 24 ft. long by 20 ft. wide by 25 ft high with an inside shelter 8 ft. long by 6 ft wide by 11 ft high. The flight has a central fountain in the middle of a lawn, with a gravel path running round the perimeter. At each corner is a planted bed containing Cotoneaster. All our aviaries hold mixed collections, and this

flight is shared with Schalow's Touracos, Emerald Green Toucanets, Rothschild's Grackles, Chinese Crested Mynahs, Blue-eared Glossy Starlings, Yellow-vented Bulbuls and Carolina Wood Ducks. Careful siting of feeding points has produced relative harmony in this flight, with only the hen Chinese Crested Mynah showing more than average aggression.

The first examples of display by the pigeons were seen during the second week of May, and over the following five weeks three very separate types of display were witnessed. The first involved the cock and hen sitting close together on the perch, both facing in the same direction. The cock puffed out his breast feathers and lowered his head in a bowing posture. He then made a series of short jumps on the spot, approximately every second, and about 2 inches off the perch. Cooing loudly throughout with the body remaining in the crouched position, he attempted mating after about 10 seconds of display but the hen did not seem interested and moved away. This display did not seem to be prompted by anything other than the fact that the birds were perched close together on the same branch. The second example of display was seen only once and took place during the first week in June. The cock was on the nesting platform and the hen on a branch just below it. The cock flew to join her and what we called "necking" followed.

Each bird was rubbing its head and neck against the other and alternating sides, a display which lasted about 20 seconds. It was accompanied by quite a loud clicking noise but it was not known whether this was produced by the beaks or if it originated in the voice box. The birds were positioned facing each other during this display, one of the most unusual forms we have ever witnessed at Waddesdon Manor from any species. The third and final example of display appeared to be one of attraction, the cock crouching very low on the perch with his head below perch level, his tail cocked in the air, and wings slightly drooped and rustling. (There was no sign of the puffed chest that we saw in the first display.) He then threw back his head making a metallic noise, not unlike a stick hitting a metal drum full of water. This was continued until the hen flew to join him and at that point the cock immediately reverted to the first example of display.

On 15th June the cock was seen carrying twigs and this continued for a few days. They had chosen a platform near the roof in the inside shelter which consisted of 16 gauge 1 inch x ½ inch mesh Twilweld, 12 inches square with a 3 inch lip. This choice surprised us as there were three platforms of similar design in the outside flight and the pigeons did not usually spend much time in the inside shelter. Despite supplying a wide range of

twigs of varying size and from different types of tree, the nest building was a disaster. The bulk of the twigs they placed on the platform were dislodged until after six days there were only three twigs left. At this point we decided to intervene and a rough nest of dead Yew twigs was constructed for the birds on 21st June. This proved to be only just in time as the single egg was laid the following day on their newly constructed nest. Incubation was by the hen alone, the cock never being seen to venture into the inside shelter. After 11 days of incubation we saw the hen off the nest and, to our disappointment, inspection of the egg revealed that the embryo had failed to form properly. However, the fact that the egg was fertile encouraged us for at no stage had we witnessed mating.

Immediately the hen rejoined the cock in the flight he started to display again. This continued for a further nine days and on 12th July the hen laid again. Inspection of the egg on 17th July revealed that it was fertile. All we could do was hope for better luck this time. The cock bird was never seen to enter the inside shelter to join the hen from the day she laid the egg. However, suddenly on 1st August he appeared on the nest platform with her and spent most of the day there. He continued to do this but was clearly taking no part in incubation but just sitting alongside the hen.

On 4th August, to our delight, a chick hatched and seemed strong and vigorous. The incubation period of 24 days quite surprised us as the information available on other species of Fruit Pigeon rather suggests 17-18 days. Hopefully we will get the opportunity to check this with a second round. Close inspection was not carried out until 7th August and this revealed a healthy chick with fawn coloured down and rather large bluish feet. The parent birds had become extremely agitated by the disturbance and we decided to leave well alone. The young pigeon grew quickly and on 28th August was seen perching on the edge of the nest platform. The following day it had fledged and was flying quite strongly around the outside flight. This was 25 days after hatching, and seven days after fledging it was first seen feeding by itself. The young bird was not caught up for close inspection, but appeared to be only different from the parents in size, being slightly smaller. By the end of September it was well established and in good plumage.

The hen laid again on 8th September and hatched a second chick on 1st October confirming the incubation period as 24 days. At the time of writing, the chick is five days old and progressing well.

As described, the Pied Imperial Fruit Pigeon *Ducula bicolor* has been bred at Waddesdon Manor. This is believed to be the first success in this country but anyone knowing of a previous breeding in Great Britain or Northern Ireland, or any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

BREEDING THE INDIAN WHITE-BACKED VULTURE

Gyps bengalensis

In the wild this handsome bird has a distribution over the Indian sub-continent from as far north as the Himalayan mountain range down to the southernmost tip. The species breeds in small colonies, typically building nests in trees growing on riverbanks. It is considered a holy bird by the Parsees, freeing their souls from their mortal remains - hence the famous Towers of Silence in Bombay.

Over a number of years I had managed to acquire eight birds from a variety of sources within the United Kingdom. All birds had their full mature plumage on acquisition and the zoos that they came from were unable to give any details of estimated ages of the birds - in one instance the birds were even misidentified as Griffon Vultures *Gyps fulvus*, a much larger species with no black colouring! The mature plumage shown when the bird is standing is of varying shades of grey tending to black. The neck and head are covered with down and often not as sparsely as frequently described. When in flight the pure white back is exposed as are the white feathers under the wings. A stark contrast indeed.

As the colony grew in number it became obvious that the existing cage was inadequate, both in size and form. The relatively small size meant that the birds were flustered at each feeding and a number of internal supports led to wing damage. A new cage was constructed approximately 150 feet square and some 25 to 35 feet high with only two internal supports. It is covered only with wire netting so that the birds are exposed to the full forces of the British climate. There are high level roosts under which there is a series of nesting platforms, each with a large tyre, to form the basis of the nest. The food troughs and water baths are situated in one corner. A number of mature fruit trees within the enclosure, together with some poplars and evergreens, give the only protection from the wind.

The release of the birds into the new aviary was a revelation. Within three weeks they were all fit enough to fly to the topmost perches although it took some months for them to re-acquire absolute assurance in man-oeuvring.

Feeding time became less of a trauma to all concerned. Even to this day I am closely watched by the birds and none will remain within 50 feet of the feeding area whilst I am there. The feeding of the birds has become simpler as the number of birds has increased. Nowadays it is only necessary to enter the aviary at most twice a week as a ewe carcass, supplemented by a few chickens, are sufficient for their needs for a week. When the

weather is mild or cold the meat remains sufficiently fresh. During summer the presence of flies makes it obligatory to feed smaller amounts more regularly as, contrary to popular belief, these birds are particular on this aspect of feeding and once meat is flyblown, it will be rejected.

At the end of a week only the bones and fleece remain to be removed. Many of the bones are broken up into smaller pieces by me to ensure availability of calcium and the efficient operation of the gizzard. Oyster grit and a multi-vitamin are sprinkled over fresh carcasses occasionally, most often when I have opened a particularly tough-skinned carcass such as a pig. I have found that with sheep and smaller carcasses, the birds are able to open them without human assistance and it is my opinion that the extra time spent together as a colony, feeding together and jockeying for position, etc., is of great importance in the formation of a pair bond.

The improved fitness and reduction in disturbance produced an immediate interest by the birds in pairing and by the commencement of the breeding season three pairs were "bonded". The bonding is first apparent to me when a female takes and defends a nesting site from all but the favoured male who is allowed to approach near to, but not on the nest. Both will stand close to each other and often there will be reciprocal preening of the head and neck. The male may attempt mating even when the female is not in condition, though his advances will be rejected. Such attempts are never on the nest proper, only in the vicinity.

This remained the position for a number of years until it was noted that one pair was showing a more constant attention towards each other than the spasmodic attentions of just a pair bond. More and more time was spent together, the male approached increasingly closer to the nest and the frequent attempts at mating were rejected less vigorously. Ultimately as the female came into condition, the male successfully mated with her though he had always to beware of receiving a nip when dismounting. At this time, nest-building began, both birds bringing quite large sticks to the site. Frequency in mating increased as it did in vigour. The male emits a hoarse sound whilst mating but the female appears to remain silent. Ultimately the egg was laid but it was not incubated for long as the male died from natural causes while on the nest. This was a great disappointment as, so far as I am aware, none had previously bred in captivity in Britain. In August 1981 a significant increase in mating over usual "pair bonding" activity was noted in one pair together with a corresponding increase in building at the nest site. An egg was laid in September and incubated alternately by both male and female for a total period of 56 days when it was found, upon inspection, to be addled.

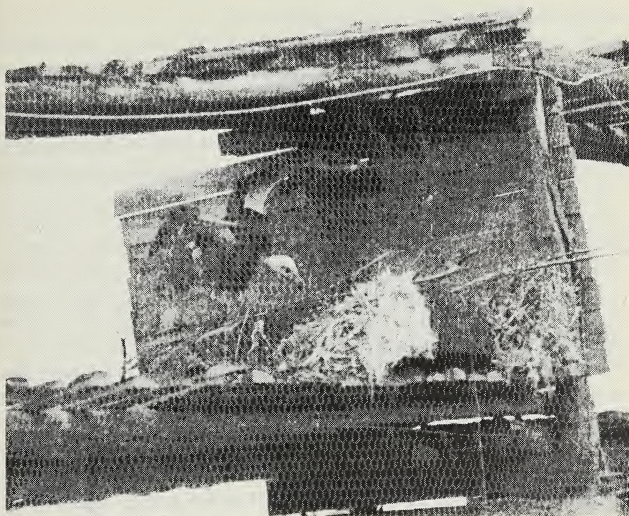
Immediately after removal of the egg, regular mating was again observed and in December 1981 a second egg was laid. This event was unexpected as most authorities state that the female is incapable of relaying save for a short period immediately following the laying of the first egg. The incubation was not without difficulty as not only was the weather particularly severe but the male was accidentally injured and for 17 days the female incubated alone, leaving the nest only once every two or three days, for approximately ten minutes each time, to feed. Subsequently the male recommenced his duties at the nest and on 28th February 1982, the 62nd day, a chick was successfully hatched.

The parents continued to share the responsibilities of brooding and feeding. For the first few weeks the nest was never left alone and the feeding by regurgitation was frequent. Initially the chick would place its whole head inside its parent's throat to receive the food. By the third day the chick's coat was a whitish down which subsequently gave way to grey down and was ultimately replaced by juvenile plumage many weeks later.

Growth continued apace and in the seventh week the chick could be observed making efforts to stand, ultimately achieving success for very short periods in the eighth week, simultaneously with the spreading and slow flapping of the wings. By now the young bird was only being brooded at night although its parents were never far away during daylight hours and would return immediately should their progeny call, either through hunger or fear. Upon cessation of constant brooding, mating between the parents, which had ceased immediately upon egg laying, was seen to occur again, probably to strengthen their pair bond.

By the ninth week the young vulture was about the size of a duck and feeding had reduced in frequency to only twice a day, usually at dawn and dusk. The parents continued to defend vigorously from intruders the nest and platform upon which it sat, a close watch on the nesting area being maintained although by now they were spending considerable periods some distance from the nest. The growth of the body feathers was now obvious and rapid (the tail feathers were also becoming visible) as too was its increasing physical strength. At this time it had, on occasion, to withstand several inadvertent but vigorous blows during battles on the nest between its parents and intruders.

The tenth week brought further progress; the young vulture began to hop onto the raised sides of the nest where it would stand and sun itself or catch the breeze with outstretched wings. A definite awareness of other activity within the aviary was noted during the week.



Young Indian White-backed Vulture, approximately nine weeks old

There followed a period of consolidation of the skills developed thus far. The young vulture became able to stand for longer, hopping around the nest, its agility increased and the wing-beating exercises became more exuberant. The primary and secondary wing feathers, although apparent, had much growth still to make and the tail feathers, now some three inches long, were still in the quill. It preened itself, keeping the plumage in perfect condition and even exposed its wings to gentle rain. Another activity which occupied much time during this period was the rearranging of fresh nesting material brought to it by the parents.

The middle of the thirteenth week brought the next significant step when the young vulture spent the night standing on the nest, rather than lying in it as it had hitherto. In the fourteenth week it had yet to leave the safety of the nest. A parent tried to entice it onto the platform by regurgitating food onto the platform a few feet from the nest. This was not successful and subsequently the adult reconsumed the food and fed it at the nest. A few days later, small black quills were seen on the head and had

covered it to form a black cap within the week. This cap would seem peculiar to juvenile birds aged under one year.

The young vulture left the nest for the platform early in the fifteenth week. The first occasion was of short duration and then it hopped back on to the nest and immediately called to the parents for reassurance. Gaining rapidly in confidence, soon all active periods were spent on the platform where it could preen and exercise without the constraint of the nest which it was beginning to outgrow. The parents were still feeding their child but the time spent at the nest was very short.

The young vulture first flew in the seventeenth week when it glided approximately 100 feet down to the carcass of a calf and this was accomplished at the urging of, and in the presence of, the parents. It was not for a further two weeks that the young vulture had sufficient ability to gain enough height to return to the nest. During that time it was either on the ground or on perches low to the ground. It was still kept under constant surveillance by the parents and was led to food twice a day by them, but from that first flight the parents were never seen to feed the young vulture, despite much soliciting.

By its return to the nest, the young bird had its full juvenile plumage of dark brown body, tail and wings with a black cap and was very distinctive when seen among the mature birds in the aviary. Although initially allowed to return to the nest, within two months the parents would evict it as quickly and aggressively as if it were any other intruder.

Throughout the entire breeding period there was no differentiation in diet for the breeding birds and for those not breeding. They were all fed on a random variety of whole carcasses - sheep, calves, lambs, piglets and chickens as available. The breeding pair ranked high in the pecking order within the colony and it was seen that the young vulture retained their rank even after the parents had ceased to oversee it, successfully defending itself when challenged by older birds of lesser rank.

As described, the Indian White-backed Vulture *Gyps bengalensis* has been bred and this is believed to be the first success in this country. The breeder, who is a member of this society, wishes to remain anonymous, but another member of the society, who has visited the aviary and seen the birds concerned, has written confirming the breeding. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

THE YELLOW-SHOULDERED AMAZON

Amazona barbadensis

By ROSEMARY LOW (Barnet, Hertfordshire)

The Yellow-shouldered must surely be one of the least known of the Amazon parrots from the Caribbean region. Less striking and distinctive than the large, highly endangered *Amazona* of the Lesser Antilles (such as the Imperial *A. imperialis* and St. Lucia *A. versicolor*, to the uninitiated it could be confused with races of *ochrocephala*, the Yellow-fronted Amazon. It is, indeed, closely related to it and perhaps *ochrocephala* and *barbadensis* should be considered as superspecies. If any other species played a part in its evolution, it was surely the Orange-winged *A. amazonica*, for reasons which I will explain later.

A medium-sized Amazon measuring about 12 inches (31 cms), the Yellow-shouldered is generally of rather slim build. It shares with *ventralis* the distinction of being the only member of the genus with the forehead white, the beak light-coloured and no red on the face. It should not be confused with the Yellow-winged Amazon *A. aestiva xanthopteryx*, a subspecies of the Blue-front, some specimens of which have a larger area of yellow on the shoulder but otherwise bear no resemblance to *barbadensis*. No confusion should arise as the Yellow-winged has the bill black.

The extent of yellow on the head varies in individuals of *barbadensis*, as does the area of blue on the cheeks; some individuals possess no blue at all.

The supposed subspecies *rothschildi*, from Bonaire, Blanquilla and Margarita, is not a valid one. It is described as having less yellow on the head and shoulder than the nominate race. Observation of birds on Bonaire, and examination of skins from all parts of the range, shows that the degree of yellow varies considerably in individuals, regardless of the locality from which they originate.

Distribution.

The Yellow-shouldered Amazon is found in Venezuela (being probably confined to two small coastal areas) and on the Venezuelan islands of Margarita and Blanquilla, also on Bonaire, an island of the Netherland Antilles. It was formerly found on Aruba, in the same group, but has not been seen there since 1955. The island has a large oil refining industry, which has resulted in little or no undisturbed land remaining.

Current Status

Little was known about the status of this species in Venezuela until April 1981. In that month Robert Ridgely, the American ornithologist, reported (pers. comm.) finding "large numbers in both areas of Venezuela from which they were recorded, namely western Falcón (from about Dabujuro west to about the Zulia border) and in northern Anzoategui (from west of Barcelona to around Puerto Piritu)." He commented: "Why this species is so limited in range remains enigmatic. But within these restricted areas it is locally abundant and there is no evidence of any decline in numbers. For reasons which are not known, it is absent from similar habitat in geographically intermediate areas in Falcón (e.g. around Loro, and on the Paraguaná Peninsula) between extreme western Falcón and Bonaire."

Its surviving numbers on Blanquilla and Margarita are unknown. Margarita is a comparatively large island, 444 square miles in extent and 37 miles long. Yepez (1964) obtained specimens of *barbadensis* in the locality of Macanao, on Margarita. They were relatively abundant there, especially near Robledar and Boca de Rio. Near San Francisco de Macanao they fed on maize, causing great damage; flocks of 30 birds were observed. Yepez did not see them on the eastern part of the island but was told that they existed there.

Finally, this species is found on Blanquilla, an island 46 miles northwest of Margarita, measuring 10 km (6¼ miles) long and 5 km (3 miles) wide. A flat, barren island, with low cliffs of coral limestone, the central plateau, 60 m (200 ft) above sea level, is dotted with thin patches of acacia, and cactus *Opuntia* and *Cereus*. Lowe (1907) had found the parrots to be "pretty common" there in 1906.

In recent years, the only part of its range in which the Yellow-shouldered Amazon has been studied by more than brief observation, is Bonaire. Various population estimates have been made, varying from 50 pairs (an under estimate) to between 375 and 400 by Reijns and Van der Salm.

Natural History

Bonaire is a little-known and virtually unspoiled island only 80 km (50 miles) from the coast of Venezuela. It has an area of 112 square miles and a population of about 8,000 people. Extremely arid, with an annual rainfall of 50 cm (20 inches), cacti, especially two species of tall candelabra *Cereus repandus* and *Lamprolaima griseus*, dominate the vegetation in most areas.

My husband and I visited Bonaire in April 1979. The only location at



R.H. Grantham

Cadushi cactuses and limestone rocks; typical of Bonaire's bizarre yet haunting landscape, inhabited by the Yellow-shouldered Amazon Parrot

which we consistently found *barbadensis* was Fontein, in the northern part of the island. On the third day we were exploring a disused plantation at the foot of limestone cliffs (near the coast but not on it) when we were treated to the enthralling sight of a flock numbering at least 14 birds, flying low above us and swerving away when they discovered our presence. They were noisy in flight, calling and chortling in typical Amazon fashion.

Here we watched them twice daily for the following eight days. Soon after first light, at about 6.30 - 7.00 a.m., and at about 4.00 p.m. were the best times, although a few birds might be in evidence at almost any daylight hour. Sometimes we saw them only as specks in the distance, flying between the cliffs, in which there were numerous holes, some of which undoubtedly formed nesting sites. On the last day, 17th April, I watched a pair of parrots which had dirty grey foreheads, probably because they had started to prepare their nest site. During the first two or three days at Fontein, the parrots kept together in a flock of up to 19 birds. Thereafter they flew off in pairs and it seemed that the flock was splitting up prior to breeding.

It was possible to approach the parrots to within about 9 m (30 ft). They fed in the disused plantation which included trees of sapadillo, almond and mango. The literature records that they feed on the fruits and tops of cacti; at Fontein I saw a parrot on cactus on only one occasion.

In times of drought, a large proportion of the parrot population on Bonaire may starve to death. This happened in early 1978. Starving birds flew into Kralendijk, the main settlement, looking for food. A board member of the national park contacted a park in Venezuela to request assistance and 2,000 kilos of mangoes were flown into Bonaire. However, for many of the parrots help came too late; the number to die of starvation or by the gun was estimated by Frater Candidus, a local ornithologist, as 200, or slightly under half of the population. Although this species may have adapted to periodic droughts, the use of the best watered locations on the island for agricultural purposes, might now prevent them from finding adequate food during periods of drought. If this is the case, droughts would have a more devastating effect on the population than in former years, and the species needs assistance in the form of funding from a conservation organisation, to provide food during severe droughts.

The Yellow-shouldered Amazon usually nests in May, laying two or three eggs in a hole in a tree or cliff. Cliff nests are illegally robbed, as this bird is prized locally as a pet. Young sell for a sum which is small by more affluent standards, yet substantial on an island where pigeons and iguanas are common foods of the poorer people.

In an attempt to discover more about the parrots' nesting habits, Frater Candidus sent questionnaires to the schools. While the results cannot be relied upon implicitly, replies indicated that some children had a knowledge of the habits of the Yellow-shouldered Amazon which was more than superficial. In one batch of replies examined, the answers to the question "In which month do the parrots start to breed?" were: March (one), April (seven), May (15), June (two), July (three) and October (three). There were other references to nests being found in October, so this may occasionally occur.

Information relating to nests suggested that they were divided approximately equally between cliffs and trees. Material found in the nest cavity included leaves and feathers and, in the case of tree nests, wood gnawed from inside the tree.

This species has been protected by law on Bonaire since August 1952, when its capture and export were forbidden. However, the law is difficult to enforce, and many parrots (perhaps one hundred or more) are kept as

pets on the island.

The future for this species is difficult to assess, in view of the lack of information on its current status on Blanquilla and Margarita. Assuming that it is only a little more numerous there than on Bonaire and in the coastal area of Venezuela, its total population would be in the order of a few hundreds - possibly exceeding one thousand but there is no evidence to substantiate this figure. The parrot must be protected in all parts of its range.

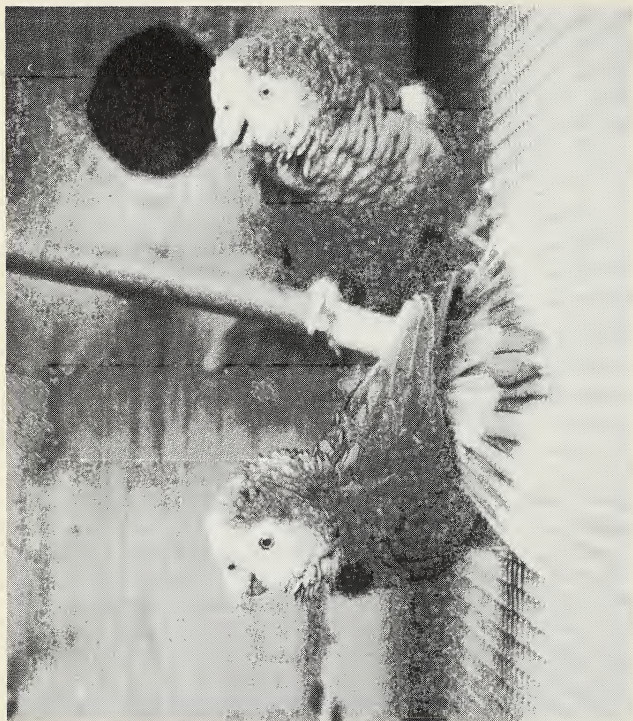
In Aviculture

This species has never, to my knowledge, been available commercially; that is, most of the few specimens in Europe and the United States have been imported privately. The majority of those in the USA were probably imported by citizens formerly resident in Venezuela or on Aruba, bringing in one bird at a time years ago, as they had every right to do.

My interest in this species was aroused in 1973. In a consignment of Amazons imported by a London dealer was a single *barbadensis*. I bought it because I knew of another; the second bird was purchased soon after. At the time there was a single *barbadensis* in London Zoo; Mr. Peter Olney, Curator of Birds, kindly allowed me to have it on breeding loan. During the next three years these three birds were kept together in every possible combination of two. No breeding attempt occurred. The reason for this was not obvious until later when they all proved to be males! Subsequently I acquired two former pet birds on breeding loan, one ("Icky") from Mr. and Mrs. C. Wright and the other ("Susie") from Mr. Philip Levingston. Both proved to be females. A sixth bird was obtained due to the kindness of another member of this society, Mr. Idris Hale of Penscynor Bird Gardens. This bird was later to sire our first youngster.

Having finally made up two true pairs, both females produced eggs annually, normally in May. The usual clutch size was three; most of the eggs were infertile. The probable reason was that one or both birds of the pair had not achieved full breeding condition by May, especially "Susie" and her male who would be retained indoors until April (usually the latter part). "Susie" proved to have a low tolerance to cold weather and is always wintered indoors with her mate, the London Zoo bird. Females of this species are rare and no risk can be taken with her. Of 21 captive birds known to me, only five are females.

In 1982 "Icky" and her mate had shown no interest in nesting by May. I therefore decided to provide her with a new mate - the bird from Penscynor. This change was much to the female's liking; his extrovert, cheer-



R.H. Grantham

Pair of Yellow-shouldered Amazons defending nest-box

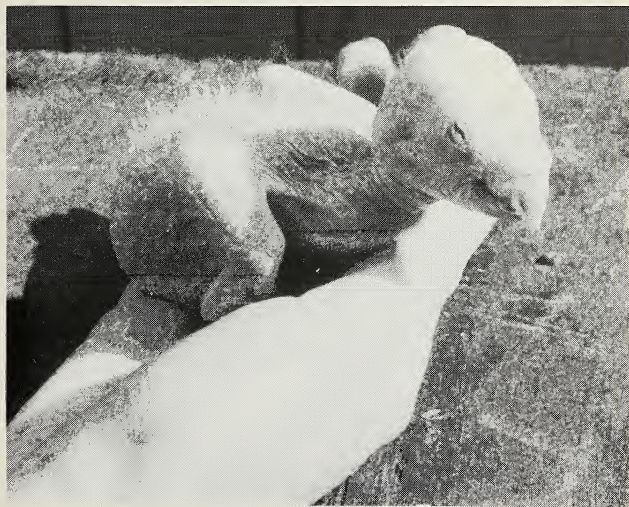
ful personality matched her own and was totally unlike the almost morose character (atypical of *barbadensis*) of her previous partner. Within four weeks she was sitting on three fertile eggs.

When checking the nest on 15th July, my husband felt only two eggs. Further investigation revealed a newly-hatched chick which did not seem very strong. It had bruises on the head, and the wing tips and toenails had been bitten. He therefore removed it immediately. It was placed in an

incubator until a brooder reached the required temperature of about 95°F (35°C).

Most Amazon chicks are only sparsely covered with down, and so it was with this *barbadensis*. It had some longish white down on the upper parts only, from the nape to the lower back. The beak (showing the smallest egg tooth I have seen in a parrot) had the raised pads on each side of the upper mandible which is a characteristic of neotropical parrots.

The day after hatching it weighed 10 g and for the first five days of its life put on only 1 g daily. Chicks which have never been fed by their parents seldom grow as quickly initially as those which have. A newly-hatched chick must be offered food of a very liquid consistency, which means feeding at intervals of one to two hours during the day. The rate at which this chick's crop emptied meant that it could be left two hours between feeds. For the first two nights it received two feeds between 11.30 p.m. and 6.00 a.m., then an additional 3.00 a.m. feed until it was 17 days old. This could have been discontinued a few days earlier but some younger chicks required night feeds so the *barbadensis* benefitted.



R.H. Grantham

Yellow-shouldered Amazon, aged 22 days (eyes not fully open)

This could have been discontinued a few days earlier but some younger chicks required night feeds so the *barbadensis* benefitted.

For the first five days the food consisted of a thin mixture of Heinz first weaning food, bone and beef broth, with vegetables, plus Heinz tinned strained fruit dessert and bone flour. This was cooked well and a small amount of yoghurt given directly on to the spoon at each feed.

After five days, ground wheat germ cereal was added and the yoghurt discontinued; three days later, ground up CeDe eggfood was added. A couple of days after the eggfood was added, the most significant weight gains occurred - a gain of 5 g in one day where previously the largest gain had been 2 g.

For the first few days the protein content had deliberately been kept at a reduced level. Chicks are more liable to succumb to an over-rich diet during that period than they are to an inadequate diet. They can, in fact, be kept alive on foods which are nutritionally poor; I am not recommending this - but felt it might be wise to err on that side as we had no previous experience of hand-feeding Amazon chicks. This one soon gained in strength and became easier to feed. At first its voice was a mere squeak and seldom used. This is fairly typical of Amazons reared by their parents, some of which may not be heard throughout the entire rearing period.

After a few days it became stronger vocally, uttering a single staccato note which was repeated six or eight times in rapid succession. Unlike some chicks which will cry for food even when their crops are bulging, it slept soundly between feeds. It was exceptionally clean and easy to feed until the age of three weeks when its head-bobbing became much more vigorous.

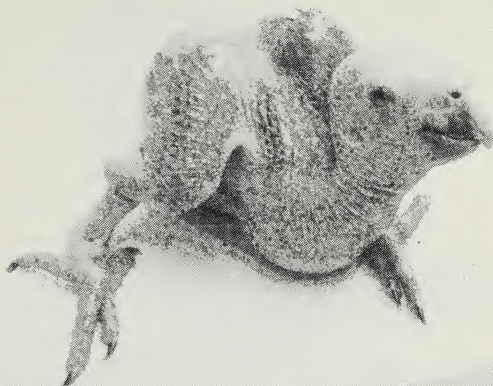
At 19 days came the first indication that the eyes were starting to slit. They were not fully open until 28 days.

It was during the fourth week that the most marked changes occurred in the Amazon chick's appearance. The tongue, which was pink on hatching, later tipped with black, had become entirely black.

The first feather tracts appeared on the wings and when the first pin feathers were apparent, by the 26th day, feather tracts were just visible over most of the body.

By four weeks old, it was no longer possible to use the grams scale as the chick's weight had exceeded 100 g. Because it was so active, it was difficult to register an accurate reading on the kitchen scales, thus weights given after that age are less precise.

By the age of five weeks, the raised sides to the upper mandible were completely dark. The first feathers were erupting - on the wings and just



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Yellow-shouldered Amazon, aged 31 days



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Yellow-shouldered Amazon, aged 54 days

above the flanks. The chick was then moved to another brooder where the temperature was lower, approximately 83°F (27°C). It was removed from a box containing paper towel, being placed on a deep bed of wood shavings.

He or she ("it" is hardly appropriate for a young parrot with a high degree of awareness and personality) continued to be the model chick; it then slept less, seemed contented and seldom called for food. This is in marked contrast to many parrot chicks whose constant vocal demands for food are made, more often than not, with the crop bulging!

Thenceforth feathering was rapid and the chick was fully feathered by the end of August, except for the short tail. The heat in the brooder, which had been reduced to about 70°F (21°C) was discontinued on 8th September (54 days), when he was moved to a wooden weaning cage with a wire front. Four days later he started to perch. At 69 days he was moved to a small parrot cage and immediately climbed to the top perch.

He flew for the first time at 77 days, circling the room strongly. He mastered the technique of flying more quickly and with greater accuracy than any young parrot that we have previously reared. Within a few days he had acquired the unusual skills of hovering and low diving.

Before he could fly, he had received much attention, sitting with my husband each evening, but as soon as he could fly he was neither demanding nor dependent. He liked to fly around the room each evening and to land on our heads occasionally, but made no other demands, unlike many hand-reared parrots which crave attention. Neither was he in the least affectionate. Unable to resist "spoiling" him before he was weaned, I had feared that he would become very imprinted. But this did not occur. At a year old "he" will be surgically sexed and, if possible, provided with a mate.

The rearing of this Amazon never provided a moment's worry (unlike that of a Queen of Bavaria's Conure being reared at the same time, the cause of many interrupted nights' sleep) except at about five weeks of age. I discovered in his mouth a small yellow area with raised spots on it. My veterinary surgeon took a swab from inside the mouth but laboratory tests revealed nothing but the presence of *E. coli* (which presumably is quite normal). He prescribed Clamoxyl, sweet-tasting drops, one of which I applied locally and another to the food daily. After a few days of this treatment, the infected area diminished. I discontinued the drops and a reoccurrence was apparent. In all the Clamoxyl drops were given for four weeks - far longer than intended, but this antibiotic appears to be harmless.

In my experience, mouth infections in chicks being hand-reared are rare; nevertheless, one should make frequent inspections inside the mouth



R.H. Grantham

Yellow-shouldered Amazon, aged 76 days

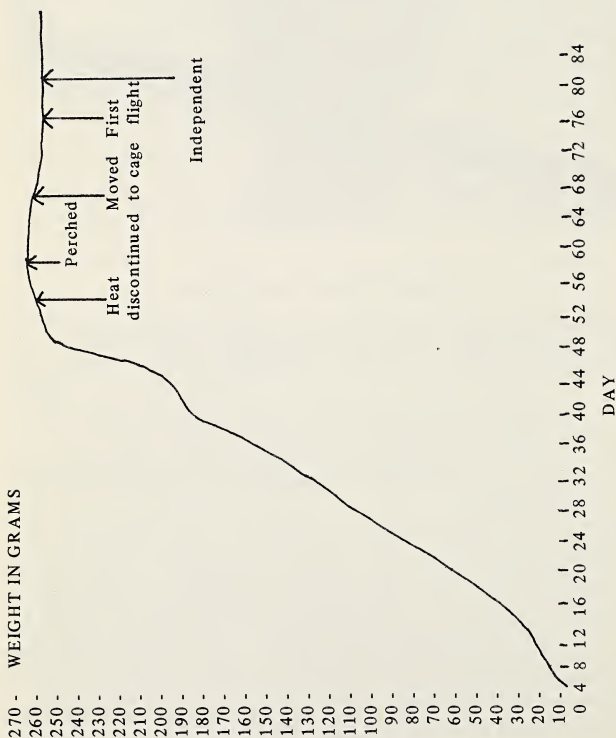
so that any abnormality can be dealt with before it becomes serious.

The very early age at which our *barbadensis* acquired near-adult eye colour was of interest. By the time it was 11 weeks old the iris was orange-not quite as bright or as clearly defined as that of an adult but quite different to the indistinct brownish iris of an unweaned bird.

On the subject of weaning, this was achieved by 11½ weeks. The transition to soaked seed and fruit (pomegranates being preferred) was made without any difficulty.

In 1982 the Yellow-shouldered Amazon was also bred by the Rev. Ramon Noegel in Florida, whose successes in breeding Amazons are without parallel. Four young, hatched in June from two pairs, were hand-reared. Nine eggs were laid (two clutches by one female) and all were fertile. In September I received coloured photographs of two of these young. One was very typical of *barbadensis* (and lacked the blue feathers on the forehead found in my young bird, the appearance of the other was most surprising. Facially it resembled an Orange-winged Amazon *A. amazonica*. The dark margins to the breast feathers and the red markings in wings and

tail made it quite clear that it was a *barbadensis* - but at a quick glance the resemblance to *amazonica* was greater. By chance, some weeks later a caged Orange-winged Amazon was placed next to my young *barbadensis* and once again I was impressed by the similarity of the two birds. This is not evident in adults - but immature plumage often provides a clue to ancestry and I believe it possible that *amazonica* may have played its part in that of *barbadensis*.



Graph showing development of *Amazona barbadensis* chick, hatched 16 July 1982.

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* * *

As described above, the Yellow-shouldered Amazon Parrot *Amazona barbadensis* has been bred by Rosemary Low and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

BREEDING THE JAMAICAN YELLOW-BILLED AMAZON PARROT

Amazona collaria

By Mr. and Mrs. J. ARMAN (Cambridgeshire)

We obtained two Yellow-billed Amazon Parrots on 4th August 1979 from an importer in Leicester. The birds were newly out of quarantine, and had only been released by the Ministry on the previous day.

Description

Believed cock: yellow beak, yellow legs with black toe nails, emerald green plumage, darker on top and lighter on the underparts. Eye dark brown with yellow iris. Skin around the eye more prominent than in the hen. Head narrow and "elongated", flat on top.

Believed hen: horn coloured beak, horn coloured legs with a tinge of grey with black toe nails. Eye resembles a very young Amazon chick's eye, i.e. no prominent iris. Plumage a little lighter than in the "cock". Head

rounded, with slightly higher dome.

The birds were placed in a cage in a back bedroom to settle whilst their aviary was prepared.

On 17th August, having noticed one of the birds producing very loose droppings, we took it a veterinary surgeon and were advised that the bird was probably suffering from stress.

The aviary and nest-box being completed, we put the birds in their indoor quarters on 18th August and they settled in nicely. The following day they were eating normally but one, which we believed to be the hen, still had very loose droppings.

On 24th August, the bob-hole to the outside flight was opened, but the birds did not venture outside.

The following day, the "hen" was fluffed up, and giving cause for concern. We brought it inside and placed the bird in a warm room where we could keep a close eye on it. Next day saw no improvement and so another visit was made to our vet. He injected the bird with Vitamin B12 and antibiotics to attempt a cure. It was not evident at that time that the bird was suffering from psittacosis, from which it died on 28th August. A post mortem carried out on the following day confirmed the disease.

Needless to say, we were very upset to lose the bird so quickly after acquisition, feeling that we had failed it, but this is a chance one takes with newly imported birds.

On 8th October the remaining bird, which we believed to be the cock, was taken ill. No food was eaten, the feathers were fluffed up and the droppings very watery. Fearing the same fate, we installed the bird in a hospital cage with a temperature of 90°F and force fed it by syringe for the next two days in a desperate attempt to prevent another fatality. We fed a mix of Farex with a pinch of Chloramphenicol antibiotic, warmed to almost boiling, after mixing with water. By the end of the second day we were very concerned as the bird showed no sign of improvement so another visit was made to the vet. An injection of multi-vitamins was administered.

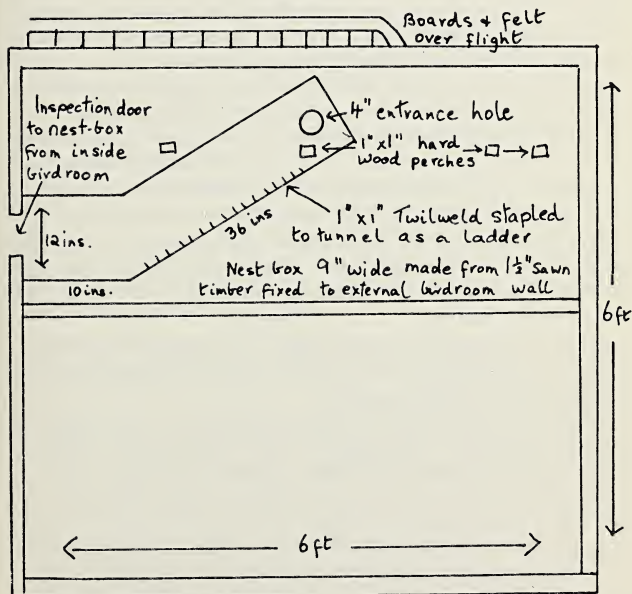
The next day the bird had improved and was later removed from the hospital cage and began to crack seed. The droppings were still watery, but the bird seemed brighter. By the following week, it had recovered completely. As it was now so late in the year, we decided to winter the bird indoors.

We were left with this single bird for almost a year, all attempts to find another having failed, but in October 1980 we were fortunate enough to be able to exchange a Yellow-crowned Amazon that we had

bred for a Yellow-billed Amazon owned by a private person in Cornwall. This new bird, which we guessed to be a hen, was very steady and although it would not talk, it did take food from our hands. As it had previously been kept in a warm kitchen, we had to keep it indoors for the winter.

On 12th April we installed a nest-box in the flight in which our first Yellow-bill had spent the winter alone and later that day put the believed hen in with the believed cock. Our fears that the established bird might attack the newcomer were unfounded and in fact, the "cock" made attempts to be friendly by putting his head down for the new bird to preen.

A week later we noticed the "cock" bird chortling and bouncing back and forth from one perch to another in a type of display, whilst the "hen" inspected the nest-box (see drawing). The "cock" bird then regurgitated



to the "hen" and attempted treading but the "hen" was not interested. We felt that the bird was probably too young. Later in the day one of the birds was seen coming out of the nest-box.

Two weeks later, the "cock" was again observed displaying, i.e. bouncing from one perch to the nest-box entrance perch, fanning his tail slightly, and making an enchanting chortling sound, whilst tapping his beak on the entrance hole. The hen responded by bouncing up alongside him. He then regurgitated seed, which she accepted, three or four times.

On 3rd May, whilst cleaning out their indoor quarters less than a month after the birds had been introduced, we heard the familiar sound of Amazon parrots mating and saw the Yellow-bills treading on a round perch. Throughout the long wet summer, mating continued, but no eggs were laid. Again we suspected that the "hen" was too young.

An extremely long cold autumn followed, during which the "hen" began to pluck out her breast feathers right down to the vent, leaving only a white underdown, and during the severe winter we were very worried about her, as she spent long periods in the shelter of the indoor quarters. In fact, we worried about all our birds that winter as the extreme weather continued week after week. Happily though, all survived.

During the early spring of 1982 the "cock" began to lose his breast feathers, leaving a grey underdown, whereas the "hen's" was white.

The pair looked very untidy but spring brought fine weather and they were observed at regular intervals carrying on their mating rituals. Again and again the "cock" would hop onto the threshold of the nest hole, then hop back on to the perch. The "hen" would peer into the nest-box without entering until eventually the cock ventured inside and chortled, apparently calling the hen. Some weeks of this behaviour passed before both birds eventually began to go in and out of the nest-box with ease. Mating took place regularly at this time.

At the same time, our Yellow-winged and Yellow-crowned Amazons were also mating, and all three pairs could be heard emitting their low rhythmic moan as mating progressed.

As with the larger species of Amazon parrots, the Yellow-billed also flick their wings prior to mating, but a lot of bickering and beak sparring also takes place, which has not been observed in the larger birds.

On 1st June, because the hen was plucked underneath, it could be seen that a large bulge was prominent in the area of the vent and she began spending longer periods in the nest box. The next day we found one egg in the nest-box; it was about the size of a dove's, white in colour and perfectly elliptical in shape. The hen spent the night in the nest-box.

By 4th June there was still only one egg although the hen had a pronounced bulge. On 6th June there were two eggs in the nest; the hen was restless and stayed indoors all night. The following day there were three eggs; the cock stayed in the indoor quarters, the hen in the nest-box though she kept popping out at regular intervals, and they did the same the following night. By 10th June the hen was sitting tight on the nest.

On 19th June two eggs were missing with no trace of the shells. The remaining egg was apparently fertile.

On the night of 2nd July the hen was startled off the nest by a noise. She went into the indoor quarters where she remained for 1¼ hours. The night was quite cold and in desperation we rigged up a spotlight in the garden to aid her back to the nest. Eventually she returned, but we feared the egg would not hatch due to the chill. However, on 4th July a chick was found in the nest, 27 days after the hen began incubation. The following day the chick looked satisfactory on inspection at 5.15 p.m., though the hen left the nest at regular intervals agitating the cock which bounced to and from the nest perch, urging the hen to return. At 9.00 p.m. the chick was found to have three toes bitten off the right foot and two nails from the left foot - we do not know which parent had done this. The wing tips were also bitten and badly bruised and so was the back of the neck. There was hardly any food in the crop. The chick measured 60 mm.

The chick was immediately removed and placed in a margarine tub filled with whitewood and cedar shavings covered by tissue paper. The tub was put in a box, heated by an ordinary 40 watt light bulb under a false platform. The temperature varied between 90-100°F, so a 25 watt bulb was inserted instead. This kept the temperature around 90°F. The chick wriggled almost continuously.

Having no strained baby food in store, we made a mix of Farex and ground down sunflower seed which proved unsuitable as it stuck in the crop and the chick was unable to digest it. It ate greedily from a syringe every three hours but the food was not passing very quickly. The next day it was fed on strained baby food only, heated to almost boiling, and fed from a bent spoon. The chick pumped hungrily and cheeped for hours. For the next few days we continued to feed the chick every three hours and it learned to make a loud noise at feeding time, also squeaking for about 20 minutes after being fed. On 8th July it weighed 1¼ oz.

By 12th July it was sitting up and, when asleep, lying on its side.

On 14th July it weighed 3 oz; it was still being fed every three hours,

and we were adding 50% Milupa to the feed, mixed to a soft dropping consistency. At 16 days old we added 50% ground sunflower seed. The eyes and ears were fully open on 30th July and the pin feathers breaking through; the feed was given every four hours. At 34 days it was trying to preen its feathers and was almost able to stand up unaided. The next day it weighed 6 ozs and we began adding ground peanuts to the feed in the ratio of 2:1 Milupa-sunflower/peanuts. At 42 days it weighed 9½ ozs, the feather heads were pushing through the quills and we cut the feeds back to every five hours.

During the next two weeks we cut the feeds back to every six hours with the last feed at 11.30 p.m. and the first at 7.0 a.m. The chick was transferred from the heated box into a cardboard box half filled with shavings to encourage it to exercise its toes. By 1st September the feeds had been further reduced to two a day, morning and night and hard seeds and peanuts were given. The chick was wormed. By 9th September the flight feathers were completely formed and the bill beginning to turn blackish across the top, and the sides and lower mandible were a mustardy shade of yellow. At 74 days old the chick was fully feathered and able to fly unaided. It was regurgitating almost all its food now and eating more and more from the hard seed. We cut back to one feed a day, late at night, but more was still regurgitated than left in the crop. The chick said "Hallo" for the first time.

On 22nd September (80 days) the chick was fully independent and flying well. It would no longer take rearing food and its crop was quite full with hard seed; it was also having apple and cake.

It may be of interest that, since hatching the chick, the parents have regrown all their plumage and are once more in beautiful feather.

As described, the Jamaican Yellow-billed Amazon Parrot *Amazona collaria* has been reared by Mr. and Mrs. J. Arman and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

* * *

BREEDING THE SIY PARROT

Pionus maximiliani siy

By MATS TELL (Ljungbyhed, Sweden)

Two pairs of Siy Parrots were privately imported into Sweden in May 1978. Initially both pairs were housed in the aviaries of an experienced parrot breeder, Mr. Alf Sundstrom, as the actual owner of the birds, Mr. J-A Alvarsson, was to be stationed abroad for at least another year or so. On a short visit to inspect Mr. Sundstrom's collection in November of that year, I had the good fortune to see these very nice and uncommon parrots for the first time. However, due to shortage of aviary accommodation, Mr. Sundstrom reluctantly had to house one of the pairs elsewhere. Thus in October 1979 (and with Mr. Alvarsson's kind permission), the birds were transferred to my aviaries.

The Siy Parrots have been housed in a 7 ft. aviary in my birdroom, connected with a 12 ft. outdoor flight, facing south. A quarter is roofed over with fibreglass and the floor is gravelled. This is the first in a block of eight identical parrot aviaries. All of them are double-wired and furnished with some dead oak and ash tree branches. The latter unfortunately quickly lose their bark, becoming very slippery, but are easily replaced. On the other hand, oak perches may last for ten years or more. A 2 ft. hollow log was hung vertically in a corner of the Siy Parrots' flight in March 1980. This log has a short, natural spout entrance. On the bottom concave I put a large handful of coarse wood splinters - actually those dug out by the Black Woodpecker *Dryocopos martius*. These splinters are collected around ant-infested tree stumps in the forest. For the 1980 breeding season the Siy Parrots shared their aviary with a pair of Azara's Conures, but these were later removed, being replaced by a pair of Virginian Cardinals.

Towards the end of April 1980 the hen Siy laid a clutch of four eggs, three of which were fertile. A chick was heard squeaking on 22nd May and a week later there were three. They grew rapidly and on 6th July the first was looking out of the log. It left the nest on 14th July, followed by two more five days later. The young Siy Parrots were a little clumsy at first but were perfect specimens, almost as large as their parents. All three had brick-red frontal bands, thus indicating their sex - females. The young parrots did not moult in 1980 but somehow the red frontal feathers gradually disappeared, being replaced by blackish ones. By the end of the year, the last red feathers were gone.

In 1981 the hen laid a good clutch of five eggs, one of which was addled. The first chick hatched on 17th May, was looking out on 8th July and fledged three days later. The remaining three fledged on 16th, 18th and 24th July. These young birds had blackish frontal bands and I suspect them to be all males.

Meanwhile, Mr. Sundstrom's pair had made two unsuccessful breeding attempts; in 1979 their three fertile eggs did not hatch and in 1980 they hatched but deserted three chicks out of four eggs. In 1981 the pair had a late clutch of five eggs in June and this time the three chicks that hatched were reared to perfection, being a cock and two hens. The fourth egg was addled and the fifth infertile.

In 1981 my three young females, bred in the year before, were moved to another aviary together with a cock Sun Conure of similar age. In June they suddenly showed signs of coming into breeding condition, despite the fact that there was no log present; young Amazon Parrots, I am told, behave exactly the same way. At first the conure was a little confused but it was not long before he started to feed the Siy Parrots and I have actually seen him mate with all of them! However, at the onset of their first (complete) moult in July, the Siy Parrots became increasingly indifferent to the conure. I then tried to introduce some young Azara's Conures with no success. These agile and highly intelligent parrots soon became the "masters" of the aviary and had to be removed. Indeed, I have seen the parents of these conures attacking my Yellow-winged Amazon Parrots *Amazona aestiva xanthopteryx*!

In October 1981 the young Siy Parrots were all put together in a separate aviary and a month later, Mr. Alvarsson, whose aviaries were by now completed, collected the parent birds as well as a young pair. Mr. Sundstrom's remaining two young birds - a pair - were put together with my own flock in November, and hopefully two new pairs will form. Although there are a few pairs and some odd birds of *P.m. maximiliani* in Sweden, these will not be used.

The young Siy Parrots are a joy to watch. Although not tame, they show no fear of people they know, coming right up to the wire for tit-bits. They are marvellous fliers. Surprisingly, they spend a lot of time on the ground.

I feed my Siy Parrots on a simple diet of home-made softfood, soaked seed (Hungarian sunflower seed, safflower, hemp and wheat), fruit and greenfood. They are not very fond of corn-on-the-cob and do not take dry seed (with the exception of small amounts of Sunflower). Black currants, hawthorn berries and the small, hard "nuts" of Hornbeam are fed when

available. The parent birds reared their young on softfood, soaked seed, green oats, seeding grasses and chickweed. These parrots drink very little, presumably because they are fed apples twice daily. For some weeks before laying, the female ate large amounts of cuttlefish "bone".

* * *

SURGICAL SEXING OF BIRDS: SOME OBSERVATIONS

By GEORGE A. SMITH (Peterborough)

In aviculture nothing appears to be cheap anymore: birds, food, building materials for aviaries, or labour. Self-interest continually induces bird-keepers to become bird-breeders. Frequently an owner is unable to maintain a collection unless the birds (through the sale of their offspring) pay some of the expenses. In which economic circumstances pairs of birds are assets; whereas two of like sex, together, are liabilities. Sexing has become a necessity for such folk and for those who have rare species. The sexes of waterfowl, ratites, and newly-hatched game birds can be determined by examining the cloaca. Sexually-dimorphic birds are self-evident. Some people will have trouble with passerines (perching birds); but in the breeding season (three months at least of the year) the cloacae of male passerines stick out whilst those of hens are far less protruberant. This sex-indicator, that is so well known to canary breeders, surprisingly is unknown to the majority of breeders of other finches, starlings, tanagers and the like. The birds must be caught and hand-held to determine this.

The two absolutely reliable ways of settling the gender of sexually monomorphic birds are by karyotomy (examination of the chromosomal complement of stained cells under the microscope) and endoscopy (examination of the gonads by looking at them within the abdominal cavity). The first method may be too esoteric for the layman and endoscopy does require a knowledge of anatomy and, in this country, the administration of an anaesthetic. (In America I have seen endoscopy "kits" demonstrated and sold at an avicultural convention). Karyotypy, while perfectly safe - the bird still has to be caught for a skin scraping to be taken - is somewhat protracted and (this is certainly so within my veterinary practice)

tends to be used only with fat, or otherwise unhealthy birds or those that are inordinately rare or where the owner is anxious about anaesthetic and surgical risks. Endoscopy is rapid and safe. Using gaseous anaesthesia (we have abandoned injectable anaesthetics as being unreliable and too traumatic) a throughput of between 20 and 30 birds an hour is easily achieved. With birds larger than lovebirds (i.e. more than 60 grams - 2 oz) mortality is consistently below 1%.

Some observations I have made during the course of this work might prove interesting to others. In all birds the pigmentation of the feathers, skin and eyes is affected by sex-hormones. Male owls tend to be paler than their mates. Well-known examples of this are the Snowy Owl *Nyctea scandiaca* and the Barn Owl *Tyto alba* where the cocks can be very white indeed. In performing endoscopy I have consistently found that male Long-eared and Short-eared Owls *Asio otus* and *A. flammeus* carry less pigmentation than hens. This is especially so on the parts covered by the folded wings, though it also is found, to a lesser degree, on the face and breast. When individuals of these two owls are held in the hand and carefully examined, those that have near white, paler axillary and underwing feathers have proved to be cocks and those with a browner, darker colour are hens. In verification of this a visit to the Natural History Museum at Tring was made. It was substantiated and further examination showed that it also applies to most, if not all, of the other species in this same genus (*Asio*). I did not have the time to check this for other owl genera. Yet whatever the biological advantage there must be for male owls to have whiter feathers than females, it may not apply for Scops Owls, for of the ten or so that I have "endoscoped", I could not correlate their appearance before or after with their sex.

Dr. Susan Clubb, who has an exceptional experience of sexing parrots by surgical means, has told me that male Grey Parrots *Psittacus erithacus erithacus* (from the same wild-caught consignment of imports and, therefore, presumably from the same geographical area) are noticeably darker on the wings and body than are the hens. This has also been my experience: they can be sexed on sight. Whether this observation applies for immature birds is not known (likewise for the owls mentioned above) as so few fledged young have been definitely sexed before they undergo their first moult. In the much smaller Timneh Grey Parrot *P.e. timneh* the sexes are indistinguishable: both being the same very dark charcoal grey.

It is generally accepted that for most white cockatoos, i.e. species of *Cacatua*, adult females have brown, and males black irides. This is not an invariable rule. Two of my breeding male Roseates *C. roseicapilla* have brown eyes: admittedly they are not quite as pale nor as pinky looking as those of the hens. The other two have the "orthodox" black eye. Coincidentally, all the males have much whiter caps to the head than the hens - this feature, again, is not universal to all cock Roseates. However, they can usually be sexed with reasonable reliability by the width of the bill. Recently I acquired a "cock" Roseate that had been the caged pet of an immigrant Australian who, after six years, had decided to go back home and was prohibited by law from taking his bird back with him. This Roseate's beak was female-narrow, the crown of the head fairly pink with coal-black eyes. On endoscopy it was proved to be a female. Likewise three black-eyed Lesser Sulphur-crested Cockatoos *C. sulphurea* that I have sexed were demonstrated to be hens. In each case, their sex had been inferred by the owner from the behaviour of their mates. Moluccan Cockatoos *C. moluccensis* which are almost invariably said (e.g. Miss Rosemary Low's "Parrots: Their Care and Breeding") to have sexually dichromatic eyes may actually have many hens with "male" eyes. (I cannot give a percentage for black eyes: it is unlikely that brown-eyed hens would be subject to sexing procedures; but I would not be surprised if there were as many black-eyed as brown-eyed ones). An owner, having just heard that three of his supposed four males actually were hens and his confidence shaken concerning eye colour, asked me to "endoscope" his one brown-eyed bird. As expected this was a hen but, from the size of its ovary, it was the least mature of the four. As the majority of the other black-eyed Moluccan hens that I have surgically sexed, from their history, were some years old, I cannot believe that brown eyes indicate a greater sexual maturity. Indeed with the Leadbeater's Cockatoo *C. leadbeateri* that we breed, the hen's irides gets its brownish distinction between three months and six months after fledging, usually the former.

Lastly I have heard it said that surgically-sexed birds will not breed so readily as "unmutilated" birds. Most birds are forbidden to breed, their owners preventing them, by some serious defect of management, so this would be difficult to prove. I doubt that slight surgical injury to the flank is of any consequence. This year I have had two hen Caiques *Pionites*, which had never bred before, lay fertile eggs (and rear the chicks) within a month of sexing.

EGG-LAYING AND INCUBATION IN THE EMU

Dromaius novaehollandiae

By ING. STRUZKA MILOS (Zoo Lesna, Czechoslovakia)

The Emu was first imported into Europe in the last century and relatively large numbers of these birds are now established in zoos. Although many zoos still experience some problems with their breeding, Zoo Lesna has successfully bred the Emu in substantial numbers for over half a century.

The aim of this paper is to report the breeding of the Emu under the conditions of Zoo Lesna, and is limited to our own observations. This paper is only a brief summary of a much larger study.

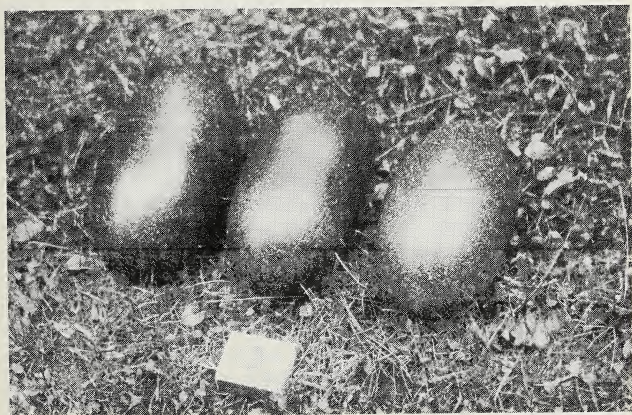
I have observed 22 egg-laying sessions of the Emu during the years 1967-1975 and have partial notes on six more from the years 1954-1967. Data on measurements of an additional five eggs was obtained from a collection of the Regional Museum of South-eastern Moravia and data on 21 more eggs was compiled by Dr. J. Krumbiegl from Lesna in the 1940s. Over a period of eight years I have completed observations on 399 eggs from five pairs referred to below as "A, B, C, D and E". Pairs D and E were under observation by me only during one egg-laying season.

- A: Male hatched at Lesna in about 1949
Female hatched in Holland in about 1965-66
- B: Male hatched at Lesna in 1968 from pair A
Female hatched in West Germany in about 1963-64
- C: Siblings bred at Lesna from pair A in 1968
- D: Male bred at Lesna in 1973
Female bred at Lesna in 1968 and a previous member of pair C
- E: Male bred at Lesna in 1968 and a previous member of pair C
Female imported in the spring of 1974 from Holland as an adult

Incomplete records exist about an additional 58 eggs, where I recorded only the weight. There are also records of 10 more eggs from Bratislava Zoo which were incubated at Lesna in 1975.

Warm eggs were collected for incubation at the shortest possible time after laying, stored in a room at a temperature of 8-12°C, regularly turned and then placed under a male bird or in an incubator. All the eggs were measured, weighed and the exact time of laying was recorded. Weight change of only a few eggs was recorded during the storage period. Detailed records were made of the length of incubation and weight of newly hatched chicks. In 1974 temperature measurements were taken at the nest under two male birds. In 1969 my associate and I observed post embryonic development up to 11 months of age, which will be reported elsewhere.

The most interesting pair was B of which the female had unusually large clutches and occasional double eggs. In 1970-71 female B laid a double egg as her 34th. The weight was 929 g, length 182.5 mm and width was taken at three points - at the largest perimeter of each of the two connected eggs and at a point of their connection. The dimensions were 94.91.5 and 93.4 mm and volume was 840 ml. The average egg volume from the same female was about 500 ml. In the 1971-72 season, the 32nd egg was double and it weighed 850 g. It did not have an obvious light dividing line as in the preceeding year. Its length was 175 mm and width 89 mm. In the year 1972-73 no double eggs were laid and two large eggs were laid without any markings suggesting that they consisted of two eggs.



Ing. Struzka Miłos

Two double eggs compared with a normal egg

They were egg No. 35 which weighed 718 g, was 146.7 mm long and 92.4 mm wide, and egg No. 36 which weighed 690 g, was 153 mm long and 89.4 mm wide. One egg was put under the male bird and the other into an incubator. Neither hatched. Taking into consideration that the female's total egg production during a season of three and a half months was about a half of her weight, her physical and nutritional condition remained surprisingly good.

Feed was provided as a moist granular mix in the morning and afternoon. The feed was composed of an albumin mix for poultry, wheat husk, wheat and rye mash, shredded apples and beets, shredded carrots, cottage cheese, ground boiled meat, chopped hard-boiled eggs, dried potatoes, rye sprouts, dry powdered nettles, mineral supplement and fish liver oil. The mix was moistened with normal or sour milk and all its components were well blended together. In the second half of the laying season more mineral supplements and dried chicken egg shells were added. Also once a week a boiled feed and bread cubes were provided. Fresh water was consumed in great quantities even during the winter.

It is interesting to compare clutches from female A during her first few years of laying. At the time of her first egg she was about three years old. The low weight of the eggs (average 369 g) and the very thin, smooth, whitish shell of two eggs in the first clutch and then of one egg in the second clutch indicate that it was her first lay. In the first clutch, egg weights were not the same; the maximum difference between them was about 40% of the average egg weight. The second clutch contained substantially heavier eggs (average 477 g) and the weight increased slightly in subsequent clutches but at a slower rate. Also the weight differences were becoming smaller. The size and weight of eggs from this female stabilised between the sixth and seventh clutches (average 532 g).

From records taken of the laying seasons since 1954, it can be seen that the starting date of the laying season has slowly moved towards autumn, but the length of each season remains unchanged. The average length of the laying season from 1954-1967 was 71.83 days. During the years 1968-75 it was 80.22 days. This was affected by three unusually large clutches laid over a longer period by female B. If these are excluded the average length for both periods would be about the same. The average length of all 28 laying seasons was 78.42 days. The late start of the egg-laying season is unfavourable for successful rearing because the chicks hatch in the winter, when the conditions for rearing and feeding are more difficult and complicated.

The interval between the laying of individual eggs for six clutches

recorded from 1954 to 1967, varied between one to 47 days with an average of eight days. During 1968-75 the interval for 22 clutches was one to 27 days with an average of 4.5 days. The average interval for all 28 observed laying seasons is slightly more than five days. We can conclude, therefore, that during later years the intervals were shorter and more even. The unpredictably long time lapses between individual eggs are interesting. There are not so many of them, but the deviations are so great that they affect the average intervals of lay and prolong the laying season. Some of the females have only one long interval; some have two to three. So far no pattern has been found.

The number of eggs laid varies not only between years but between each female. In 1954-67 the average clutch was 9.66 eggs and in the years 1968-75 it was 18.36 eggs. For all the 28 observed clutches, the average is 16.5 eggs. The number of eggs increased, therefore, during the last few years.

In the past the eggs at Lesna were weighed only occasionally and so from 1964-65 we have records only for 16 eggs from two females. The average was 427.5 g ranging from 320 to 470 g. Later on, all eggs were recorded. The optimum weight of an Emu egg is hard to determine but should presumably be close to those laid in Australia. However, even from the very small eggs hatched in 1968 there grew very healthy and fertile birds, as we observed them later on during their own egg-laying hatching and breeding. From heavy eggs heavier chicks are hatched and they also grow faster, but at maturity there is no obvious size difference.

Eggs for incubation were set for one to 58 days; 58 days was the oldest egg which was successfully hatched in 1969. It was intended to hatch the eggs as soon as possible if conditions permitted - willingness of the males to sit, availability of incubators or sufficient number of eggs. No connection between the length of incubation and the age of eggs was found; only the fact that the eggs which were put under males that were already sitting were the first to hatch. The average incubation period is 53.71 days, with a range of 47 to 63 days. Some of the longer incubation times were due to the fact that chicks were too weak to crack the shell and had to be helped by various means. Results from electric incubation were worse than from sitting males but then the eggs in the incubator were usually worse quality and older than those placed under males. Around the 40th day of incubation, eggs were placed into warm water and it was observed that healthy eggs "moved". Later, to avoid wetting the eggs, we placed them on a piece of glass and observed them move. Several times during these observations the eggs were weighed, and it

was found that the eggs without movement were either infertile or the embryo was dead and the average drop in weight was 9.58%. Moving eggs recorded a drop in weight of 13.2% which may be due to gas and water exchange during their growth. This could be a valuable method for rapid accurate sorting of eggs being hatched.

Egg fertility varied during different years for different pairs. Some pairs reached higher percentages of fertility, 85-100% for pair A, but pairs B and C reached only 60-80%. The lower rate was usually the rule for first clutches from young pairs and for young birds.

There is a correlation between the weight of eggs and successfully hatched chicks. At Lesna it ranged from 223 to 510 g with a mean of 381.01 g. Water loss during storage was measured on 50 eggs. The average loss was 0.246 g for 24 hours. Average storage time was 22 days with a minimum of three and maximum of 42 days, which is a relatively long period and causes a large water loss.

In 1975, one male incubated ten eggs starting on 2nd March. Because after three weeks two eggs had to be removed from the nest, we decided to substitute them with new ones. This happened on 27th March. The male sat peacefully and on 22nd and 23rd April the chicks from the eight original eggs began to hatch. The male sat one more day but became restless and the other eggs had to be removed and placed into the incubator where they were hatched on 15th and 16th May. This experiment verified the observation made in 1964 when the male sat on ten eggs, later found to be infertile, for a full 78 days. In our case, the chirping of chicks ended the incubation time for the male and he did not show any interest in the two remaining eggs.

In the laying season 1973-74, the temperature of eggs was recorded at two nests and occasionally at a third one. An instant measuring electric thermometer and later a special medical thermometer were used for taking the temperature between the eggs. The temperature was taken between 7-10 a.m. and 1-2 p.m., sometimes even at 4-5 p.m. Due to technical reasons it was not possible to record the temperature at the same time during every laying season. The lowest temperature recorded was 30.0°C the highest 38.0°C, with a mean average of 34.46°C.

The temperature of the nest was also taken, but only when the male was preparing for sitting on a special floor consisting of blown-out egg shells filled with a mixture of gypsum and wood dust so that their weight coincided with the weight of the average egg. Here the temperature did not exceed 28.0°C during this preparation period; which varied from five to ten days for individual birds. Starting with the 53rd day the freshly

hatched chicks were taken out from the nests but the males stayed sitting until the 55th day when the rest of the unhatched eggs were removed and the hatching period ended.

Conclusions

- 1) It is not desirable to breed Emus in adjoining pens. They disturb each other when mating, laying and incubating. A similar problem can arise if young birds are kept in adjoining pens during the laying season. A separation distance of 40 m was found adequate. Even when the birds could see and hear each other at this distance it did not disturb their activities.
- 2) Under the conditions existing at Lesna during a decade when observations were made, the clutches and egg weights increased with time. This is probably connected to the fact that the beginning of the laying season moved by four to eight weeks towards autumn, so that females were in better physical and nutritional condition.
- 3) Large clutches did not have any adverse effects on the females. On the diet provided they continued to produce large quantities of apparently normal eggs. But the fertility of larger clutches was obviously lower than of average or smaller clutches.
- 4) It is not possible to determine an optimum number of eggs in a clutch to achieve maximum fertility, hatching and survival rates.
- 5) To achieve comparable results with artificial incubation, a detailed study of temperatures under sitting males is required.
- 6) The structure, shape and colour of eggs is constant during the lifetime of each female. These characteristics can identify which female laid the eggs.

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Ing. Miloš Stružka has supplied detailed tables of his findings reported above and copies may be obtained from the Editor on request, accompanied by a stamped, self-addressed envelope. (Overseas members please send cost of postage.)

THE JACK ROUGH COLLECTION

By. F.C. BARNICOAT (Johannesburg, South Africa)

In bird-keeping circles the name of J.B. Rough is known all over southern Africa. After almost a lifetime of bird-keeping he and his wife opened "Parrots' Paradise" to the public some 13 years ago on their farm just outside Rustenburg. Situated about 75 miles north-west of Johannesburg, Rustenburg is nearly 2,000 feet lower in altitude and has a sub-tropical, frost-free climate and lies in the heart of an important citrus-growing area. Sadly "Parrots' Paradise" has had to be closed to the general public for several years. Rocketing petrol prices and the closing of fuel stations over weekends led to fewer visitors to the park and the stage was reached where it was no longer worthwhile to keep the park open to the public. Jack Rough will never be without birds, however, and I was privileged recently to pay him a private visit and be shown the many species of parrots and doves which he continues to keep and breed in his vast ranges of aviaries and the huge walk-through wilderness aviary, 30 x 28 x 3 metres high, rising to 6 metres in the centre, which was formerly the most attractive show-piece of the park and in which nearly every South African

estrildid and fringillid bred successfully.

Jack Rough was always interested in birds and mammals generally and his bird collection formerly embraced all groups. He bred the Yellow-billed Hornbill three times in one unit of a range of parrakeet aviaries. The pair made use of a "grandfather-clock" type nest-box and the male sealed the hen inside by plastering mud around the rather large entrance hole. Various toucans were kept for years, though without breeding results. Other soft-bills, like the Glossy and Plum-coloured Starling thrived in the larger wilderness aviary and the Superb Starling *Spreo superbus* bred in a nest-box fastened near the top of one of the more central supporting poles of the aviary. Even in such extensive accommodation the aggressive attitude of all species of starling proved a problem and placed very disappointing limits to what could be kept in the large aviary. Surprisingly aggression was still more of a problem with the sunbirds and the ambition to house and possibly breed a representative collection of this gorgeous group of African birds in near natural surroundings was doomed to failure from the start. Although most of the species thrive on nectar mixture made of honey, Bovril and Complan (a proprietary comprehensive food based on dried skimmed milk) and become delightfully tame, only one male can be housed per aviary. Even towards other species certain male sunbirds may prove aggressive. In the wilderness aviary numerous Madagascar Lovebirds began to be found dead for no apparent reason until the Malachite Sunbird was seen to cling on to the tail of a Lovebird as it flew round and round the aviary in desperation until it crashed into the wire, breaking its neck.

Certain factors, apart from the closing of the park to the public, have led to the reduction of the collection:

1. Bees pose a constant threat in this area. Swarms are almost constantly seeking shelter from the hot sun and a nest-box in an aviary shelter is an irresistible attraction. Young and adult birds of any species in the aviary of the bees' fancy are stung to death. In particular the bees go for the birds' eyes. The spring months of September and October are usually the worst for such attacks. The feeding of nectar mixtures and fruit is so attractive to bees and has led to fatalities to such an extent that the lorikeet group in particular as well as softbill species in general have had to be dispensed with.
2. Rats are practically impossible to keep at bay. In particular, the wilderness aviary provided a happy hunting ground for them. The vegetation has had to be drastically thinned out. The small birds in particular fall prey to the rats. The larger parrots in nearly bare aviaries are more res-

istant to the depredations of these pests. An interesting project in which Patagonian Conures were provided with natural nests in which they could burrow into an earth mound supported by a concrete wall with nesting holes had very soon to be abandoned because of infestation by rats.

3. The unprocurability of new blood for several rare species has led to their becoming infertile and doomed to die out, notable examples being the Galapagos Dove, the breeding results of which highly worthwhile species were encouragingly successful for many years but only to gradually lose fertility to the point where at present a last unproductive pair survives, and the Madagascar Lovebird, the formerly prolific stock of which seems likely to go the same way.

4) The reliance on a single successful breeding pair has in certain instances led to the disappearance of the species from the collection. Compatibility is a vital factor in bird breeding. Occasionally one is lucky enough to strike the outstanding breeding pair, such as Jack Rough's famous pair of Eclectus Parrots, which he kept for over 30 years and from which he raised over a hundred offspring to be sold all over southern Africa. Recently this pair died, the cock within a short time of the hen, and thus has disappeared a species for which this collection was well known. Likewise an old breeding pair of Alexandrine Parakeets, whose offspring were legion, has died. It is not always easy to strike another ideally compatible pair, and the temptation not to hold back sufficient of the young ones until it is too late is great.

5) The restrictions imposed by the Department of Nature Conservation on all native species make it difficult or impossible to assemble a worthwhile collection of local birds or to embark upon any interesting experiment even under the most favourable and near natural conditions with any but the simplest and commonest species.

Accordingly at present the collection embodies mainly the two groups to which Jack Rough was always particularly attracted, and which seem the most suitable for the existing conditions - parrots and doves. However, two species outside this range still have a place: a thriving flock of Vulturine Guineafowl, which has been breeding for 19 years and from which 22 chicks were reared in 1979 and four in 1980, many successfully foster-reared under bantams, and several pairs of Malay Crested Fireback Pheasants (Vieillot's), which have bred and should have the potential to do especially well in this warm to hot climate. In general, pheasants and waterfowl are poorly represented in South African collections and I had not previously encountered any species of Fireback in this country, where they would probably prove easier subjects to breed than in the colder

European countries.

Five species of macaw have bred recently: Blue and Yellow, Scarlet, Military, Illiger's and Yellow-collared. A 44-gallon metal drum placed on the ground is the usual nesting site provided for the larger macaws, which will reduce any wooden box or barrel to matchwood in no time. The smaller species like the Illiger's seem easier to breed and the Yellow-collared have proved particularly prolific. Two pairs were incubating at the time of my visit (November 1981), the hen of the one pair being the daughter of the other, making a second generation breeding of this macaw a possibility within a comparatively short period.

A character I missed from the collection was "Bonny", the free-flying, tame Blue and Yellow Macaw, hand-reared like so many other macaws, cockatoos and other large parrots by Mrs. Rough, whose meticulous devotion to the task was almost invariably rewarded by an end result of top quality. Visitors were always entranced by the wonderful sight of this great, colourful bird wheeling in flight over the park and showing up so well against the green background of the trees. He would often fly to a shop a mile or so away, where he would receive some tidbit. It is thought that his totally unexpected death must have been brought about by his being fed something harmful by the public.

Still in the collection are the following cockatoo species: Moluccan, Umbrella, Lesser Sulphur-crested, Citron-crested and Bare-eyed or Little Corella. All have been bred at one time or another. Leadbeater's was never bred and is no longer in the collection.

Four very fine Many-coloured Parakeets had just left the nest. They seem to be early nesters. Red-rumped and Crimson-winged Parakeets breed well, as do Golden-mantled, Mealy and Crimson Rosellas.

The *Poicephalus* Parrots have always been a speciality with Jack Rough. He first bred the Meyer's nearly 50 years ago and still has several breeding pairs. The rare Rueppell's has also bred very well over many years and is still represented in the collection. Senegal Parrots continue to breed year after year and Jardine's have also been rewarding nesters. However, Jack Rough gives pride of place to the stock of genuine, pure Cape or Knysna Parrots which is steadily being built up. They are *P.r. robustus*, the subspecies with the southernmost distribution, and show no trace of the pinkish red on the forehead which characterises the Cape Parrot from further north, i.e. *P.r. suahelicus* from Mozambique, and eastern Zimbabwe northwards. Two hens were kept for over ten years and thousands of miles were travelled in search of a genuine male. The prospective

sellers merely had a Cape Parrot of the northern race *suahelicus* or a Jardine's to offer. At last a man from Louis Trichardt in the northern Transvaal visited "Parrots' Paradise" and claimed that he had a Knysna Parrot male which he had had to mate to a Jardine's female and from which union there had been no breeding results. This time the long journey was worthwhile and within a month the Knysna hen was on eggs. This first clutch proved infertile, but soon the pair was breeding again. Two chicks hatched, but had to be hand-reared after starting to feather. Subsequently they have been excellent parents and have themselves reared broods of one, two and recently of three fine young.

Of the Asiatic parakeets the little Malabar is the favourite. They are excellent breeders and the female with her black beak forms a lovely contrast to the male with his red beak. The Indian and African subspecies of the Ring-neck are bred and Plum-headed, Alexandrine, Moustached and Derbyan Parakeets.

Rough was the first South African to breed the Golden or Queen of Bavaria's Conure. After rearing a brood of two, the hen was tragically poisoned when accidentally fed grass that had been sprayed while she was rearing three chicks, only one of which was successfully hand-reared. Probably there was no female among the offspring and the last of these rarities were sold. Other conures that have done well include the Sun, Jandaya, Golden-capped, Black-headed, Maroon-bellied, Red-fronted, Brown-eared and Green.

It is to be hoped that an outstanding pair of Mealy Amazons will in due course produce offspring. Blue-fronted, Spectacled and Double Yellow-headed Amazons have all been bred. Much disappointment attended all efforts to secure a mate for the fine Dufresne's or Blue-cheeked Amazon which was in the collection for several years. In the end this interesting bird was parted with.

Finally, to touch briefly on the doves, which were always such a strong point of the Rough collection, it was disappointing to note the disappearance of so many species, among them both Bartlett's and Luzon Bleeding-heart Pigeons and the delightful little Plumed Dove, which nearly bred some years back. However, thriving stocks of the Emerald-spotted Wood-Dove, Blue-spotted Wood-Dove and, in particular, the Black-billed Blue-spotted Wood-Dove, the close relative hailing from north of the Equator, are still maintained. It was good to note breeding pairs of Scaly and Inca Doves, Tambourines and Namaquas, Amboina Cuckoo-Doves and Picazuro Pigeons among others. The Galapagos Doves were an attractive sight, possibly not to be repeated much longer, as

explained above.

While speaking of the Columbidae, it may be interesting to readers overseas that I had earlier in the morning obtained several excellent views of the Rock or Speckled Pigeon *Columba guinea* and the Rameron or Olive Pigeon *Columba arquatrix* in the wild at the nearby holiday resort of Rustenburg Kloof. Several pairs of the former were nesting on the inaccessible rock ledges in the kloof and the Rameron Pigeons were easily identified in the tops of tall trees by their conspicuous yellow beaks.

* * *

*Sadly I have to report that, after this article had been prepared for printing, Jack Rough died suddenly on 7th January 1983.

THE BLACK-HEADED CAIQUE - FIELD NOTES

Pionites melanocephala

By E. McLOUGHLIN (Co. Kilkenny, Eire)

I encountered this parrot many times in a small section of sand-belt forest in south-eastern Guyana, visited monthly between 1970 and 1973.

Apart from odd sightings of apparently solitary individuals, it was generally seen either in pairs or, quite often, in larger groups of up to five individuals. Observed in each month of the year, no seasonal fluctuation in numbers was detected. Its population density in this area was about the same as that of *Deroptyus accipitrinus*.

Field characters

Visually this is a small parrot with fairly narrow shoulders, a rather large head and frequently, when excited, a bold upright stance.

The only white-bellied parrot in the region, this characteristic helps to separate it, particularly from the rather similarly coloured, but green-bellied *Pionopsitta caica* (Caica Parrot) as well as other species.

Its short-tailed silhouette is very different from that of the long-tailed *Derophtus accipitrinus* (Fan Parrot or Hawk-headed Parrot) whose voice and habits are, in general, quite similar.

Commonly heard rather than seen, its most specific call seemed to be uttered when slightly disturbed. This call, an arresting, often repeated "keeya-keeya", resembled closely the corresponding call of *D. accipitrinus*. The call of *P. melanocephala* is frequently prefixed by a characteristic, fairly long "ee-keeya-keeya", while *D. accipitrinus* regularly intersperses its call with a short "tak", e.g. "heeya-heeya, tak-heeya".

It was seen and heard on a number of occasions, typically in a group of two or more birds. Sometimes perched 20 or more feet apart, they engaged in a sort of conversation in a variety of whistles and sounds, some resembling the squeaks of a rusty gate.

In the manner in which these calls were made - separated by a couple of seconds - alternating between the participants, with the total duration of the performance anything from a few minutes to, on a couple of occasions, one lasting well over half an hour (which the observer left while still in progress), the similarity with corresponding behaviour in *D. accipitrinus* was striking.

Many of the actual notes uttered in these performances were very similar in both species, call notes and/or visual checks being commonly needed to separate them.

Appearing briefly at times in the open when crossing clearings, *P. melanocephala* remained generally within the forest.

Breeding

On 23rd March 1972, three individuals were seen to alight on the crown of a tall tree. Two of them flew down to inspect its twin trunks at a height of about 40 feet. A short time later all three flew away. It seemed likely that a site for a nest was being sought.

I was told on 10th May 1973 of a nest discovered about two weeks previously from which three small parrots were seen to emerge, to be joined later by two others, presumably their parents. Later on the same day I was taken to this nest about one hour before sunset. The nest was in a living

tree about 70 feet high. The entrance appeared to be a natural, vertical cleft in the main trunk about 55 feet from the ground. The tree was about 20 feet from a trail and about 100 yards from a creek. This was an area of mixed bush and savannah.

While I waited in the vicinity of the nest, five birds arrived in a nearby tree and, with the aid of binoculars, these could be identified without difficulty as *P. melanocephala*. Three were noticeably smaller than the other two with shorter tails and a noticeably yellowish tinge to the somewhat dingy white of their belly feathers.

Many minutes were subsequently spent in a gradual, surreptitious approach to the nest during which time these normally noisy birds were almost completely silent except for a few very soft, subdued sounds, including a clucking "culuck".

I was told later of another nest not very far from this one and of several adult *melanocephala* pursued by a hawk, fleeing in different directions. It seemed as if several pairs may have nested within a rather small area.

Another nest was described to me by an Amerindian (Harry Peneaux) living at Orealla, as being situated in the limb of a large "cedar" tree (*Cedrela* sp.) which had been felled. The loggers' attention was drawn to the fact that a parrot was observed flying into a hole in the branch - after the tree had been felled. Only one juvenile was present in this nest.

Two females in the writer's possession, nesting in captivity, uttered continuous subdued double notes for many minutes and sometimes hours on end.

Feeding habits

I was told by Harry Peneaux, that it fed on *Hitia Byrsonima coriacea*, var. *spicata*, *Waramia Tapirira guianensis* and Poixdoux *Inga* sp. Another Amerindian, Alvaro Sarmento, residing on the Berbice River, described its diet as similar to that of *D. accipitrinus* and included Awarra *Astrocaryum tucumoides* (Drude), Cocorite *Maximiliana regia* (Mart), Poixdoux *Inga* sp. and especially Guava *Psidium guajava*. For the last two items they visit farms, feeding on cultivated forms of the indigenous fruits.

In early October 1971, the writer saw a group of five pecking at, and apparently eating, the newly opened yellow green leaves of a very large deciduous forest tree. Many partly eaten leaves were found beneath the tree after the birds had flown. In January 1972 four were noted feeding on the yellow/orange pulp and/or the seeds of a tangerine-sized wild *Ficus* fruit. In March 1972 a group arrived in a nearby tree and apparently commenced feeding. After they had left, red tubular blossoms were found scat-

tered beneath the tree. The stalk at the base of the flower was missing in most cases, while the blossom itself was intact.

Due to the density of the foliage it was possible, while the feeding took place, only to hear the birds so the observation was not fully confirmed. In captivity many kinds of flowers are partly eaten by this parrot. (From my general observation, several South American species of parrot commonly feed on blossoms.)

Upon hearing that *Aratinga pertinax* not merely nested in arboreal termitaria, but actually fed on the termites in the wild, a piece of termite nest was given to a captive Black-headed Caique. Eating continually, an estimated 200-300 termites were eaten by the bird in about an hour and a half. This bird, which had probably been hand-reared, also showed a great liking for grasshoppers and small caterpillars.

Summary

Quite different in outward appearance, this species resembles closely *Derophtus accipitrinus* in habits and behaviour. . Breeding, as with other larger parrot species in the area, occurred in the early months of the year*. Seen quite frequently in groups of five, this, along with the number seen at the nest, suggests a clutch size limit of three. At least in the area studied it seemed to be highly sedentary. Even during one period of drought, when humidity fell to the lowest level in the area for about seven years, no fall in its numbers was noted.

Addendum

The captive bird mentioned above remains in the writer's possession. A mate was found for it and three eggs were laid in 1980. At least one was fertile but none hatched. Two young were successfully reared in 1982. There was no sign of any unhatched egg when these chicks vacated the nest. Approximately nine months old now, these retain the juvenile plumage and the dark irides of the immature bird.

*As noted by Haverschmidt, the larger parrots appear to breed in the early months of the year. The province of Berbice adjoins Suriname where his observations were made (Haverschmidt - "Birds of Surinam").

A BIRD SHOW IN MOSCOW

By JEFFERY BOSWALL (Bristol)

During the 18th International Ornithological Congress in Moscow in August 1982, a show of caged birds was arranged in three rooms at the Zoological Museum. I visited it on the last (of about four) days, Sunday, 22nd August.

It was arranged by the "Captive Singing and Decorative Birds Department of the Moscow Society for the Protection of Nature", to quote verbatim my interpreter, Irene Yershova, a new member of the club.

First I asked her which birds ordinary Muscovites with no special interest in aviculture might keep and was told that the most popular native birds were Siskin *Carduelis spinus*, Goldfinch *C. carduelis*, Bullfinch *Pyrrhula pyrrhula* and Chaffinch *Fringilla coelebs*; first equal among exotics are the Budgerigar *Melopsittacus undulatus* and Canary *Serinus canaria*, with the "Japanese Finch" (?Japanese Grosbeak *Coccothraustes personatus*) third in line.

Of the four hundred members of the club, about 250 were canary fanciers (about 70% of whom favoured the species for its song, the others for its plumage). Hybrids included a cross with a Two-barred Crossbill *Loxia leucoptera*.

About 50 members kept other exotics, particularly the Gouldian Finch *Chloebia gouldiae*, the Zebra Finch *Poephila guttata* and the Common Mynah *Acridotheres tristis*.

The remaining 100 members kept Soviet indigenous birds, I was told, and the show itself strikingly confirmed this view. I toured the exhibition systematically and noted every species. Those familiar to European ornithologists were:

<i>Coturnix coturnix</i>	Quail
<i>Gallinula chloropus</i>	Moorhen
<i>Streptopelia decaocto</i>	Collared Dove
<i>Aegolius funereus</i>	Tengmalm's Owl
<i>Coracias garrulus</i>	Roller
<i>Melanocorypha calandra</i>	Calandra Lark
<i>Calandrella cinerea</i>	Short-toed Lark
<i>Galerida cristata</i>	Crested Lark
<i>Lullula arborea</i>	Wood Lark
<i>Eremophila alpestris</i>	Shore Lark
<i>Anthus trivialis</i>	Tree Pipit

<i>Motacilla flava</i>	Yellow Wagtail
<i>Motacilla alba</i>	White Wagtail
<i>Erithacus rubecula</i>	Robin
<i>Erithacus luscini</i>	Thrush Nightingale
<i>Erithacus svecicus</i>	Bluethroat (red spotted & white spotted)
<i>Phoenicurus phoenicurus</i>	Redstart
<i>Oenanthe oenanthe</i>	Wheatear
<i>Monticola saxatilis</i>	Rock Thrush
<i>Turdus merula</i>	Blackbird
<i>Turdus philomeios</i>	Song Thrush
<i>Turdus iliacus</i>	Redwing
<i>Acrocephalus palustris</i>	Marsh Warbler
<i>Hippolais icterina</i>	Icterine Warbler
<i>Sylvia nisoria</i>	Barred Warbler
<i>Sylvia communis</i>	Whitethroat
<i>Sylvia borin</i>	Garden Warbler
<i>Sylvia atricapilla</i>	Blackcap
<i>Ficedula parva</i>	Red-throated Flycatcher
<i>Panurus biarmicus</i>	Bearded Tit
<i>Parus cristatus</i>	Crested Tit
<i>Parus ater</i>	Coal Tit
<i>Parus major</i>	Great Tit
<i>Sitta europaea</i>	Nuthatch
<i>Lanius collurio</i>	Red-backed Shrike
<i>Pica pica</i>	Magpie
<i>Fringilla coelebs</i>	Chaffinch
<i>Fringilla montifringilla</i>	Brambling
<i>Carduelis carduelis</i>	Goldfinch
<i>Carduelis spinus</i>	Siskin
<i>Acanthis cannabina</i>	Linnet
<i>Acanthis flammea</i>	Redpoll
<i>Loxia leucoptera</i>	White-winged Crossbill
<i>Loxia curvirostra</i>	Crossbill
<i>Carpodacus eruthrynus</i>	Scarlet Rosefinch
<i>Pinicola enucleator</i>	Pine Grosbeak
<i>Pyrrhula pyrrhula</i>	Bullfinch
<i>Calcarius lapponicus</i>	Lapland Bunting
<i>Plectrophenax nivalis</i>	Snow Bunting
<i>Emberiza citrinella</i>	Yellowhammer
<i>Emberiza cia</i>	Rock Bunting

<i>Emberiza hortulana</i>	Ortolan Bunting
<i>Emberiza rustica</i>	Rustic Bunting
<i>Emberiza aureola</i>	Yellow-breasted Bunting
<i>Emberiza schoeniclus</i>	Reed Bunting
<i>Emberiza bruniceps</i>	Red-headed Bunting

Birds less well-known to European bird watchers were:

<i>Otus brucei</i>	Striated Scops Owl
<i>Luscinia calliope</i>	Siberian Rubythroat
<i>Myophonus caeruleus</i>	Blue Whistling Thrush
<i>Turdus hortulorum</i>	Grey-backed Thrush
<i>Parus cyanus</i>	Azure Tit
<i>Emberiza leucocephala</i>	Pine Bunting
<i>Emberiza buchanani</i>	Grey-necked Bunting
<i>Emberiza cioides</i>	Meadow Bunting
<i>Serinus canaria</i>	Canary hybrid
<i>Serinus pusillus</i>	Gold-fronted Serin
<i>Rhodopechys sanguinea</i>	Crimson-winged Finch
<i>Acridotheres tristis</i>	Common Mynah

The native species most popular with Muscovite bird keepers were Blackcap, Bluethroat, Wood Lark, Skylark and Redwing.

* * *

NEWS AND VIEWS

Harewood Bird Gardens have, for a number of years, successfully reared the Ypecaha Wood Rail *Aramides ypecaha* and it is pleasing to hear that some of their offspring are now themselves beginning to breed. A pair obtained by G.K. Booth of Doncaster in 1979 bred in 1981. He writes: "Early in May I noticed leaves were being stripped and deposited in the stream. A nest was finally constructed in a hollow in the bank top by the stream and under a railway sleeper which spanned the stream. It was hidden behind a clump of flags and was lined with the broad leaves of the flags.

"The first egg was laid on 22nd May, the second on 23rd, then two more, each at two-day intervals. They were large for the size of the bird, being about the size of a domestic duck egg and they had largish red-brown blotches on a creamy background. The eggs were always laid in the late afternoon.

"Incubation commenced on 29th May and once started, the birds sat very tight with one bird always patrolling in the area of the nest and being very aggressive to any bird that came within 7-8 feet of the nest. The first chick hatched at midday on 21st June, making the incubation period 24 days. A second hatched the next day, after which the parents were never seen to go back to the two remaining eggs.

"As soon as the chicks left the nest, only a few hours after hatching, the male took charge of them and after taking them to the stream, brooded them on the bank just above the waterline. The chicks were seen to swim in the stream a few days after hatching.

"The diet given consisted of dead day-old chopped chicks, maggots, chopped fruit mixed with softbill food and mixed budgie seed, taken in limited quantities and stale bread or cake soaked in water. Vionate powder was given twice a week on the chopped chicks.

"Both parents fed the young by passing food between each other and then placing it at the feet of the young. If the chicks did not take the food, the process was repeated until the young fed. Bread, soaked in the stream, was eagerly taken by the parents for the chicks.

"The chicks were dusky brown, with darker brown markings; bill, feet and legs were black and, for the first week, they stayed in one area by the edge of the stream, always watched over by one parent. At the age of 10 days the chicks were beginning to explore their aviary and were becoming less secretive. At two weeks, the tail and wing feathers were starting to show, and it was noticed that they started the habit of flicking their tail feathers as they walked.

"By a month old they were well developed, standing about 4½ inches high and the mauve colouring on the breast was beginning to show. At 40 days old they had almost attained full colour and while occasionally they were still fed by the parents, they were mostly fending for themselves."

* * *

Mats Tell has sent the following news from Sweden: "No doubt the extraordinary hot and dry summer of 1982 had a negative influence on the breeding activities of many of my birds. The final result was, however, better than the year before. The following birds were reared to independence: Sun Conure - 6, Azara's Conure - 4, Bourke's Parrot - 21, and Bluish Seed eaters - 4. Eclectus Parrots, Virginian Cardinals, White-collared Seed eaters and Crested Black Buntings had infertile clutches and again a pair of Silver-eared Mesias failed to hatch any chicks. Blue-crowned Hanging Parrots, Fire-crowned Bishops and Nonpareil Buntings did not nest, although an old female Nonpareil built a beautiful nest without laying.

"In Sweden, Yellow-mantled Whydahs *Euplectes macrourus*, Cape Canaries, Hooded Siskins, Golden-breasted Buntings, Rosy-rumped and Black-cheeked Waxbills were bred this year."

* * *

Henk Wareman sends news from the Netherlands: "In recent consignments from South American some rare parrots have again appeared such as several Rose-faced Parrots *Pionopsitta pulchra* and Spot-winged Parrotlets *Touit stictoptera*. From Sulawesi came several consignments of interesting softbills like the Thick-billed (Grosbeak) Starling *Scissirostrum dubium* and the White-necked (Buton) Starling *Streptocitta albigollis*. Incidentally, these are most unstarling-like. In England I saw *S. dubium* in the collection belonging to Miss Ruth Ezra and Raymond Sawyer at Cobham, together with other species from the same Indonesian region.

"This breeding season resulted in some rare breedings of different soft-billed birds, as well as from seed eaters. Species bred among others were: Red-legged (Blue) Honeycreeper *Cyanerpes cyaneus*, Collared Sunbird *Anthreptes collaris*, Occipital Blue Pie *Urocissa erythorhyncha*, Black-collared Barbet *Lybius torquatus*, Red Bishop *Euplectes orix*, Black-chinned Siskin *Carduelis barbata* and Golden-billed Saltator *Saltator aurantirostris (nigricaps)*."

The population of the Hawaiian Goose or Ne-Ne is said to be on the decline again. A recent report from Hawaii states the numbers on the island have decreased from approximately 650 in 1975 to a present population of around 300.

* * *

Further evidence that Desmarest's Fig Parrot *Psittaculirostris desmarestii* is a colonial nester comes to light from observations by Bruce Beehler, published in a recent newsletter of the Papua New Guinea Bird Society. Mr. Beehler reports observing pairs of these birds attending cavities in a tall rain forest tree, calling noisily during all hours of the day. The birds moved in and out of these cavities, and sat for long periods at the entrances of them, chattering and looking about. The nests were all very high in the tree (more than 25 metres) and were in branches less than 30 cm diameter.

* * *

The Newsletter of the Papua New Guinea Bird Society, covering March-April 1981, contains an interesting paper on the Origin and Identification of New Guinea Birds of Prey. The same issue also documents the first confirmed sighting of a new species in the New Guinea region, the Grey Falcon *Falco hypoleucus*.

* * *

An unusual pest control experiment enlisting the help of birds is under way in the extensive pine woods of Chuxian Prefecture, Anhui Province, China, in an effort to control pine moths. Azure-winged Magpies *Cyanopica cyanus* are trained for up to three years to take the moths.

Nestlings were put into small cages and signalled with a whistle whenever they were fed. As soon as the young birds were able to fly, they were transferred to a huge enclosure in the forest containing trees, water and insects. The researchers taught the magpies to feed mainly on harmful insects by throwing them pine moths and other insects to eat, putting some on branches for them to find, or simply blowing the whistle to call them to eat the moths. After three years, the birds were released in the Sishon Forest. When a whistle was blown the magpies would begin searching for insects in the trees. Over a period of 20 days, 18 birds had success-

fully eliminated 62 per cent of moth larvae, 70 per cent of the pupae and 90 per cent of the adults. (*Wildlife*).

* * *

Since the International Symposium on Bustards held in Jaipur in 1980, conservation bodies are concentrating efforts to ensure the survival of these majestic birds. The Great India Bustard *Ardeotis nigriceps* is the only species listed in the Red Data Book at present but it is likely to be followed by two other species endemic to the Indian subcontinent - the Lesser Florican *Sypheotides indica* and the Bengal Florican *Houbaropsis bengalensis*. The outlook seems bleak indeed, so much so that the I.C.B.P. is budgeting for extensive population research and conservation procedures for these and three other species - the Houbara *Chlamydotis undulata*, Great Bustard *Otis tarda* and Little Bustard *Tetrax tetrax*.

* * *

Two new species have recently been discovered. A Metaltail Hummingbird from northern Peru, located in Pinura department, has been designated *Metallura odomae*. The other, a species of Shortwing (small, undergrowth dwelling member of the Thrush family) turned up in the Tirap district, Arunchal Pradesh in the Eastern Himalayas.

* * *

A German aviculturist, Helmut Wagner of Mossingen, has reared one offspring from a pair of Stella's Lorikeet *Charmosyna papou stellae*. The pair are kept in a cage, 125 x 70 x 70 cm, and an egg was deposited on the floor on 7th July, 1981. As it was not damaged, it was placed with an incubating pair of Swainson's Lorikeets for 20 days. At that time it was obvious that the Stella's Lorikeets were firmly incubating an artificial egg which had been supplied and subsequently their own egg was returned. After a further nine days, the egg hatched and a beautiful normal red hen was reared. Both parents were of the melanistic phase. (*Trochilus*, 1982, 3: 22-23).

* * *

A.J. Mobbs writes: "A new mutation of the Gouldian Finch is being bred in the U.K., namely the Lilac-breasted. Adult males have the overall colour of the normal with the breast lilac instead of purple. Females have extremely pale lilac on the breast.

"The mutation has been about for at least three years and from breeding data received by me (as collator of mutation reports for the Australian Finch Society), appears to be fairly well established.

"I personally bred four Lilac-breasted (in 1981) from a Lilac-breast to White-breast mating.

"This new mutation can already be found in all head colours, e.g. Red-, Black- and Orange-headed. As yet little is known genetically regarding the Lilac-breasted; however, it has proved dominant to the White-breasted mutation and will immediately, if mated to such, produce Lilac-breasted (as well as White-breasted and normals split for White-breast and Lilac-breast).

"Blue-breasted Gouldian Finches in which the breast is an attractive powder blue, are being produced in the States. It appears the mutation is dominant to the normal, Blue-breasted being produced immediately from a Blue-breast to normal mating."

* * *

A new species of Screech Owl *Otus marshalli* has been discovered in Peru.

* * *

The latest issue of *Ibis* (April 1982, p. 203-210) contains a brief paper by former Avicultural Society Council member, Colin Harrison, on "The Earliest Parrot: A new species from the British Eocene". Fossil remains from the lower strata of the London clay at Walton-on-the-Naze, Essex, have been dated from the Lower Eocene period (50-60 million years ago). *Palaeopsittacus georgei*, as the species has been called, is believed to have been about the same size as the Senegal Parrot *Poicephalus senegalus*, could grasp objects in the foot but was poorly adapted for climbing among branches. Flight was probably less vigorous than in most recent psittacines.

* * *

The population of the Mauritius Echo Parrakeet *Psittacula echo* is at a critical level and, with the nucleus of three males and two females reputed not to have bred for several years, it seems the species is doomed to extinction. Carl Jones, who is considering several possibilities for a last ditch attempt at saving the species, seems to think that some Echo Parrakeets left Mauritius in the mid- to late 1960s, possibly for America. If any member has information on this, even though it may now be only for historical reference, could they please contact Carl Jones at Forest Quarters, Black River, Mauritius, Indian Ocean.

* * *

From Henning Jacobsen comes news of the death of two doyens of Danish aviculture, Walther Langberg and J.L. Albrecht-Moller, who died on 3rd September and 29th August 1982 respectively. Both were known throughout Europe, Mr. Albrecht-Moller for his comprehensive book on parrots and Walther Langberg for his work with parrakeets, parrot finches and Australian finches. Mr. Langberg was also well known to Budgerigar fanciers, having produced the Budgerigar Standard for Scandinavia and much of Europe. Many will remember him for the Foreign Birds he so successfully staged at the National Exhibition of Cage Birds during the 1960's, and for his breeding of lutino Nyasa Lovebirds. These two highly respected aviculturists will be sadly missed by their many friends. Mr. Albrecht-Moller, who was 82, had been a member of the Avicultural Society since 1953, Mr. Langberg joined the Society in 1950.

* * *

The interesting article by Geoffrey Kenyon on Controlled Environment Aviaries (*Avicultural Magazine*, 1982, p.36) touched on the subject of planting such accommodation. Here at Padstow Bird Gardens in Cornwall, we have two such controlled areas, one devoted to birds while the other houses a live exhibit of butterflies and moths. That devoted to birds proved little problem as the more usual type of plants were used but planting for the butterflies is a different proposition. Greenery for the sake of it is not practical and planting has to be given some thought and must take into account two different aspects. Firstly, shrubs giving a high flower production to provide a food supply are important, although this food source can be augmented with dissolved sugar, fructose or honey in water.

Secondly, and perhaps the most difficult aspect of keeping and breeding butterflies in captivity, is obtaining the larval food plants on which the butterflies can lay their eggs. Most species and genera have specialised preferences, many of which are very difficult to obtain as established plants. To solve this we obtain the seeds required from Thompson and Morgan, London Road, Ipswich, Suffolk. This firm publish an illustrated catalogue of what must be the most comprehensive seed list available in Britain, and it is well worth obtaining a copy for, besides a wide variety of unusual plants for indoor areas, a selection of sprouting seeds (mung beans, alphantoco, fenugreek and alfalfa) are also offered.

* * *

A member of the Avicultural Society for over 20 years, Jeffrey Boswell (Natural History Unit, BBC, Whiteladies Road, Bristol BS8 2LR, Britain) is working on a 13-part television series on birds.

He would particularly like to know of:

- 1) Captive birds that use tools, e.g. parrots that scratch themselves with sticks - if possible "reliably"!
- 2) Captive birds, e.g. parrots, that perform "song and dance" acts. Maxwell Knight owned an African Grey that had learned from humans to sway rhythmically while singing.
- 3) "Talking" birds of any species that are instantly intelligible to those who have never heard them before.
- 4) Birds that voluntarily imitate human or vocal or instrumental music.
- 5) Birds that have been taught human tunes, as Bullfinches were (and may still be?).

Please write, or telephone Bristol (0272) 732211. Mr. Boswell will be delighted to hear from members from any part of the world who have any interesting information on the above.

* * *

For some years now, the Avicultural Society has exchanged the *Avicultural Magazine* for *The Living Bird*, an annual publication produced by the Laboratory of Ornithology at Cornell University. Now *The Living Bird* has become a quarterly magazine and the first issue has just reached us. This colour production maintains the high standard of the annual but has expanded its scope. It features articles and photographs on bird behaviour, habitat, conservation, art and research and is international in

behaviour, habitat, conservation, art and research and is international in coverage. In addition to articles written by professional writers and ornithologists, the laboratory will encourage amateur "birders" to contribute as part of the larger mission and tradition of the Laboratory of Ornithology - to act as liaison between the amateur and professional ornithologist and to encourage people's interest and increase their knowledge of living birds. *The Living Bird*, together with all the other magazines that the Avicultural Society receives in exchange for our own Magazine, can be seen in the joint Linnean/Avicultural Societies' library at Burlington House.

* * *

At the XVIII International Ornithological Congress in Moscow the International Ornithological Committee accepted the invitation of the National Museum of Natural Sciences of Canada and of the Canadian ornithological community to hold the XIX Congress in Canada. The Congress will be held in Ottawa, Canada, from 22nd to 29th June 1986. It elected Dr. Prof. Klaus Immelmann (West Germany) as President of the Congress. Dr. Henri Ouellet (Canada) was designated as Secretary-General.

Details about the general and scientific programmes, field excursions, and other activities during the Congress will be available later.

Those interested in participating in the Congress are urged to inform the Secretariat in order to obtain announcements and application forms. Correspondance should be addressed to: The Secretary-General, Dr. Henri Ouellet, XIX Congressus Internationalis Ornithologicus, National Museum of Natural Sciences, National Museums of Canada, Ottawa, Ontario, Canada, K1A 0M8.

D.C.

(Please note my change of address to: D. Coles, Windsor Forest Stud, Mill Ride, Ascot, Berks. SL5 8LT, to which all notes for inclusion in "News and Views" should be sent from now on. Please take the trouble to write to me if you have some interesting information - this column can only be as entertaining as members care to make it!)

REVIEWS

BIRDS OF THE NORTH SOLOMONS

By Don Hadden. Wau Ecology Institute Handbook No. 8, 1981. 107 pp.
 Numerous colour plates. Price: Kina 6 or US dollars 9.50.

There has long been a dearth of popular ornithological literature for many of the islands dotted around the Pacific Ocean. Don Hadden's book fills a gap on two of these - Buka and Bougainville, the two main islands forming the outlying North Solomons Province of Papua New Guinea. Bougainville's land birds are listed in "Birds of the Southwest Pacific" by E. Mayr, published in 1945 but those of Buka have not previously been documented. This volume describes and updates all species recorded from the islands and coastal waters, covering 150 species, many of them endemic to the Solomons group.

The text is set out with introductory sections on physical features, climate and vegetation, and a brief outline of the history of ornithological studies of the region. These are followed by chapters on the most frequently seen non-forest birds and where to watch birds on Bougainville. Species accounts follow the normal pattern of classification and relate to their biology within the region. Some specific details from outside the region are given but by and large are omitted. While this may be a criticism by some, it is because of the lack of breeding and other data which is known from outside the region and the book admirably achieves its main aim, which is to outline all that has been recorded on the birds within the region only.

* * *

BIRDS OF FIJI, TONGA AND SAMOA

By Dick Watling. Illustrated by Chloe Talbot-Kelly

Published by Millwood Press Ltd., Wellington, New Zealand; available in Britain through Croom Helm Ltd. 176 pages; 15 colour plates, colour photographs, sketches and distribution maps. 1982. Price: £25

For the first time the Fiji region as a whole is covered in one volume and as such is a most welcome addition to the popular geographical literature. The author has done an admirable job on a region which is difficult to categorise. Apart from the three main island archipelagos, nearly 500 islands are dispersed in over one million square kilometres of the South-

west Pacific covered by this volume.

Like most oceanic regions, bird populations in terms of knowledge can be separated into two groups - land birds and those inhabiting the seas. Coverage of land birds is as comprehensive as the intended appeal of the book allows. Each species account is categorised into identification, flight, food, breeding, habitat and range, remarks, allied species and subspecies within the region. Various local names are also given as is a distribution map. Sketches dispersed throughout depict aspects of a species biology, be it a food plant, nest site or anatomical peculiarity and are aesthetically pleasing as well as being informative.

Sea birds are not as comprehensively covered but are adequate. The author relies heavily on two publications for this section and admits to having only a passing interest in sea and shore birds and, not surprisingly, then admits to being a poor sailor. Because of the makeup of the region, it is probable that much still remains to be discovered about this side of the region's avifauna.

The book is divided into five parts. The first is introductory and covers ornithological history, maps of the region, composition of the avifauna, ecological isolation of related land birds, breeding and moult, conservation and habitats - the latter illustrated with fine colour photographs by Jim Sears.

Part Two is devoted to the 15 colour plates depicting most of the species recorded while Parts Three and Four are accounts of the land and sea bird species. The final part is the various appendices and takes in a glossary, bibliography, checklist of birds of the region and indices of English, scientific and local names.

The area is rich in endemics, some of which are familiar to aviculturists, even if not available, and as such the book is of interest. Conservationists will also find items of interest throughout, none more so than recurrent sentiments on the devastation caused by the introduced mongoose. It always amazes me that more emphasis is not placed on the eradication of non-natives to protect island populations.

The book in its own right is worthy of inclusion in the library; the approach and aspects covered by Dick Watling, although different from other geographical literature, only go to enhance the book.

D.C.

RECENT ADVANCES IN THE STUDY OF RAPTOR DISEASES

Proceedings of the first International Symposium on Diseases of Birds of Prey. London, July 1980. Edited by J. Cooper & A. Greenwood
Chiron Publications, P.O. Box 25, Keighley, West Yorkshire BD22 7BA
Price (including postage): Britain & Europe - £11.50, elsewhere - £12.00

During the past few years, the enormous strides which have been made in breeding raptors have highlighted the lack of authoritative and up-to-date books on the management, breeding and diseases of these birds. Although entitled "Recent Advances in the Study of Raptor Diseases", this volume does an enormous amount to redress this lack, for its scope is wider than the title suggests.

It comprises the Proceedings of the first International Symposium on Diseases of Birds of Prey which was held in London in July 1980. The first international meeting ever devoted to this theme, it brought together most of the world's authorities and specialists in the field of raptor diseases. These included the British veterinarians John Cooper and Andrew Greenwood, who edited the 34 papers in this volume.

The papers are presented in three parts: Pathology and Microbiology, Surgery and Anaesthesia, and Medicine and Therapeutics. Among the subjects covered in the first part are the effects of chronic lead ingestion, causes of death in trained raptors, hand-rearing of vultures and abnormal and maladaptive behaviour (the result of imprinting).

Surgical treatment of bumblefoot is one of the papers in the second part, which has a wider application than birds of prey, although it refers specifically to raptors. This is also true of the paper on diagnostic avian laparoscopy. Not only can the laparoscope be used to determine sex, but to diagnose disease. It has been found to be a safe, rapid and effective method of direct observation of the abdominal contents and can be used to examine many organs.

Most serious aviculturists will find something of interest in this volume and to raptor breeders and falconers it will prove indispensable.

R.L.

CORRESPONDENCE

*A reply to Alastair Morrison's Dissenting View on Aviculture
(Avicultural Magazine, Vol. 88, No. 2)
and on keeping Eunymphicus in particular*

I would guess that there are more Horned Parrakeets outside Germany than currently kept there, and I do not entirely agree with the list of endangered species drawn up by the I.U.C.N. I

dangered species

dangered species drawn up by the I.U.C.N. I do not believe that the plight of many parrot species that are now in grave danger can be blamed on aviculturists. Within recent years it has been published that the original vast areas of primeval forest on the New Caledonian Islands, and especially on Ouvea, have been felled with an incredible speed - not for timber but for strip-mining for important minerals. I would love to see more of Mr. Morrison's energy being joined with that of other readers of our Magazine and directed against the destruction of wild habitat, even if not wishing to speak against the recent CITES amendments. Of the two forms of *Eunymphicus cornutus* I am convinced that another 20-30 pairs in the hands of skilled European and other aviculturists will make the difference between survival and extinction, and although the specimens thus bred may not, after some generations of captivity, be suitable for reintroduction in the wild, they would at least still exist as living representatives of their species.

From my own correspondence and from notes in the literature, it appears that *Eunymphicus* reproduces as easily as *Cyanoramphus*. It may possibly be less hardy in captivity but could it not be that the losses experienced are due to stress caused in smuggling? Smuggling has apparently been the source of several specimens kept in European collections and I have not a doubt that officially licensed exportation will save the lives of more birds than anything else I can think of.

I am therefore in full agreement with Professor Hodges and Miss Low in their views. The idea, which I cannot remember seeing in print before, that all who keep rare and endangered species should nominate a responsible organisation, or better still, a responsible aviculturist to receive all the birds in the event of the owner's death, should be given full support and publicity by the Society. I have not much faith in the capacity of zoos in general to breed most species, though I know there are many

remarkable exceptions to this, and I would urge the fortunate owners of rare species to take action in due time and to realise that this could be vitally important to both the birds and to man.

Vejlby Vange 64,
8240 Risskov,
Denmark.

H.H. Jacobsen

The Editor does not accept responsibility for opinions expressed in
articles, notes or correspondence

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VOLUME 89

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THE AVICULTURAL MAGAZINE welcomes original articles that have not been published elsewhere and that essentially concern the aviculture of a particular bird or group of birds, or that describe their natural history. Articles should be preferably typewritten, with double spacing, and the scientific names as well as the vernacular names of birds should be given. References cited in the text should be listed at the end of the article. Line drawings should be in Indian ink on thick paper or card; photographs which illustrate a particular point in the article will be used where possible and should be clearly captioned.

ADDRESS OF EDITOR

Mary Harvey, Windsor Forest Stud, Mill Ride, Ascot, Berkshire, SL5 8LT, England.





M. Newbury

The White-browed Laughing Thrush *Garrulax sannio*

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1982

BREEDING THE WHITE-BROWED LAUGHINGTHRUSH

Garrulax sannio

By N. HEWSTON (Worcester)

The White-browed is a small Laughingthrush, similar in size to the Black-headed Sibia *Heterophasia capistrata*, but with the stronger legs and feet typical of *Garrulax*. It is a brown bird, paler below, with cinnamon under tail-coverts. The crown and short crest, and the throat, are darker brown. Two buff stripes extend from the lores, one above the eye and a broader one below. The sexes are similar but in this breeding pair the cock has a longer bill and larger head and is slightly darker on the crown and throat. The species ranges from Assam, east to South China and Hainan, and is a common resident above 2,000 ft. in scrub and secondary growth (King and Dickinson, 1975).

I obtained four birds in December 1980. I had not seen this species offered for sale prior to this and can find no reference to it in avicultural books and periodicals including the *Avicultural Magazine*, so I assume that it has not been bred before. It has, however, been regularly available since 1980.

The birds were housed in a planted flight 18 ft. x 6 ft. x 6 ft. high, with a shelter 6 ft. x 3 ft. x 6 ft. high, with a pair of White-cheeked Touracos *Tauraco leucotis*. They spent a lot of time searching for insects in leaf litter on the aviary floor. They were very sociable, all four often sitting together. Although they would often sit in twos for mutual preening, it was difficult to distinguish pairs as they frequently changed partners. The only sign of friction was during periods of harsh, self-assertive calling, when one bird calling from a high perch would be displaced by another which would call in turn.

The birds were fed on softbill food (usually Haith's "Prosecto"), maggots, mealworms, minced beef and the mixed fresh fruit and soaked

sultanas provided for the Touracos.

In April 1981, nest-boxes were provided when one bird was seen carrying roots, and a nest was built in the highest box, an open-topped 4 in. cube near the roof. All four birds were seen carrying nesting material but I think the nest was built by just two. Display was observed, with one bird circling the other on the floor, head held low and tail horizontal, singing quietly. One unmarked blue egg was laid three weeks after the box was put in but this disappeared after three days. Mating was observed twice during May, in both cases on the aviary floor. Once the hen raised her tail vertically to invite mating; on the other occasion, the cock enticed the hen to the floor with an item of food and mating followed.

Another high nest site was provided in May but there was no more breeding activity. The Touracos did breed successfully, with very little friction between these and the Laughingthrushes. There was a night-fright problem with cats during the summer, and in October one bird died from an infection. Another was sick but was successfully treated.

In 1982 the birds were already building haphazardly in late February but were still being shut in at night. Late in April nest-building began seriously in the other high nest-box, shallower than the first, and I finally ascertained which two birds were paired. The third bird, believed to be a hen, followed the pair around but was kept at a distance by the hen, so it was removed. Mating was again observed on the aviary floor, the birds standing side by side with tails vertical and heads low just before mating. Three eggs were laid on consecutive days and incubation, beginning with the laying of the third egg, was shared. Two young hatched after 14 days. The third egg, containing a full-grown embryo, was found broken at the other end of the flight.

The young were fed mainly on maggots and mealworms for the first few days, with spiders and ant larvae and pupae as available, but I was then able to borrow a light-trap and good numbers of moths were also taken. The young were brooded constantly for the first eight days, thereafter only slightly less. At nine days I could see from outside the aviary that the young birds' eyes were open and the facial stripes were visible. At 10 days the cock stopped brooding but continued to feed the young in the nest, where the hen still spent most of the day. At 12 days the young were not brooded for most of the day, but the hen still spent the night on the nest. Both young left the nest at 14 days. They were much smaller than the adults, with pinker feet and legs and very short tails.

As soon as the young left the nest the cock started to repair it. After five days another egg was laid and incubation started the next day. Three

*N. Hewston*

Young White-browed Laughing Thrush, 15 days old

days later we suffered more night-fright problems with cats. The cock injured its head and stopped incubating and one of the young hurt its foot. The next day the hen deserted and one egg was found broken on the floor. A second egg was removed cold from the nest. The following morning the other young bird had lost most of its tail. Problems with cats continued, but only the cock bird regularly took fright.

Within a few days of the young leaving the nest, each parent was feeding only one and would chase off the other if it begged for food. The young bird fed by the cock was feeding itself in three weeks, while the hen fed her charge for several weeks more. At one stage this bird seemed to be falling behind the other because of its reluctance to feed itself, but both have now developed into full-sized healthy birds and have been wintered with their parents.

For a few weeks while they were nesting, the cock was very aggressive to the Touracos, confining them to the shelter, and I had to provide an indoor nest site so that the Touracos could breed. He would also challenge me if the nest was inspected.

Peace resumed shortly after the young left the nest and the Touracos were also able to nest successfully.

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As described above, the White-browed Laughingthrush *Garrulax sannio* has been bred by Mr N. Hewston. This is believed to be the first success in this country but anyone knowing of a previous breeding in Great Britain or Northern Ireland, or any other reason that would disqualify the claim, is asked to inform the Hon. Secretary.

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REARING THE AFRICAN JACANA
Actophilornis africana
AT THE WILDFOWL TRUST, SLIMBRIDGE, GLOS.

By RALPH HODGSON

In the Tropical House at the Wildfowl Trust there is a pair of African Jacanas which, early in 1982, showed signs of nesting and breeding. The female dropped several eggs at random which were taken and incubated successfully. The chicks only survived for a few days but it did prove that we had a breeding pair.

Eventually, a clutch of four eggs was laid in a primitive nest, little more than a few scraps of greenery arranged to stop the eggs rolling into the water. These eggs were also incubated in the Propagation Centre. They were set on 4th May; three proved infertile but the fourth hatched on 30th May, an incubation period of 26 days.

Feeding was by trial and error and consisted mainly of insects, egg yolk and vitamin concentrate, but proved satisfactory and the chick grew well. It gradually developed a most attractive plumage and at three months was fully grown and beautifully coloured with upper parts and wings bright chestnut. The crown and back of neck were dark brown, with forehead, cheeks, throat and upper breast white. The bill was slender and coloured pale brown. At 14 weeks there was no suggestion of the grey-blue frontal shield of the parents.

It was decided to introduce it to its parents in the Tropical House and all seemed to be going well until 6th September (between 14 and 15 weeks) when it was found dead. It had probably been attacked in the night by another bird, possibly one of its parents. A post mortem showed it to be a female and in good condition. As far as we know, this is the first time that this species has been bred and reared artificially in the U.K. and probably in Europe.

On 30th June another clutch of three eggs was left with the parents and these hatched on 23rd July, after 24 days' natural incubation. One chick died after three days and the other two chicks were found drowned after two and four weeks respectively. We can only presume that they were frightened into water too deep for them, as they had no previous enthusiasm for water.

In spite of this misfortune, we learned of several unusual habits of this species. The first is that the female, rather larger than the male, takes no interest after laying but leaves the entire incubation, and later the broo-

*Joanna Turner*

Young African Jacana at the Wildfowl Trust

ding and care of the chicks, to the male. Secondly, after the chicks have hatched they can in some way attach themselves to the father's breast; we could not see how this took place but he could stand up and move about with three pairs of legs hanging down like six matchsticks. In their natural habitat we imagine that this will allow the male to keep the chicks safe whilst he feeds or moves to another location. Finally, neither parent gave the chicks any help or encouragement in feeding. We noticed that they started to stalk from the first day and were given insects, fruit flies, etc., which they were seen to wash before eating, after they were about two weeks old.

It is hoped that the lessons learned this year will allow greater success in future.

* * *

KEEPING AND BREEDING GOLDIE'S LORIKEET

Trichoglossus (Psitteuteles) goldiei

By Dr. WOLFGANG MERCK (Hamburg, W. Germany)

I received my pair of Goldie's Lorikeets in December 1980. According to the person from whom they were obtained, they came from two different breeders in Germany and had been reared that same year.

The pair are alike in colour but the male is slightly bolder, particularly about the head, and his bearing is more upright than the female's.

Goldie's Lorikeets are charming little birds, not as colourful as many other lorries, but they are lively being good at both flying and climbing. Their accommodation, therefore, should not be too small. My outdoor aviary measures 4 x 1.5 x 2 m high with an adjoining shelter of 1.5 x 1.5 x 2 m. They are not sensitive to cold and the shelter is only moderately heated. They go freely into the flight even in frosty weather, though I do not let them out when the temperature falls below -2 or -3°C. They bathe thoroughly every five days or so and when rain falls after a period of dry, hot weather, they also enjoy rain-bathing. It is amusing that their flight is very often synchronised with that of their aviary neighbours, a pair of Swainson's Lorikeets.

The aviary is not planted except for two branches of Cotoneaster which penetrate the wire from outside. The birds do no damage to the leaves, though the berries are probably gnawed off at an early stage. Creeping wild vine is also nibbled. They also go down on the floor, which is partly turfed, to eat the seeding grass.

The diet consists of honey, glucose (containing an addition of multi-vitamins), baby cereal and baby fruit powder, diluted in water to a soupy mixture, sprouted sunflower seed, fresh corn, figs, apples, pears, grapes, grated carrots and a little biscuit. Of these items, apart from the nectar, figs and sunflower seeds are by far the most relished, as are seasonal berries such as Cotoneaster and Pyracantha. Chickweed and dandelion heads are eaten but spinach is hardly touched. In springtime the buds of fruit trees and lilac are sucked (though I was later told that the latter is poisonous!). I also give them fresh willow twigs - though they only nibble the bark, the birds hang, swing and climb on the twigs.

In 1981 no breeding attempts were made as the birds were certainly still too young. I had given them a small rectangular horizontal nest-box in which they roosted but this box seemed unsuitable for breeding and in 1982 I gave them a natural log, similar in size as for budgerigars, but I

made the mistake of not removing the first box. The female took to the new log, but at first I did not realise that the male stayed in the old box.

In April I was often able to observe the cock displaying. I never saw the birds pairing, so supposed that the two eggs, which were laid between 20th and 22nd April, would be clear. I was pleased, therefore, to see, a week later, that they were fertile. Two tiny chicks, covered in white-grey down, were seen on 16th May.

As the parents were quite trusting, they did not resent my checking and cleaning the nest. This needed to be done only occasionally in the first few weeks, but as the chicks began to grow, it was necessary to do this every 4-5 days. Rotten wood and wood shavings were used. The male fed the female, but not the young. Even after fledging on 17th July (the first chick left in the morning, the second in the afternoon), the male did not feed them but showed a hostile attitude towards them, so much so that I considered separating him. It was apparent that he did not acknowledge the young to be his own because they did not come from his "house" - the old nest-box. Fortunately, the female fed the young very well and did so for some weeks after fledging. Later on, the male stopped being aggressive towards the young and the whole family - apart from some bickering - lived in harmony.

When leaving the nest, the young were quite similar to their parents in size and plumage, only lacking the red cap which was replaced by some red feathers at the front. All green areas were somewhat paler than in the adults. I am sure the young are a pair as they now differ in size, like the adults.

The first nights after fledging the young did not return to their nest-box and had to be put in. As they were even more trusting than the adults, there was no difficulty in doing this. However, as on subsequent nights, they did not roost in a log but clung to the wire and seemed quite uneasy. I fastened a small horizontal board near the top wire, on which they roosted for the next few nights. Afterwards, they took to the male's nest-box; he, meanwhile, had joined his mate in her log!

* * *

SECOND GENERATION CAPTIVE BREEDING OF THE KEA

Nestor notabilis

AT WILHELMINENBERG (Vienna, Austria)

By Dr. JOHANNA SIEBER (Research Assistant - Institute for Comparative Ethology of the Austrian Academy of Sciences, Vienna)

In 1968 our Institute imported two Keas from New Zealand; a third one followed in 1969 but unfortunately died soon after arrival. These imported birds were all fully adult, wild-caught.

Housing

The surviving pair was caged in a large aviary measuring 10 x 10 x 5 m, with an adjoining indoor compartment, 3 x 2 x 2 m, containing breeding facilities, i.e. a large hollow tree trunk with an entrance hole 20 cm round. Some straw and hay are provided throughout the year and are accepted as nesting material. The ground of the aviary consists of natural soil and one side slopes gently and is covered with rocks of various sizes. In New Zealand Keas live mainly in mountainous regions near the timber line so they can easily withstand our cold winters in central Europe without additional heating. Some thick stems are provided for climbing.

Diet

Since the Kea is almost omnivorous, we provide a mixed diet consisting of different seeds (sunflower, peanuts, wheat, barley, hemp, millet), fruits and vegetables of the season, cut up meat (beef or horse), hard-boiled eggs, lettuce, and occasionally cottage cheese and margarine or other fats. Every day some freshly cut branches of native trees (oak, birch, willow, fir) are given, for Keas eat the leaves or needles and like to tear off or chew the bark. We have not found it necessary to give additional vitamins or minerals. Keas are extremely fond of bathing, even in very cold weather, and sometimes soak their food in water before eating it, so a large container of water is supplied. When they are rearing young, additional minced meat, mealworms and pink mice are offered.

Reproduction

Breeding behaviour of the Kea has been described elsewhere, therefore I shall discuss our breeding record only briefly. Just one year after arrival, the first pair began to build a nest and the male was observed feeding the female and copulating several times. In April 1970 a clutch consisting

of two eggs was laid and after 19 days, one chick hatched; the second egg was infertile.

In 1971 two infertile eggs were laid, but from March 1972 onwards the pair has been breeding successfully every year (see Table below).

Date	No. of eggs	No. of chicks
April 1970	2	1
December 1971	3	-
March 1972	4	4
March 1973	4	3
February 1974	4	4
February 1975	4	4
February 1976	4	4
February 1977	3	3
January 1978	4	3
January 1979	3	2
January 1980	3	3
January 1981	3	1

Altogether we obtained 32 young out of 41 eggs during nine years, all of them being successfully reared by their parents. Most of the young were given to other institutions when at least six months old, but we kept some in the Institute to establish a second breeding pair.

In 1975 we tried to pair the female "Cinda" with the male "Rufus", both brother and sister from the clutch of 1972. Their aviary was similar to that of their parents only without the rocky slope. Unfortunately "Cinda" died in 1976 when eggbound.

Subsequently we paired "Rufus" with "Twiggy" from the 1974 clutch. In 1978 "Twiggy" laid two eggs, both infertile. In October of the same year, "Rufus" died of an intestinal infection. Only one month later "Nugget" (hatched in 1972) was placed in the enclosure with "Twiggy" and in December 1980 we saw them copulating intensively for the first time. At the beginning of May, "Twiggy" laid three eggs, from which two chicks hatched and were reared without any problems; the other egg disappeared.

Conclusions

As far as we know, this is the first full second generation captive breeding of Keas, at least in Europe. Zurich Zoo was successful once with a captive-bred male and a wild-caught female. Through our experiments we learned that the female reaches maturity at four years when the first clutch is laid.

We are concerned about the possibility of inbreeding in the long term and are anxious, therefore, to exchange birds at intervals with other institutions to minimise any deleterious effects.

ACKNOWLEDGEMENTS

I would like to thank our animals keepers, especially Mrs. I. Steininger, for the excellent care of our birds which undoubtedly is the basis of our success.

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BREEDING THE WHITE-CAPPED PARROT

Pionus senilis

By RICHARD ZIMMERMAN (Jackson, Michigan, USA)

In 1975 I acquired seven immature White-capped Parrots directly from U.S. quarantine. One died, one arrived so injured that it has remained in the house as a pet, a third was attacked by the others and was given to a friend. Of the four remaining, two proved to be males and two females. I cannot sex *Pionus* visually and the colour varies from bird to bird, as does size. The male White-cap is noticeably larger than the hen. However, my Dusky and Plum-crowned hens are larger, while in the Bronze-wings, the sexes seem to be the same size. I do not know if this is a rule or applies only to my birds. As time passed, one pair proved to be incompatible, neither bird having the slightest interest in the other, and this pair was eventually sold.

The remaining pair was housed alone in their aviary. On one side was a pair of Dusky, on the other there were Bronze-wings. During the late winter of 1981 they began to show an interest in the nest-box (6 inches square by 17 inches high) by enlarging the hole, throwing out the cedar shavings and tearing the roof off the box.

During the spring the hen would crouch on the perch, drop her wings and shiver, uttering a loud cry; mating then took place.

The weather at this time was typical of the mid-western United States - warm bright days followed by cold dark ones with much rain.

The very large eggs were laid during the last week of April. When laying, the hen's abdomen was so swollen that it touched the perch she was sitting on and she seemed very uncomfortable. I only saw her out of the box once in that condition. I tried to examine the nest-box regularly but when she began to lay she sat so tightly that I could not see what was going on. I caught her off the nest twice, once after the first egg had been laid and again after the clutch of four eggs was completed. After that she would not leave the box even when I opened the small viewing door and she puffed up and hissed until the door was closed.

The first egg hatched on or about 24th May. I was able to tell when the young hatched by the harsh, rasping noise that they made while being fed. The rare glimpse I got of the young showed them to be covered with a thin white down.

The male was not seen to enter the box until the young were feathered out. The job of feeding the young, as far as I could determine, was the sole

responsibility of the female though she, of course, was fed by the male. When the young were feathered and the female no longer stayed in the box during the day, the male would enter the box and from that time on he fed the young directly.

The chicks left the nest on 17th, 22nd 24th and 31st July. When the young first left the nest-box they spent the daylight hours in the aviary and returned to the nest-box at night. The first two out returned to sleep in the box until the third baby left the nest. After that, they would periodically return to the box. As they feathered out, they acquired bronze-coloured wings, blue flight and tail feathers, a little red around the vent while the feathers of the white cap were tipped with dark green. The rest of the plumage was bright green except for blue ear patches. The eye ring, bright pink in the adults, was grey in the young. The parents reared the four young to independence.

In 1982 the birds again went to nest in April. A larger box was provided (8 inches by 9 inches by 20 inches high) as I felt the first box to be too small. Only two young hatched; the other eggs were infertile. The following dates may be of interest: first egg laid on 20th April; first chick hatched on 20th May; pin feathers and eyes starting to open by 4th June; eyes open and chicks standing upright by 7th June; out of the box on 12th July.

The adults proved to be very tolerant of interference. The youngest of the two chicks broke its wing while in the box - I presume one of the adults may have jumped on it in the dark of the box. It had surgery performed on its wing and was separated from its parents, although in their sight, while it was recuperating. The chick was hand-fed with a mixture of wheat germ, oatmeal, high-protein baby cereal and various baby fruits and vegetables. After three weeks it was returned to the aviary containing the parents and its sibling. Again it was taken from the parents to have the metal pin removed from the bone and returned to the parents one week later. On both occasions the parents accepted it back and were even anxious to feed it.

All my *Pionus* are housed in indoor aviaries measuring 3 feet square by 6½ feet high. Attached to each indoor aviary is an outside flight 16 feet long, to which the birds have access through a small sliding window. During cold weather their quarters are heated by electricity and the birds are not allowed to use the outside flights. They are confined from late November until April, as they seem very uncomfortable when the temperature drops below 50°F (10°C) and I do not believe in subjecting tropical birds to uncomfortably cold weather. In the winter months they receive a

good deal of light as the top two feet of each aviary is clear Plexiglass.

None of my *Pionus* eats a great deal of seed, although sunflower, safflower and a mixture of canary and parakeet seed, cracked corn and turkey pellets is before them at all times. My birds also receive daily - fresh corn-on-the-cob (whole maize), apples, Cheddar cheese, carrots, spinach, peas, raw peanuts and grapes. I use a mixture of Torulayeast and Gevral Protein as a dietary supplement. This same diet is fed all year long. Their favourite rearing food is corn-on-the-cob and my breeding pair have consumed up to two ears a day when young are in the nest.

Members of the *Pionus* genus have all the best qualities for either aviary or pet birds. They are beautiful, especially in the sunlight, active, curious, not too noisy and can make gentle, entertaining pets.

* * *

Note added in proof.

For a year I kept the two female White-caps together thinking they were a pair. In the spring both hens laid eggs in the small nest-box mentioned in the article.

Both birds incubated; one bird, because of the small size of the box, sitting on the eggs, nine in all. The other hen sat on top of her. Never did they fight or show any aggression to each other.

HAND-REARING THE LAPWING *Vanellus vanellus* AND RELATED OBSERVATIONS

By BRIAN HILL (Yeovil, Somerset)

Articles on the Lapwing in the *Avicultural Magazine* appear to have been scanty. Workman (1931) kept adult birds which had been casualties from shooting. He found them easy to care for on a diet of earthworms, scalded crushed biscuit meal and bread and milk. When the earthwork supply dried up, they were given a diet of beef heart, boiled rice and boiled potatoes. He does not make any mention of the "leg tremble" that is so characteristic of this species.

Goss-Custard, Wilkins and Kear (1971) hatched chicks that had been incubated at 101-102°F. Their starter food was minced eel, boiled maggots, boiled egg and mealworms. Later they were reared on live daphnia, green flies, moths, caterpillars, flies, locusts, woodlice, small earthworms, and duckweed. They found heat lamps necessary up to four weeks, but not thereafter. This is a week longer than I found was necessary. They give graphical growth rate data, and comparative data for the Curlew *Numenius arquata*, Redshank *Tringa totanus* and Ruff *Philomachus pugnax*. They too make no mention of the "leg tremble". However, the "leg-tremble" or "pattering" habit is discussed at some length in Spencer (1953).

Acquisition of the chicks

I came across four recently-hatched chicks which had fallen into a trench several feet deep on 12th May 1982. The trench had been recently excavated around the perimeter of a field of broad beans near Long Sutton, Somerset. It had been dug presumably to improve the drainage of the field, as it was situated on the periphery of the flood plain of the River Yeo, just a few feet above the water meadows.

The nest had presumably been situated amongst the sparse bean plants at the edge of the crop, on relatively dry ground. The chicks were being persuaded and coaxed by their parents, alighting on the ground a few yards in advance of the chicks, to walk toward the moist meadows with their rhynes (local name for ditches) and generally high water table. Apparently the parents, and in particular the female, are only capable of indicating and drawing the chicks in the general direction toward feeding grounds, and not to give close guidance to avoid hazardous ground. So the chicks had stumbled into the ditch, which had smooth steep sides of clay

and a little water in the bottom. A drove, with another ditch, lay between the fields and the water meadows. At first I gathered up the chicks and conveyed them across drove and ditch on to the nearest meadow. They were set down, and I withdrew to watch. The parents continued to circle above the spot where the chicks had stumbled, or perhaps could not hear their cheeps from the meadow. Anyway, it seemed that future care of the chicks by the parents would be hazardous (with an additional threat from watchful crows) so I decided to take them home for hand-rearing.

The chicks were not reckoned to be more than 24 hours old when found. The first Lapwing chicks to be seen for the 1982 season were recorded on 30th April.

Hazards to Lapwing chicks

I have other records of recently hatched Lapwing chicks getting into hazardous situations because of nesting in a habitat altered by man.

On 4th May 1980, whilst cycling along the Castle Cary to Somerton road near Christian's Cross, a road which was fairly busy with traffic, a pair of Lapwings was frantically trying to lead a brood of chicks across the road, which had ditches on both sides. On this occasion, gathering up the chicks, conveying them a few yards across the road in the appropriate direction, and setting them down in the pasture, did the trick. Although the adults had flown low over our heads, calling and trying to distract us, when we withdrew they almost immediately settled on the pasture a few yards from the chicks.

Then again on 9th June 1982, near Glanvilles Wootton (Dorset), a brood of four recently-hatched chicks had a miraculous escape from being trampled on by a herd of dairy cows. Whilst passing, my attention had been drawn to the field on hearing adult Lapwing calls. The gate I stopped by showed the field to be sloping, dry, with scanty herbage, and patches of dusty earth. Small in size, it was not the sort of situation in which I would have expected Lapwings to nest. However, its lower boundary to my right was formed by a small stream and adjacent strip of marshy ground.

Most of the herd were on the far side, and scanning with binoculars revealed the Lapwing chicks coming from the left, and evidently being coaxed down the slope to the marshy bottom. By coincidence I had arrived on the scene just before afternoon milking, for a couple of farm women appeared at the far side and started the herd moving toward the gate. Through the binoculars I could see the chicks spreading out several yards apart, with the herd coming toward me. My field of vision filled with legs, hooves and thrown-up dust - rather like one of those long focus shots

much favoured by makers of films showing herds of ungulates on the move on the dry plains of Africa. The female Lapwing remained on the ground trying to muster the young by calls and visual signals, and at times putting herself between an oncoming cow and a chick. The male bird meanwhile remained some yards away, either watching from the ground, or aloft in pursuit of marauding crows which were obviously watching for an opportunity to snatch a chick. When the dust literally settled, and I scanned the field, I was amazed and relieved to spot all four chicks unscathed, and closing on the marshy ground.

Accommodation

The chicks that were taken home for hand-rearing were accommodated in a small conservatory, the floor of which was part covered by a layer of peat kept constantly moist, part exposed tile, and part covered with slightly damp earth and compost. There was a shallow pan of water surrounded by the peat.

Warmth was provided by a heat lamp with reflector, beneath which the chicks could find the degree of warmth they required for comfort. In order that they could rapidly regain the warmth if they wandered away from the heat lamp at night, a red light bulb was kept illuminated all night adjacent to the heat lamp. Its light output was such that it only just discernibly illuminated the far corners of the floor space. During the prolonged spell of hot weather this set-up resulted in a consistent temperature that did not fall below 60°F (15°C), even at night.

Ektachrome transparencies were taken to show the development of the chicks, at approximately weekly intervals.

Foods and feeding

Right from the start there was no problem in getting the chicks to eat; they voraciously devoured earthworms and woodlice. In fact, as their appetites grew my family were pressed into collecting sufficient quantity of earthworms, woodlice and other invertebrates, which became increasingly difficult as the drought of May became prolonged.

Earthworms (Lumbricidae) were the favourite food, but they also readily took woodlice (Isopoda), centipedes (Chilopoda), cleansed blowfly (Calliphoridae), maggots, black ants (Formicidae).

The depth of the peat varied from two to six bill lengths, so that any earthworms which were not eaten at once went into the moist peat and were available during the night. As the chicks got older, more earthworms were taken at night than by day.

Early competition for food

Whilst earthworms were plentifully available from a compost heap, they were provided in such quantities that most escaped being devoured directly and went into the moist peat. Nevertheless, competition for particular worms was observed from Day 1 (13th May) in a most curious and often amusing way. A couple of fist-fulls of worms would be tipped onto the floor, there would be a rush to get the biggest ones, and a chick would run off with one chased by the others, even though a writhing mass of worms remained. Often the competition for worms would result in two or even three of the chicks in a tug-of-war: heaving back until the worm either snapped or one contestant lost its grip!

In these competitions, one chick was noticeable from the beginning as being less robust than its siblings. In all the competitions for a worm it was always unsuccessful and even when we tried to give it a worm for itself, it would subsequently lose it. It soon grew weak and died on Day 6.

Early preference for wet ground

Providing a range of substrate (moist peat, damp compost/soil, dry stone) plus the shallow pan of water, enabled one to study their requirements for moisture. Initially they confined their movements almost exclusively to the patch of moist peat around the water pan. They kept their feet moist by frequently wading in the water. Also worms were often taken into the pan and washed by dunking and shaking, and after the worm had been swallowed the bill was washed by dipping it into the water and giving a little shake. Shaking the bill whilst immersed was also the only method observed by which the chicks drank.

Lapwings almost invariably site their nests either on slight eminences above saturated ground, or on dry ground not many yards from bottom-lands, water meadows or areas subject to seasonal flooding. Earthworms remain nearer the surface in saturated ground, and so more available to Lapwings. In addition such ground in the spring may have a greater profusion of other prey than drier ground.

"Leg tremble" or "Pattering" (Spencer, 1953)

Early in their development, certainly by Day 8, the "leg tremble" was noticed. A chick would pause, tilt its body slightly forward, evidently looking at the ground in front, and rapidly tremble one leg for a few seconds, vibrating it with the toes just in contact with the ground. The other leg, meanwhile was kept rigid. Often, but not always, this would be followed by the chick taking a pace or two forward and pulling a

worm from the peat. Evidently this vibration caused worms near the surface either to move or expose some small part, so giving away their position. It is well known that earthworms respond to vibration, but differently according to the degree of the disturbance. Walk across soggy pastureland and you will hear worms all around withdrawing into their burrows with your every footfall. When the disturbance is more severe, as with digging, worms will often come right out on to the surface of the soil, perhaps mistaking the disturbance for a burrowing mole. It was probably more than coincidental that I observed in February 1981, after overnight frost, a Lapwing pacing amongst several mole heaps on the unfrozen marginal land of Sutton Bingham Reservoir, Yeovil. It picked and probed at the heaps, and may well have been taking advantage of prey disturbed by moles working below.

Diminishing preference for wet ground

As the chicks grew, they demonstrated a declining requirement for a wet substrate day and night. By Day 21 they were spending most of the day resting on dry or only slightly damp compost during the hot weather. Juvenile Lapwings in the wild have to adapt to a habitat which becomes drier as spring gives way to summer.

Continuing development

The characteristic two-syllable call was first heard in rudimentary form on Day 15. At this date wing coverts were just starting to emerge from sheath. Also by this date there was a discernible gradation in size of the three remaining chicks.

From Day 16, stewed apple was offered and small amounts were readily taken. The heat lamp was not required during the day, but continued at night, having been on continuously from Day 1. By this stage most earthworms were being taken at night. During the day there was a preference for large ones. Bathing now involved deliberate wetting of the plumage as opposed to mere wading. It involved a rather tentative tail bobbing to wet the ventral area, and a dipping action to wet the head, neck and breast.

From Day 17 onward, as the drought conditions were making it increasingly difficult to obtain sufficient earthworms and woodlice, substitute foods were offered and taken. Chopped boiled egg, supplemented with lean beef mince and tinned baby food mixed with milk became the basic diet.

By Day 21, with the weather continuing very warm, observation

showed that the heat lamp was not required even at night. Remiges were out of sheaths to the extent of showing about 1 cm of vane.

On Day 25, and occasionally thereafter, to supplement the unnatural diet, a quantity of freshly dead fish fry and live daphnia was offered in a shallow pan of water. Both these prey were readily taken. Additionally some larvae of the Small Eggar moth were offered, but not surprisingly on account of their hairy skins, were ignored.

As the hot spell continued, and even though ample ventilation was provided, the conservatory on the south side of the house became hotter and more humid than outdoors, so I thought it would be beneficial to transfer the chicks to the outdoor aviary where they would also have more room and become acclimatised. Therefore on 8th June (Day 28) they were put outside, and for the first two days all was well.

A deeper pan of water was provided for their by now more complete and energetic bathing. It was on about this date that the characteristic head bobbing was noticed. There was much calling "pee-witt".

However, on 10th June there was a sudden drop in the temperature accompanying heavy overnight rain. There was a danger of the chicks becoming chilled. As soon as I could I transferred the chicks back into the conservatory and put them under the heat lamp. But my action was not prompt enough to save one chick the next day. A description of its plumage (at about 30 days old) from its skin is as follows:

Bill dark grey; culmen about 2.5 cm, forehead to crown, to back of head - dark brown - black tipped with buff. Crest projecting about 1 cm. Nape downy, off-white. Mantle medium brown, tipped with light brown and the back the same. Rump downy, showing vestigial light brown-dark brown coloration of chick (the "pepper and salt" natal camouflage pattern) with some rufous feathers at base. Upper tail coverts rufous-buff. Rectrices (10) about half the vane out of sheath, the outer two almost pure white; the next inner pair white proximally, black distally and with rufous-buff tip; the emerged part of the remaining rectrices all black with rufous-buff tip. Undertail coverts rufous-buff, but not with the intensity of coloration that adult birds have. Feathering round the vent white. Lower breast, belly, flanks, tibia feathering - all pure white. Legs flesh coloured. Pectoral band dark brown-black, with some feathers tipped with dingy white. Throat dingy white. Face mottled "pepper and salt" pattern. Remiges (about half emerged): outer three primaries Nos. 1-3 dark brown, with central dingy white blotch. Remainder (Nos. 4-10) black with slight green sheen; secondaries (about half emerged) dark brown-black. Scapulars long, i.e. projecting well beyond emerged secon-

daries, and brown tipped buff. Primary greater wing coverts - coloration as for secondaries. Median wing coverts less dark, tipped with buff and with more greenish sheen. Lesser wing coverts dark brown-black. Underwing coverts white.

When the danger of heavy rain passed the chicks were transferred back into the outside aviary. Feather development continued so that by Day 38 flight was first observed. But the previous day one of the two remaining chicks found a small gap in the aviary netting, released itself a little prematurely into the garden, and promptly disappeared.

Release

As I could not provide a spacious enough aviary or even grounds for a full-winged Lapwing, I decided to release the remaining bird back into the wild. A farm a few miles away was chosen, because it had the kind of land favoured by Lapwings out of the breeding season. In addition there was a paddock of rather more than an acre around a stream and pools, surrounded by high netting (which keeps out most ground predators) and where is kept a collection of mostly pinioned exotic waterfowl. It was thought that release into the paddock would enable my bird to try out its flying skills whilst having short cropped turf and wet margins to forage on, and eventually to join with post breeding flocks when they appeared on the farm a few weeks later.

So on 19th June (Day 39), a day after having first been observed to fly, it was released in the paddock. It remained in the vicinity of the paddock for at least the next two days. Thereafter my visits were infrequent and contact was lost. Hopefully it joined with a flock passing over.

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NOTES ON FERAL ROSE-RINGED PARAKEETS

By DEREK GOODWIN (Petts Wood, Kent)

Introduction

The Rose-ringed or Ring-necked Parakeet *Psittacula krameri* is probably well known to most of my readers. It is a slender, elegant bird, its body not very much larger than that of a Starling *Sturnus vulgaris* but with a long pointed tail and rather long wings. Its plumage is a bright but delicate green with much yellow on the outer tail feathers. The bill is mainly red. The male has black at the sides of the throat and a pink ring round the back of his neck. Actually this ring, although usually appearing a delicate silvery pink, is composed of bright, orange-tipped feathers which are (at least the orange parts of them) overlaid by the bluish silvery extreme tips of the feathers immediately above them on the bird's neck. This I discovered, to my surprise, when examining specimens in the British Museum.

The name Rose-ringed Parakeet is less often used in avicultural circles than Ringneck or Ring-necked Parakeet but I prefer it, as it is more descriptive, is used in Forshaw's monograph on parrots and avoids confusion with *Barnardius barnardi*, the Australian species also known as Ringneck Parakeet or Mallee Ringneck Parrot.

A comprehensive paper by our member, Mr. G.A. Smith, on the behaviour of the Rose-ringed Parakeet in captivity, together with good sketches of its various displays and postures, and much other information was published in our Magazine in 1972; much of this information but not, alas, the sketches, is also to be found in his excellent book (Smith 1979). Readers seriously interested in this species are recommended to read Smith's writings on it. This article merely records some rather casual observations I have made on Rose-ringed Parakeets off and on, mainly "somewhere in Kent", between the autumn of 1974 and the present time of writing (mid-October 1982). Their only merit is that they are observations made on birds that were completely free. My first Rose-ringed Parakeets at liberty, indeed the first time that I saw any parrot at liberty, was in the grounds of Cairo Zoo during the war years. This was during brief periods of leave from the desert; I only saw the parakeets a few times and recall little of them save the vivid impression made on me by their beauty and their wild, impetuous-seeming flight, during which the bird rolls from side to side in the air.

Attracted by their loud calls, I and my friend Eric Knowles saw our first English feral Rose-ringed Parakeets in the autumn of 1974. There

were eight of them, six adult males and two that were either hens or immature males. They were clinging, clambering and fluttering on the bark of a great Cedar of Lebanon, in a garden adjacent to a public footpath. We watched from a discreet distance. Several individuals and parties of people passed within a few yards of the noisy and conspicuous birds without noticing them! We thought something in or on the bark must be attracting the parakeets but had no proof of this. After they had flown, first into the higher branches of the Cedar and then away, we never once, from that day to this, saw them on that tree.

Population and numbers

As I said, on the first occasion we saw the parakeets there were eight. Subsequently over the years we most often saw from two to six birds but once in the summer of 1979 I saw 18, about a third of them hens or immatures, perched in one tree. A party of nine was seen on 3rd March 1982. These last were very active and vocal so had clearly survived the rather hard winter of 1981/2 without harm.

Examination of specimens in the museum did not suggest the possibility of distinguishing independent juveniles from hens "in the field" and some of the courtship postures (see Smith 1972) are suggestive of food soliciting. I have not seen any definite feeding of juveniles by adults (only of hens by their mates) nor any young looking out of nest holes. I have, therefore, no evidence at all that there has been any successful breeding in the area between 1974 and 1982. This in spite of the fact that a pair have nested every year in the same tree, two pairs nested this year (1982) in trees about 500 yards apart, and I think on much circumstantial evidence that three or four pairs have nested every year. Some of the places where I believe nest sites to be are on private land where it is not possible to search for the nesting holes.

Quite a few people are aware of the presence of the Rose-ringed Parakeets in this area. It is, therefore, possible that the nests are being regularly robbed of the young when the latter are old enough to handrear. Since unsexed immature birds of this species cost £30 each in a Kent pet shop, such human predation on the species seems all too likely!

Feeding

I once saw two Rose-ringed Parakeets in Surrey feeding on the catkins of some sort of poplar. Parsons (1982) has recorded them flocking to feed on Hornbeam seeds elsewhere in Surrey. I have never seen any "serious" feeding by "my" Kent birds. They could, of course, easily be overlooked

when feeding in trees in leaf in summer. Both in Brazil and Australia I have observed that some parrots are very quiet when *feeding* in trees, in great contrast to their noisiness when in flight. However, I think that serious feeding is done well away from their nesting areas and probably largely from bird tables in nearby suburbs or towns. Certainly cock birds in the breeding season periodically fly right off in the direction of one or other of three built-up areas, returning after about half an hour and then usually calling the sitting hen out of the nest-hole and feeding her.

I have never seen them showing any signs of hunger. Often, in hard winter weather, they appear well-fed, and are certainly active and vocal, when most of the native wild birds around them appear to some extent subdued by hunger.

Social and reproductive behaviour

I think the main attraction for them of the areas where I see these birds is the presence of nest sites. One or several adjacent trees seem to be used as meeting or loafing places by up to 18 in one instance, as I described in the introductory section. These always seem to be based on or in the immediate vicinity of a tree containing a regular nest site. From 1975 until 1980, a tall ash standing in a field (very near to woodland) was "the meeting place". Since then this tree (at least when I have observed it) appears seldom to have been used except by the pair nesting in it and, usually only for a few minutes on the way back from a feeding flight to his sitting mate, by the cock of a pair nesting in a small wood about 500 yards away from it. In 1981 and 1982, the corner of a small, rather well sheltered and "sunny" wood about a third of a mile from the ash tree, has been used. I think probably two and just possibly three pairs nest in this area.

Although single birds, sometimes certainly cocks whose mates are sitting are seen in flight (and heard, for flying birds usually call frequently), they appear to prefer to fly in company. A lone bird, calling loudly in flight, is sometimes joined by one or more others, or may be diverted by others answering it and alight near them, only to take wing again after a few minutes. Sometimes I have had the impression of a bird deliberately "calling for" another to join it on a feeding flight, flying to and alighting briefly in the "meeting tree(s)", whence it then departed with a companion. The cock of the pair (I do not, of course, know whether it has been the *same* pair each year) that nests in the field ash and the cock of the pair that nests about 500 yards from it, often behave in this way.

All courtship and allied behaviour that I have seen has been as described by Smith (1972). I have not, however, had the impression of the male hav-

ing "very real terror" of his mate. I suspect that if Mr. Smith's birds really were terrified (as distinct from a little fearful, shy or diffident), this was probably caused by their close captivity and inability to escape at will from the hen. The killing of males by females, of which Smith (1972) gives instances, is, I imagine, almost certainly an artifact of captivity just as, in some circumstances, driving cock pigeons may kill their mates when both are confined, though this does not, and almost certainly could not, happen under natural conditions.

At times, apparently immature birds (mostly males, judging by their behaviour as they were seen indulging in courtship movements or what were probably such) have been seen. Whether these are birds that have actually been bred in a feral state or merely "new" escapees joining the established birds, I do not know. Usually when I have seen more than a couple of pairs, adult males have been in the majority. For two years running, I think in 1977 and 1978 (unfortunately I have lost my file with the parakeet notes in and am having to do this article from memory and this year's notes), two cocks were a constant trouble to the pair nesting in the field Ash. As soon as the cock of the nesting pair had departed on a (presumed) feeding flight, they would be at the nest-hole within minutes. This at once brought the hen to the entrance, where she repulsed them as often as they advanced. They appeared to wish to court her and/or to look into the hole. On the occasions that I watched, the hen spent most of the time that her mate was absent defensively in the nest entrance. When her mate came back, he appeared to know what to expect and would fly, with angry-sounding calls, extremely fast for the last few hundred yards. Usually the two cock birds would flee as soon as they heard him coming but sometimes they delayed, and then they would be furiously chased for a short distance. However, though they then often seemed to vanish completely, back they were round the hole again as soon as the cock flew off to get more food.

I think these two cocks were homosexually paired. I sometimes saw one (I think at different times both) preen the other's head; they never showed the slightest aggression towards each other and they habitually flew together. This last is, of course, no evidence, as cocks whose mates are sitting may also fly together.

Pairs start to re-visit old nest sites in late August or early September. Smith (1972) considered that male Rose-ringed Parakeets had little interest in the nest-hole as such; later (Smith, 1979) although stating that males "seem to have no interest whatsoever in nesting arrangements", stated that they may chew at the nest entrance and "sometimes may 'crane-

peer' at the entrance hole".

From what I have seen of feral birds, I think the cock *is* interested in the nest-hole as well as in his mate, as on autumnal visits to the nest site the cock is often the first to fly down from the top of the tree and perch near to the hole. From this position, he frequently calls and (not at the moment of calling) lowers his head and body in a bowing movement rather like that of his sexual display except that he does not first draw himself "up and back". As he bows forward, the nape feathers are so arranged that the pink neck ring looks much thicker than usual, and is very conspicuous if one looks down at the bird from above as, of course, the hen in the tree top does.

Perhaps it will be of interest to describe one such nest site visit:

"4th November 1982. Pair came flying, calling in flight, and alighted about 12 feet apart in the top of the field ash. Cleaned their bills repeatedly and vigorously on their perches. Then they rested for about five minutes. The male suddenly took wing, with a single call, flew down in a steep, part circle and alighted on the branch in front of and about 12 feet from the hole. He kept calling at intervals in various modulated tones, especially with an odd vibrant sound, not heard in the "kee-ack" flight call and suggestive of the "kwerp" calls of the Black-headed Gull. Also frequently bowed forward to perch, his pink neck ring very prominent as he did so.

"After some six or seven minutes the hen gave two calls at short intervals, then flew down and alighted about six feet from her mate. The cock then began to clamber up along the thin branch that grows towards the hole. He looked nervously towards the hole, with elongated neck, then stepped from the branch to the trunk and clung there about four feet above the hole. The female flew to the hole, alighted just below it and moved up until she was hanging from its lower edge. Her tail was widely spread, every feather clearly separate, and pressed against the trunk. She began "crane-peering" (as described by Smith) alternately looking into the hole and drawing as far back as she could without losing her position. The male then flew up, alighted on the trunk about four feet to one side and above the hole, then moved towards it so that he could, by stretching his neck, lean down and peer into the upper part of the hole each time the hen drew her head back from peering in."

I have seen pairs apparently searching for new or alternative sites in late winter. I had my best view of this on 1st January 1981. The birds, just as is the case with Stock Doves, feral pigeons and swifts, were attracted to shadowed and dark spots that merely looked like cavities, as well

as actual holes and broken-off stumps of branches.

Except in the case of the two persistently interfering cocks already mentioned, usually only a pair of birds are seen in the immediate vicinity of a nest-hole. On two occasions, however, I saw an excited mob (this seems the best descriptive noun!) of at least seven or eight flying round a nest-hole, individuals continually fluttering up to it, either to fall away at once or to do so after clinging to the trunk for a moment. The behaviour was, at least superficially, very like that which one sometimes sees from House Martins at a nest with well-grown young. On the last of these occasions I went to where I could get a better view of the nest-hole. Doing this, however, caused the parakeets to take alarm and flee so the fact that I saw no young, or anything else to account for their interest, does not prove that there was not some creature or creatures within the hole that had caused the commotion.

Nest-sites

Of the four sites in which I know the birds have nested (from their behaviour, as, short of cutting open the nests, there would have been no way of proving the presence of eggs), three are in old nest-holes of the Green Woodpecker *Picus viridis*. The other was in the partly rotted underside of a sloping branch. This appeared to have only a very small cavity and always to be in imminent danger of the cavity walls rotting completely away, as indeed they did after about five years. It was, however, clearly the site that most appealed to the birds as, so long as it was in existence they ignored the old Green Woodpecker hole at about the same height in the trunk of the same tree (the field Ash) to which they subsequently moved.

These two sites were about 20 feet above ground level, the other two were much higher up in an ash and an oak tree respectively. Holes that are large enough for a Stock Dove *Columba oenas*, and at least one that is not *quite* large enough for this, as I have seen Stock Doves trying in vain to enter it, appear to be of no interest to the Rose-ringed Parakeets. Possibly holes made by the Greater Spotted Woodpecker *Dendrocopos major* are too small (though one would think that the parakeets could enlarge them) as I have not seen them used. Old holes of this species are, of course, like their makers, more abundant than those of the Green Woodpecker. Another possibility is that Greater Spotted Woodpecker holes may be even more liked by the Starling and that it can and does prevent their use by the Parakeet.

Inter-actions with other species

Species that are neither potential predators nor competitors for nest sites are never, so far as I have seen, interfered with in any way by the Rose-ringed Parakeets. Nor have I seen any such bird show fear of them.

Some of those people who are implacably opposed to any introductions except those made in the interests of blood sports, commerce or food production, have claimed that if the Rose-ringed Parakeet becomes established it will compete with native species for nest sites. They are careful to make this accusation vague and generalised but I will be specific in countering it.

So far as I have seen, holes of a size suitable for the Stock Dove, Mandarin Duck *Aix galericulata* or any of the owls, do not interest the Rose-ringed Parakeet. If they did, it is highly unlikely that this bird would be able to hold them against any of the species listed above. Stock Doves nest every year in holes in two trees in which the parakeets that I have watched regularly nest and others do so in all areas in which I suspect the parakeets nest. Neither species shows any hostility to, or indeed interest in, the other. The parakeets show neither alarm nor anger when a Stock Dove is perched close to their nest-hole.

This is in contrast to the attitude towards the Starling *Sturnus vulgaris*. When hanging on the trunk, looking into their nest-hole, parakeets are sometimes “dive-bombed” by Starlings. Conversely, I have often seen a Parakeet, always the hen of the pair, drive away a Starling that has come near her nest-hole. If a pair of Parakeets are at a little distance from their hole, the approach of a Starling to the hole will always induce the hen either to chase it away, or to quickly get between it and her nest-hole.

In one instance, a hole which a pair of Rose-ringed Parakeets were visiting in the late winter had in it later in the spring, a Starling’s nest from which young fledged. So it is possible that the Starling may sometimes succeed in driving off the Parakeets. On the other hand, at least two of the nest sites have been retained by Parakeets although, as stated, I have no proof that any young have ever fledged from them in spite of constant interest in them by Starlings. If, occasionally, a pair of the latter are displaced by parakeets, this is hardly going to be a mortal blow to the status of the Starling, either in Britain or throughout its now enormous world range.

“But”, the anti-Rose-ringed Parakeet faction will say, “If the Rose-ringed Parakeet and the Starling are in competition for woodpecker holes, what about the woodpeckers?” What about them indeed? Well, in such areas as this, where the sort of trees in which woodpeckers can drill holes

exist only in small woods, clumps or single trees in fields, all within half a mile or less of towns or suburbs, most new woodpecker holes (except those of the Lesser Spotted Woodpecker *D. minor*) are taken over by Starlings as soon as or a little before they are finished. This is especially the case with the Greater Spotted Woodpecker. If I remember rightly, Dr. Hans Löhrl published a paper some years ago in which he reported that in an area of Germany where he had studied it, the Greater Spotted Woodpecker lost *all* its newly-made holes and only succeeded in rearing a brood if it finally laid in a derelict old hole, unwanted by Starlings. I think the situation is much the same in many parts of Kent and Surrey.

As the Rose-ringed Parakeets select their nest sites well before the time of year (late March and April) when woodpeckers make new nesting holes, it seems unlikely that they would even if equally abundant, which they are never likely to be, ever rival the Starling as a competitor of breeding woodpeckers. The most serious long term enemies of our woodpeckers are, of course, council, forestry and other officials who remove dead, dying and diseased timber.

The birds of prey and corvids that regularly inhabit the area are the Sparrowhawk *Accipiter nisus*, Kestrel *Falco tinnunculus*, Tawny Owl *Strix aluco*, Carrion Crow *Corvus corone*, Magpie *Pica pica* and Jay *Garrulus glandarius*. Sparrowhawks are few in number (I have only seen three different individuals there in the past six months or more) and the Tawny Owl is normally roosting by day. I have never seen either of these in sight of a Rose-ringed Parakeet so I do not know what the latter's reaction to them would be.

I have often seen Jays and Magpies quite near to parakeets and have never seen the latter pay them the slightest attention. One of the nesting trees (the field ash) is a very favourite resting place for Magpies but the Rose-ringed Parakeets never seem to mob them.

This is very different from their reaction to the Carrion Crow. Nesting Rose-ringed Parakeets violently mob Carrion Crows if they come within yards of the nest-hole, giving their alarm calls vehemently and "dive-bombing" the crow repeatedly. Even crows perching in the top of the nesting tree or in neighbouring trees are often attacked in this way. Occasionally I have seen parakeets, sometimes a lone bird, sometimes a presumed pair, mobbing a crow in flight at a distance from any nest site. One of my most vivid memories is of a single parakeet seen dive-bombing a crow in the air below my eye level. It appeared as if it actually landed on the crow (though this may well have been an optical illusion) and for a moment I had in my binoculars the unforgettable picture of the slender,

vivid green bird superimposed, wings spread, upon the larger, shining black one!

Although not so numerous as Carrion Crows and Magpies, Kestrels are always present in the area. Usually the Rose-ringed Parakeets pay them little attention. Once I was watching a cock Rose-ringed Parakeet that was perched in the top of a tree, I think in the immediate vicinity of its nest-hole (I was looking down from a footpath at the small private wood involved). As usual there were Stock Doves and Wood Pigeons resting nearby. A cock Kestrel came gliding over the tree tops and those Stock Doves and Wood Pigeons more or less in (or rather under) its line of flight took wing to either side but the parakeet showed no obvious reaction. This greatly surprised me even though I had often seen parakeets and one or more Kestrels perched in the same tree without heeding each other as it seemed unusual, and I should have thought unwise, for any bird to allow a Kestrel to fly closely *over* it. The Kestrel often gives the impression of being an inefficient and half-hearted predator where birds are concerned but this impression may be far from correct. Some Kestrels, probably most experienced adults, are very quick indeed when they see a *good* chance to catch a bird.

However, I have never seen a Kestrel show interest in a parakeet, nor until about two weeks ago, had I seen parakeets show alarm at one. Then, however, two parakeets were perched in the field Ash when a Kestrel swooped down and alighted in the top of it. As he did so, both parakeets flew up with loud alarm cries. They did not mob the Kestrel but flew around with hesitant flight and then went off to the vicinity of the other nest site some 500 yards away. I think they had noticed the Kestrel only when it was already near and moving *fast* towards them and this caused their fear.

It would be interesting to know whether the very different behaviour shown by nesting Rose-ringed Parakeets towards Carrion Crows and Magpies is due to experience in *this* country or to the fact that throughout most of their natural range the Magpie does not occur whereas black crows do and, like some other birds, Rose-ringed Parakeets have an *innate* recognition of them as potential predators on fledgelings. I think the latter is more likely, but I may be wrong. However, some of our members who breed this species, or have observed it in India, will, I hope, be able to inform us on this point.

“With my beak bent, my little wanton eye,
My feathers fresh as is the emerald green,

About my neck a circulet of the rich ruby,
My little legs, my feet both feat and clean,
I am a minion to wait upon a queen."

Over 500 years ago, the poet John Skelton put these words into the mouth (or syrinx) of a captive Rose-ringed Parakeet in solitary confinement. No doubt that bird gave much pleasure to its royal mistress but I doubt if as much as I, a mere commoner, am now vouchsafed when I watch the beauty and exuberance of flight of this lovely exotic at full liberty.

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TOOL-USING AND RELATED BEHAVIOUR IN BIRDS: MORE NOTES

By JEFFERY BOSWALL (Bristol)

Since the publication of my 1978 paper (*Avicultural Magazine*, Vol. 84, No. 3, p. 162) some further observations on tool-using by birds have come to light; and some corrections and re-appraisals also need to be made.

Borderline cases in wild and captive birds

That the Common Crow *Corvus brachyrhynchos* might use motor cars to crack open nuts for them was first suggested by Maple (1974) and has now been shown by Grobecker and Pietsch (1978) to be the case. At Long Beach, California, they twice saw a bird drop a palm fruit on a road and wait for a passing vehicle to break it open. It would appear that the Carrion Crow *Corvus corone* in Shetland will "often drop large seashells on the roads and await passing lorries", though no more details are given (Conder and Everett, 1979).

Further examples of using a bait to attract fish are described. Harry Shrikes - in a letter, dated 24th October 1967, to Leslie H. Brown - described how a Green-backed Heron *Butorides striatus* on a partly submerged rock in the Kiboko River, would fly to the bank on which lay some boiled maize, left by some anglers, pick up a grain and then fly back to the rock. The grain of maize was then carefully put in the water, upstream of the rock, and watched intently as it floated by. As it went almost out of reach the bird would retrieve it and repeat the performance. If the grain was taken or lost the bird would fetch more. Although the bird was watched for half an hour, it appeared to have been unsuccessful in attracting a fish. However, a party of American bird-watchers said that just before Shrikes began his observations, the heron was seen to make a catch. The Kiboko flows past Hunter's Lodge on the main Nairobi-Mombasa road in Kenya and this same bird, or another doing the same thing, was photographed at the same spot in either 1967 or, more probably, 1968, by Juanita Carberry (in litt.) who observed an identical incident except that the heron was using bread (see Plate i).

In January 1968, W.J. Eggeling watched a Green-backed Heron at the same location. The following extracts are taken from his unpublished account (Eggeling, 1974) deposited at the Alexander Library in Oxford. "This pond contained a multitude of fish ranging in size from several pounds in weight to mere minnows. The water was very clear, several

feet deep at the bank near at hand but shelving very gradually on the far side. Feeding the fish was an attraction to visitors and at one place where a drain debouched a shoal was always in evidence and the red earth of the bank was bared and flattened by human feet. As we sat, a Green-backed Heron flew down from a spreading Acacia tree and searched diligently around the bared space. Suddenly it saw a small white object (later identified as a short length of a synthetic straw), picked this up and flew with it to a tiny island near at hand On alighting, the heron adopted a crouching attitude and, with neck outstretched low over the water, dropped the object which it carried. Slowly this drifted away from the islet, the bird's bill following almost imperceptibly, ready to strike. Nothing happened. Just as the object was almost out of reach, the heron lifted it and tried again. Once more nothing. This time the heron took out the object and bore it to another island, to try from there. Again nothing happened, the bait drifted out of reach and the bird flew off. A few days later I rose at dawn and went over to the pond but it was some time before a movement high up in one of the thorn trees drew my attention. The heron had roosted there and was just waking up. It stretched and preened, and later flew down directly to the same bare patch as before. It searched around but found no suitable bait. Then, out in the water, something brown and white caught its eye. This was a crust of bread, the outside end of a loaf, lying partly submerged on top of a tangle of water-weed, inaccessible from below because of the density of the weed growth. Without hesitation the heron picked up a piece of this bread and flew across to the first islet from which it had previously fished. There was a boil as soon as the bread touched the water and the bait vanished. There was no strike; the fish which had taken the bait was presumably too big. The heron tried again, using another piece of bread. The same thing happened. Next the heron went to another island; again the boil was that of a big fish, again there was no attempt at a strike. Several times more the heron tried from this stance, always the result was the same. Finally, it took another piece of the now much smaller crust and flew over to the other side of the pond alighting on a stone close to the shore in water only two or three inches deep. As before the bird was crouched, the neck and bill outstretched above the bait, the eyes intent. There was no boil this time, instead the water dimpled and the floating bread jiggged up and down. The heron struck; it had caught a fish about $2\frac{1}{2}$ inches long!"

It has come to light in Florida that Green Herons *Butorides virescens* have been seen baiting fish at two sites additional to those already known. At the north campus of the Miami Dade Community College (11,380 NW



i.

Juanita Carberry

Wild Green-backed Heron that baited fish from the rock shown,
at Hunter's Lodge, Kenya



ii.

B. Hunter

Wild Green Heron at Miami Seaquarium
waiting to grab fish attracted to bait placed by itself

27th Avenue, Miami) there is an artificially constructed lake about 100 x 300 metres in size. Here Gloria Cashin (discussion, June 1979) saw, photographed and filmed a Green Heron that regularly baited fish with bread provided by Miss Cashin. This behaviour was first observed about 1974 and was most recently seen in June 1979. The bird would take a small piece from a large lump of bread and place it on the water surface, catching the fish thus lured. The bird would also re-position the bait if it drifted to an inconvenient position.

Further north in Florida, Mrs. Vincent Newell (discussion, June 1979), who lives on St. Lucie Boulevard, Fort Pierce, had a Green Heron (photographs of which I have seen) which visited her large natural-looking garden pond for a period each year for several years, from about 1972 to 1977. The bird often caught fish which had been attracted to bread thrown for them by Mrs. Newell, and "quite often" over the years the heron was seen to move the bread, particularly when it floated too close to the rock from which the fishing was done. Mrs. Newell formed the impression that if the bread was too directly below the bird, the fish would be less likely to come: and this is consistent with the crouching posture and near horizontal strike angle shown by the Miami Seaquarium bird, for example (see Plate ii).

In Cuba, at the Havana Zoo in 1967, James Hancock (discussion, July 1979) saw a wild Green Heron placing and replacing a food item on the water surface of a lake for the purpose of attracting and catching a fish. It was successful.

According to the latest revision of the taxonomy of the heron family, the birds from East Africa and North America referred to above are treated as races of the species *B. striatus* (Hancock and Elliott, 1978).

By a coincidence (unless it was a case of observational learning), at Hunter's Lodge in Kenya in one of the same two years of 1967 or 1968 as the Green-backed Heron was seen baiting fish, Alan Root (taped interview, 1978) saw a Pied Kingfisher *Ceryle rudis* behaving similarly. The bird would retrieve from the water surface a piece of dry bread thrown out as fish food and carry it to a branch above the water. Root then saw the bird drop the crust on to the water and, subsequently, dive down and capture a fish that had come to feed on the bread. Root had been told of this individual bird's behaviour by Malcolm Coe who (in litt. 1978) recalls that he "was having tea by the water of a dam which was stocked with *Tilapia* and Black Bass". It was the practice for the staff of the lodge to throw waste bread on to the water which attracted large numbers of feeding fish. "As I sat there, a Pied Kingfisher flew over the water and "stooped" and

picked up bread and then carried it back to a yellow fever tree on the other side. The bread then fell on the surface and the bird sat there directing its gaze at the water. When the fish broke the surface to feed on the bread it "swooped" on the fish and caught one."

Judd (1975), writing about a Blue Jay *Cyanocitta cristata*, that had been in captivity for 18 years, tells how, when the level of water in the Jay's drinker got too low to drink from, it put "solid objects, such as bits of food and trash, into the water to raise the level within its reach." (Aesop, in his fable illustrating that "little by little does the trick" has a crow do the same thing 2,000 years before the Jay). This use of objects to raise a water-level does not meet the stricter criteria for true tool use. In any case, the observation on the Jay was recorded briefly and without discussion and it is difficult, therefore, to be certain that the objects were dropped purposely into the water to raise its level.

To the list of birds that regularly use anvils upon which they shatter hard-shelled prey can be added the Tooth-billed Bowerbird *Scenopoestes dentiostriis*. It is said, by Marshall (1954), to live "essentially on fruit, but it eats insects and large ground molluscs which it sometimes cracks on a special stone that is often near the display-ground".

Rand (1954) attributes heaps of broken shells found by stones in the forests of Siguijor Island in the Phillipines to the work of the Ruddy Kingfisher *Halcyon coromanda*. His evidence was only circumstantial however. I know of no other case of a species of kingfisher that uses an anvil for snails whereas several kinds of pitta are known to do this.

Two species that are not usually thought to smash snails - the Pied Flycatcher *Ficedula hypoleuca* (Page, 1978) and the Stonechat *Saxicola torquata* (Fisher, 1979) - have recently been reported as attempting to do so.

Under the title "Tool-using by a Black Eagle?", Dick and Fenton (1979) describe the behaviour of an adult *Aquila verreauxi*, apparently acting in defence of its nest. During 90 minutes the bird, approaching its (empty) nest in an Acacia tree, dropped 11 sticks from a height of about 20 m. that fell within 3 m. of the observer who was standing about 10 m. from the base of the nest tree. The repeated dropping of the sticks may represent an effort to drive away a potential predator as the authors suggest, but there may be an alternative and more parsimonious interpretation.

True tool-users in captivity

Two additional instances of parrots scratching themselves with implements have been reported.

In the summer of 1975 Mrs. Katharine L. Regan (in litt. 1976) and her sister saw a Sulphur-crested Cockatoo *Cacatua galerita* or *sulphurea*, at the London Zoo, holding a lolly stick about four inches long in one claw and scratching itself all round the crest and face, eyes shut and "obviously ecstatic".

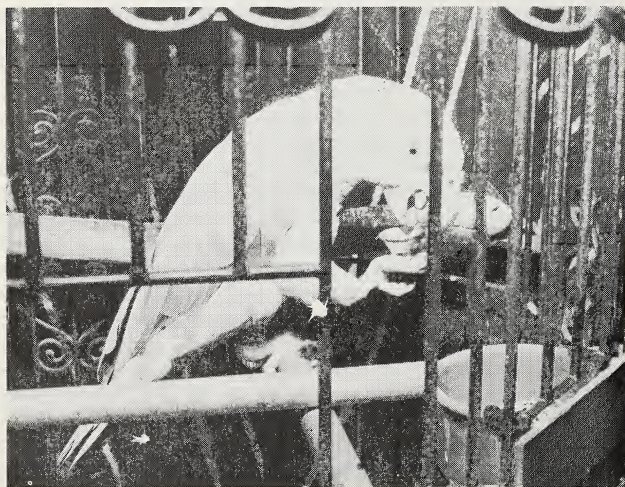
An African Grey Parrot *Psittacus erithacus* owned by Dr. Irene Maxine Pepperberg (in litt. 1978) of Indiana, "routinely employs pieces of wood (and) keys to scratch the underside of his beak and head In addition to the scratching performance, I have noticed an additional behaviour which might be considered tool-use. If a piece of paper or a flat leather toy I call a "hide", which is about two inches by three, is on top of his cage (where he spends a good deal of his time), my Grey will occasionally use (one of these) as a tray for pieces of food or other toys (e.g. he will use the hide to catch "crumbs" of nuts: he will then carefully pick up and consume these bits). " In a subsequent discussion Dr. Pepperberg agreed that although an example of sophisticated object-use, the deliberate positioning of an object to catch food particles cannot be regarded as a true tool-use. Plate iii shows this bird scratching its head with a stick.

The behaviour of a Yellow-fronted Amazon Parrot *Amazona ochrocephala panamensis* is of particular interest. The bird is reported by its owner, James J. Murphy in Washington State, USA, (in litt. 1978) to "regularly use an inverted metal toy bell as a 'cup' to eat from". The 18 month old parrot "scoops up a quantity of mixed seed with the inverted bell held in his beak. The bell is then transferred to either foot and eating commences. This action is usually repeated several times, then the bell is gently placed back in the seed tray till next time I have often found the bell submerged in the water tray. I strongly suspect that the parrot often drinks in this manner as well a few days ago a comical situation arose when the bird tried - without much success - to eat a large portion of carrot by holding it in his bell "cup". The cup was so small and the carrot so large by comparison, that the bird had considerable difficulty in keeping the large carrot in the cup and still chew on the other end. This bird has eaten every food item given him out of the cup, i.e. dog kibble, apple slices, turkey pellets, etc. Food items are never placed in his cup. He always manages this for himself." (see plate iv).

Parrots normally pick up objects with the beak and then transfer them to the foot, as this Yellow-front did. In the light of this, it seems likely that the "Staffordshire" Lesser Sulphur-crested Cockatoo *C. sulphurea*, that drank from nut shells and a spoon, also first baled with its beak and then transferred the vessel to its foot; also with the unidentified



iii. *Bruce E. Bahlke*
Captive Grey Parrot using wooden stick as a tool with which to scratch its head



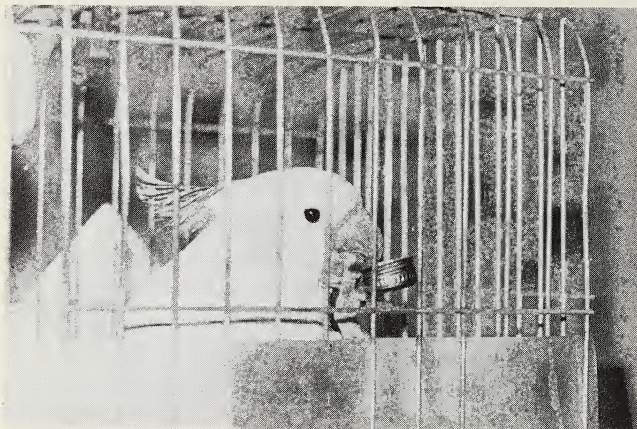
iv. *Bill Swedberg*
Captive Yellow-fronted Amazon Parrot using metal toy bell as cup
to scoop up seed and then feed from

species of cockatoo that used empty monkey-nut shells to scoop up water (Boswall, 1977, p. 97).

We must be cautious, however, because Mr. Murphy says that the Yellow-fronted Amazon "often approached his seed tray and reached in, not with his beak, but with his foot. After some shuffling about he extracts a clenched 'fist' full of seeds which are brought directly to the beak where normal shelling and eating takes place. The clenched "fist" of seeds remains high near the mandible as the seeds are eaten. This action is usually repeated two to three times each session. I don't believe this action is a daily occurrence. The motivation behind this kind of activity is likely a form of environmental enrichment by mimicking the actions of the people he sees around him; for his large cage is set high on a stand within easy viewing distance of the dining table." Another example of a parrot picking up scraps with its foot refers to a Lesser Sulphur-crested Cockatoo (Bertagnolio, 1979).

Mr. Murphy's male Goffin's Cockatoo *C. goffini* displayed an unusual form of tool-using. The bird was kept, temporarily, indoors, housed in a large cage, and demonstrated considerable dexterity with an empty, circular metal container. The container was about three inches across and three or four inches deep. The cockatoo grasped the container by the holes on its top with his foot and struck at a bell suspended from the cage top. "The resulting noise was quite impressive" and usually occurred early morning or late evening. A variation of routine was to "grasp the container with his foot, and the bell with his beak, and clash them together at about one beat a second for between five and fifteen repetitions. The resulting acoustics were less impressive, but what (they) lacked in volume was made up for in frequency". Mr. Murphy comments "beyond the obvious learned component of this behaviour, there may be an innate component as well. The temporal arrangement of the observed commotion coincided with the often noted periods of noisy activity generated by this species, and others, in the captive and wild state. However, since this bird was not raised in isolation, this is pure speculation".

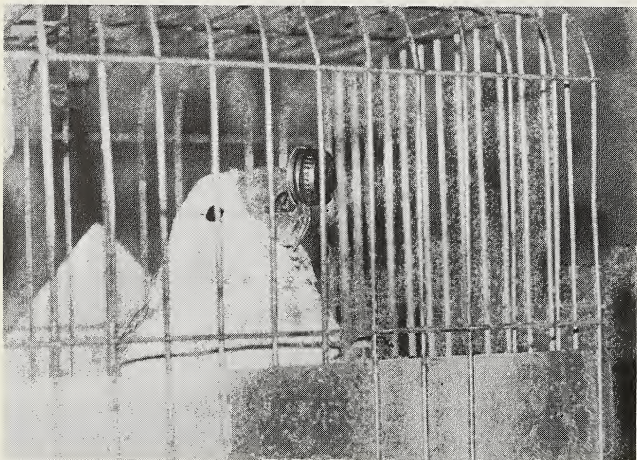
A Lesser Sulphur-crested Cockatoo owned by Mr. and Mrs. Colin Longthorp of Hull uses screw-on type soft-drink bottle tops to bale water and drink from. The bird takes the bottle top in its bill and brings it through the cage bars by first turning it on its side (as it is shallower than it is wide). He then transfers the bottle top to his left foot before taking it back between his mandibles, often rotating it for some time before then scooping water from the pot in his cage. The bird then assumes an upright posture, the container of water still in its bill. At this point the bird may or may



v.

Colin Longthorp

A captive Lesser Sulphur-crested Cockatoo, having scooped up water into an inverted metal bottle top held in the bill, and having held the "cup" in its left foot so as to adjust the position of the container in its bill, is removing its foot prior to drinking



vi.

Colin Longthorp

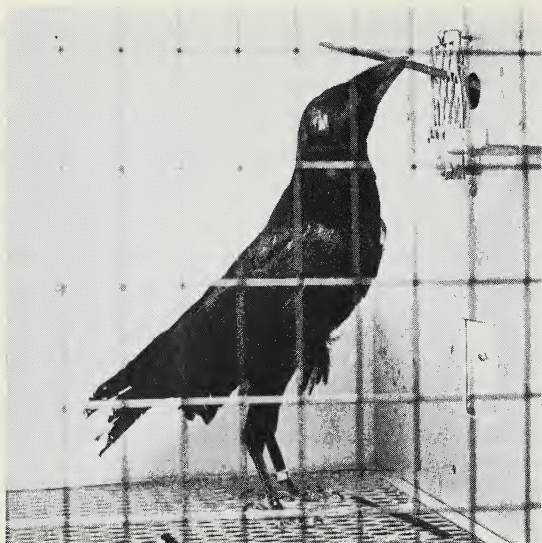
A captive Lesser Sulphur-crested Cockatoo drinking water from a metal bottle top.

The bird has not only tilted its head back but has used its bill simultaneously to tilt the "cup".

not use one foot to help re-position the bottle top more horizontally in the bill before tilting his head backwards and simultaneously tilting the bottle top backwards by tightening its grip with the bill. The movement of the cockatoo's neck muscles shows that some water at least is drunk. Some also "misses" and wets the outside of his bill. Occasionally, either as a result of the adjustment of the position of the bottle top in the bill or as a result of a jerky head movement much of the water spills down the bill on to the cage floor. Either way, the bird then brings its head forward and takes the bottle top from the beak with a foot. It is discarded within about three minutes by placing it in the water pot or the seed pot or by dropping it onto the cage floor or outside the cage. No bottle top is used more than once as a scoop. Plates v and vi illustrate the stages in this procedure.

An apparent case of implement-wielding by a captive Greater Sulphur-crested Cockatoo *C.galerita* was reported by Kawata (1974) from Indianapolis Zoo. The keeper, Bob Newell, wrote: "While I was cleaning the cage, I saw two cockatoos busily engaged in some kind of activity in the corner. One was using what appeared to be a flat stone. Holding the stone by the flat surfaces it scraped away the earth from a spot where the wall meets the floor". On a later day, both Newell and Kawata saw the bird holding a small stone and, apparently, using it for scraping earth. "I am not sure whether the digging was actually aimed at escape or just the moving aside of already loosened dirt and an occupational activity", Newell added.

I asked George A. Smith to comment on this account and he wrote: "A common pattern of behaviour of captive parrots is for them to take a stone in the bill, steady it with a foot, and then spend what can be considerable amounts of time appearing to break off small portions to swallow as gizzard-grit. Frequently such "play" stones are dropped into drinking vessels - drinking with a stone in the bill might be a difficult thing to do - or in nest-boxes - presumably because they need the bill empty to chew away at the interior. Certain it is that captive parrots can be extremely covetous of their play-stones and will try to prevent other parrots from filching them by flying up, and working away at them, in a 'secret' corner; for one parrot observing another whittling away at a stone will often approach and try to take it away for itself. The assumption is made that being largely arboreal birds, of tropical rain forest, grit could be difficult to come by in the humus of the forest floor. Parrots - unlike all other birds known to myself - therefore, by this behaviour could acquire small-sized grit from large stones. Parrots digging holes as, for example, excavating a nest-chamber, loosen "detritus" with the bill and then scratch this back with alternate movements of the feet. The cockatoo, in the account,



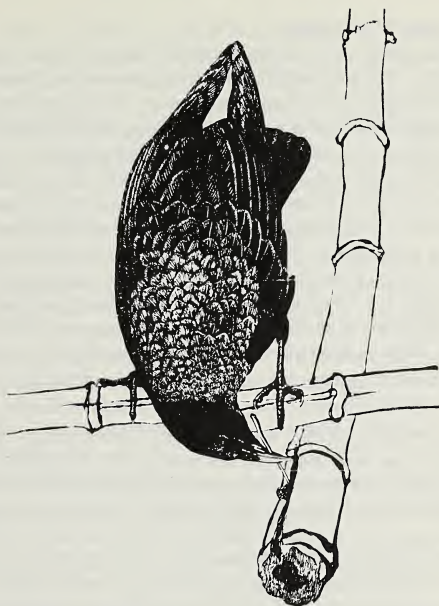
vii

R. W. Powell & W. Kelly

Captive Common Crow using a coffee stirrer as a tool to operate a response key behind the metal screen. The screen prevents the bird from pecking directly at the response key. When the response key is operated, the bird is rewarded with food

raises the problem of whether it was coincidental that it had a stone in its bill whilst digging (a coveted toy it held dearly to itself whilst otherwise engaged: like a child that takes his Teddy bear everywhere with him) or was it utilising the stone as a shovel, as an implement, a tool? That it several times repeated the shovelling with the stone makes me suppose that this was an example of "true" tool-using; but before giving an opinion I would like to see it for myself." In the absence of a more detailed observation, and experiment, this case must remain not proven.

Jewett (1924) quotes observations made by a Miss Adelaide King, of the U.S. Biological Survey, on a captive Northwestern Crow *Corvus caurinus*. "While passing through the City Park in Portland, Oregon, one afternoon recently, I saw a crow in one of the bird enclosures trying to pry a peanut out of a crack in a bamboo perch on which he was sitting.



viii.

Tony Angell

Northwestern Crow using a small stick to pry a peanut from a crack in a bamboo perch. This drawing was inspired by an observation on a captive bird in the city park in Portland, Oregon, made by Jewett (1924).

(Reproduced from "Ravens, Crows, Magpies and Jays")

This bamboo perch had a rather large crack in it, and a peanut that had been thrown into the cage had lodged there. The crow worked with his bill for quite a time, unsuccessfully. He then stopped and looked on the floor of his cage. Observing a small stick he picked this up and flew back on the perch and worked on the peanut with the stick. With this he was able to push the peanut along the crack, but not to get it out. When he had pushed the peanut quite near the edge of the cage, he hopped around to the other side and pushed in the other direction. He finally succeeded, with the little stick in his bill, in prying the nut on to the floor of his cage, where he jumped down and got it." Angell (1978) published a drawing inspired by this account which is reproduced in Plate viii.

True tool-users in the wild

No fresh examples of tool-using in wild birds have since come to light. Two, however, ought to be deleted from my previous list (Boswall, 1977). On pp. 152-155 (loc. cit.) doubt was cast on the claim that the Black-breasted Buzzard *Hamirostra melanosterna* (now called the Black-breasted Kite) used objects to smash the eggs of ground-nesting birds: particularly the Emu *Dromaius novaehollandiae*. Stephen J.J.F. Davies kindly permits me to quote his letter of 6th December 1978 in which he stated that this bird of prey "is a species that has interested me greatly because it actually breeds at the same time as Emus in Australia's north-west and can be seen quartering the ground, at the time the Emus are incubating, probably particularly searching for eggs that have been laid away from the nest. Tom Spence, the Director of the South Perth Zoo, has captive birds and following up some of the early literature he presented one of them, confined in a cage by itself, with an Emu egg which it opened by striking it with its bill. The egg opened on the first blow and neither Tom nor I is in any doubt that this is how the birds deal with Emu eggs. They probably take the eggs of other species as well. Their feet are small and weak (and) ill-adapted to carry large stones. A much more probable explanation of the stones found in Emu nests is that the Emus themselves rolled them into the nests. There is an interesting note in *Emu* (Schrader, 1975) describing an Emu sitting on a "nest" of Paddy-melons in Queensland. These small melons resemble Emu eggs in colour and size - although the shape is slightly different. This is an extreme case of Emus collecting egg-like objects but we fairly frequently find stones, insulators, etc. in Emu nests". Unless, and until, any scientific evidence of implement-wielding on the part of this raptor comes to light it can no longer be considered a tool-user.

Alfred Russel Wallace believed that the Palm Cockatoo *Probosciger aterrimus* opened the hard Areca nut by biting off a piece of leaf to lay between the nut and the upper mandible and so prevent the nut from slipping from the mouth. After quoting his account in full (Boswall, 1977) I suggested that aviculturists owning Palm Cockatoos might be able to observe and comment on Wallace's finding. George A. Smith (in litt., 1978), who has a pair of these birds, had offered them leaves when feeding such hard-shelled nuts as Brazils and almonds. "They ignored the leaves completely and easily cracked the nuts open without their help". He says, "I have been quite unable to see just how the fresh leaf, in Wallace's account, could wedge the nut. Apart from not understanding how the bird could manage to cope with holding a leaf in the bill and then taking up the nut, it seems to me that the juices expressed from the leaf, by the pressure of

the bite, might well have the effect of a lubricant and actually cause the nut to spin. Like other parrots when the Palm Cockatoo breaks open hard or shiny objects, it uses its toes (or, sometimes, presses the object against a hard, firm surface, such as the horizontal bars of netting) to assist the tongue in preventing the rotational forces set up by the huge biting force of the lower mandible. With the roughened inner surface of the upper bill to fasten its top, the thumb-like tongue pressed hard behind it, a toe, or a fixed solid object, at its front the poor nut doesn't stand a chance".

It is worth mentioning that Skead (1975) gave the actual reference (Alexander, 1838) to the November 1836 Namaqualand note on the Egyptian Vulture *Neophron percnopterus* using stones against eggs of the Ostrich *Struthio camelus*: which I mentioned in my earlier account. Brooke (1978) quotes B.J. Glanville who wrote in the annual report of the Albany Museum (Grahamstown) for 1880 (Grahamstown is now in the Republic of South Africa) to the effect that the vulture was objected to by Ostrich farmers because of its attacks on Ostrich eggs. Yet another early record of tool-using by a (presumed) Egyptian Vulture appeared in the *Port Elizabeth Telegraph* for 27th August 1867 (Brooke, 1979).

It is worth noting that the observations on tool-using by Bald Eagles *Haliaeetus leucocephalus*, quoted by Van Lawick-Goodall (1970) without a reference, had been published by Bindner (1968).

The use of tools by captive Common Crows, reported in my last paper (Boswall, 1978) is illustrated, with a photograph, by the same two authors, in an earlier paper of theirs (Powell and Kelly, 1975) - see plate ix.

ACKNOWLEDGEMENTS

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THE BARN OWL IN BRITAIN

A RESEARCH PROJECT ORGANISED BY THE HAWK TRUST

To those not familiar with its work, the Hawk Trust may appear to be devoted only to diurnal birds of prey, but it has always been concerned also with owls. Since the Trust was established there has been a welcome increase in the numbers of most birds of prey in Britain. The outstanding exception, however, is the Barn Owl *Tyto alba*.

This once widespread and common species has been declining in numbers for many years. In 1934 Blaker estimated the total population in England and Wales as 12,000 pairs, but in 1973 Parslow put it in the range of 1,000 to 10,000 pairs, while in 1976 Sharrock estimated 4,500 to 9,000 pairs. These estimates suggest that the population may have halved in 40 years, but the ranges in which they are set certainly suggest that the status of the species is in great need of investigation.

There are indications that the decline is accelerating. Osborne quoted figures showing a reduction in an area of Oxfordshire from 34 pairs in 1971 to 14 in 1979, in the Isle of Wight from 30 to 20 and in West Dorset from nine to one. Two surveys of farmland birds published in *Bird Study* in the 1970's both recorded a breeding pair of Barn Owls in 1968 but none thereafter.

The Barn Owl has long been associated with farms and changing conditions on them are among the many causes suggested for its decline. Modernisation of farm buildings, the use of silos in place of corn ricks and the felling of hollow trees have reduced the number of roosts and nesting sites as well as the numbers and accessibility of prey. According to Prestt the Barn Owl came second only to the Sparrow Hawk *Accipiter nisus* in damage from toxic chemicals in the 1950's and early 1960's. Unlike the Sparrow Hawk, it has not recovered. Recent research in America by Mendenhall and Pank has shown that some rodenticides are fatal to owls. Many are killed by road and rail traffic and by hard winters. Finally, the Barn Owl is even now persecuted by some gamekeepers although Glue found remains of only one gamebird in 42,000 prey items in the analysis of Barn Owl pellets.

As David Glue has said: "It would be difficult to name a bird that is more beneficial to man than the Barn Owl". For this reason also, the Hawk Trust has decided to investigate the causes of its decline and to determine whether it can be aided to recover. A large number of county surveys are already being undertaken on the Trust's behalf by bird clubs and

natural history societies, and our own members are conducting local surveys in many areas. It is hoped that we can also acquire the co-operation of such bodies as the B.T.O., the R.S.P.B., the N.C.C. and the Avicultural Society. A most welcome financial support has already been received from the Game Fair Committee of the Country Landowners' Association.

It is clear from the wide range of recent population estimates that the first need is an accurate census of the Barn Owl, and a questionnaire is now being circulated to any person who is interested. If members of the Avicultural Society would like to participate, they should apply for a questionnaire to: Barn Owl Survey, The Hawk Trust, Freepost, Beckenham, Kent. If you do not have the time for a proper survey, any observations you can make now may well be a guide to those who have. A second questionnaire has also been devised which asks for information from bird rescue centres about any disabled Barn Owls which have been presented to these centres in the last four years and this can also be requested from the Trust.

Finally, any dead Barn Owls found should be sent for examination to: Mr. J.E. Cooper, Royal College of Surgeons, 35-43 Lincolns Inn Fields, London WC2 3PN.

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* * *

JOHN JAMES YEALLAND

1904 - 1983

John's many friends, all over the world, will have been very grieved to learn of his death on 24th January after a long illness, bravely and cheerfully fought. The gap he leaves cannot be filled but anyone who was lucky enough to know him will always retain a fond memory of his kindness and courtesy, his wry humour and his great wisdom - about people as well as birds.

John grew up with birds, his father having charge of the collection of the Marquess of Tavistock (later 12th Duke of Bedford) which was housed in aviaries in the gardens of the Yealland family home at Binstead in the Isle of Wight. John went to work at London Zoo when he was 17, as a keeper on the staff of the Western Aviary and a photograph exists of him in the Zoo's football team of that day. When his father died in 1922, John left the Zoo and took charge himself of the Duke of Bedford's collection which was moved from Binstead to Warblington, Hampshire, later to Rye in Sussex and then to Haywards Heath. When World War II broke out he was in Belgium, just outside Brussels, looking after the private collection of Dr. J.M. Derscheid, who was later to die tragically in a Nazi camp. In 1940 John managed to get on one of the last boats leaving before the German invasion. Whilst the other refugees on the crowded boat were clutching their most precious belongings, John doggedly nursed a pair of rare ducks in a cardboard box all the way back to safety in England. The rest of the war years were spent in the Civil Defence and later in the army, in the Royal Signals, on water transport, stationed in Cornwall.

He spent 1946 at Slimbridge where he helped to start the Wildfowl Trust. The following year he joined forces with Gerald Durrell on an expedition to the then British Cameroons, collecting for the zoos that were restocking after the war. A highly amusing and interesting account of their adventures with people and animals was written by Durrell (now Hon. Director of the Jersey Wildlife Preservation Trust) in his book "The Overloaded Ark" (Faber & Faber). He writes now: "I shall always remember what a joy and an education it was to watch John looking after his collection of birds. He was so meticulous and so devoted to his charges that it was a pleasure to see him work. For example, with his insect-eating birds (of which, towards the end of the trip, there were about 150) he would go out and collect wild wasps' nests and then, with tweezers, feed each and every bird the wasp grubs individually. He was a very astute

observer and a most delightful companion with a gay and witty tongue. I think the whole avicultural world has lost one of its great men."

In 1950 John Yealland travelled to the Hawaiian Islands and most important amongst the birds that he brought back were the first Hawaiian Geese (Nene) to found the Wildfowl Trust's breeding programme to save this species, and later that year he also collected Iceland ducks for the Trust.

In 1951 he rejoined the staff of the Zoological Society of London, this time as Curator of Birds, a post which he held, with great distinction, until his retirement in 1969. Under his curatorship the bird collection at London Zoo flourished and his determination sought out many birds and collections of birds from all over the world to restock the aviaries depleted by the war years. He set a very high standard of husbandry, as well as using his other great interest, in horticulture, to ensure that the aviaries, both outdoor and tropical, were suitably and attractively landscaped and planted. Malcolm Ellis was one of the young keepers who trained under John Yealland and he writes now: "We addressed him always as 'Mr. Yealland', but unbeknown to him (I think) many of us knew him affectionately as 'the little man'. We would mimic the way he would gently incline his head to one side and slowly say, 'Yes'. We will remember how he would listen patiently and after careful consideration, say 'Yes' each time. And the times when, convinced by this that we had his agreement and were about to turn away, he would conclude by saying, slowly and with firmness, 'No. I don't think that is a good idea' and, having so replied, we knew he would not change his mind. During the period that John Yealland was Curator of Birds, the collection was of a high standard. He was respected because he had been a keeper, because of the extremely conscientious way he went about his duties, because of his knowledge of birds and his meticulous attention to detail. No statement was made before he had carefully checked the facts. I shall always be grateful for the help and encouragement which he gave me."

During his curatorship he must have answered many thousands of enquiries from the general public as well as other aviculturists, and always with unfailing helpfulness, sound advice, and often humour - I can hear him now patiently advising yet another, rather demanding caller on how to feed a young abandoned street pigeon, by suggesting that she should chew some raw cabbage and then regurgitate it - and the responding horrified squawk from the other end of the telephone. He took a keen interest in other collections and there must be many successful aviculturists today who can be thankful to John for his help and advice when they were

starting out in birds.

In 1974 he succeeded Miss Phyllis Barclay-Smith as Honorary Editor of the *Avicultural Magazine*, and brought to this work a lifetime's knowledge and experience, as well his renowned meticulous attention to detail. During his Editorship the Magazine reached a new high standard and after he retired from this post at the end of 1978, he continued to give me unfailingly good advice as well as checking all the proofs of the Magazine with the greatest care. Some of his margin comments were gems to be cherished, such as, 'One would have more faith in what Mr. --- is describing if he knew how to spell it'. I know of no one now whose knowledge of birds, plants, nomenclature, geography and grammar equals John's and his contribution to the *Avicultural Magazine* was inestimable.

Our President, Dr. Jean Delacour, writes of him: "I remember John Yealland as a boy when his father was in charge of the Marquess of Tavistock's birds, mostly parrots, and it so happened that he was connected all his life with collections that were very familiar to me as I was either a close friend of their owners, or a member of council of the institutions for which he worked.

"Through this I came to know him well and to appreciate his considerable qualities. John was small, quiet, unassuming; he had a great sense of humour. To the exaggerations of over-enthusiasts he had a mild way of answering that stopped wild stories without offending their authors. He had a great knowledge of all sorts of birds which he had collected and kept during his busy life. He proved to be very successful in all his assignments and took a very important part in the progress of aviculture during the last fifty years. He thought clearly and wrote well.

"John Yealland will be greatly missed by his friends and by all those aviculturists throughout the world who have gained, through his efforts, a better understanding of birds, and have learned of a more intelligent way of taking care of them".

Mary Harvey (Editor)

NEWS AND VIEWS

Among the increasing number of species being reared in Britain, it is pleasing to note that two species of rare parrots, the Red-fronted Macaw *Ara rubrogenys* and St. Lucia Amazon *Amazona versicolor* reared for the first time in 1982. Jersey Wildlife Preservation Trust's success with the latter is a significant event as it represents the first captive breeding of this critically endangered species.

* * *

The January 1983 issue of *Australian Aviculture* officially announces the breeding of the Beautiful Firetail *Emblema bella* by one of its members, Mr. Brian O'Gorman of Stawell, Victoria. No details are given but an article is to be published in a later issue of that magazine. Also in the same issue are notes on hand-rearing Grass Owls *Tyto longimembris*.

* * *

One of the rarest birds in the world, and the rarest in Africa, has been found in Natal by two Durban ornithologists. The White-winged Flufftail is said to be so rare that it was once thought to be extinct until a dead bird was found eight years ago, below a powerline in Heidelberg in the Transvaal. Dr. John Mendelsohn, the acting curator of the Durban Museum, and Mr. Ivan Sinclair, the Museum's taxidermist, recently found 12 of these birds at the Franklin Marsh in East Griqualand. (*Natal Mercury*)

* * *

Carol Noble, Secretary of the Forpus Fanciers, would like to hear from other keepers of any species of Forpus Parrotlet as she is preparing a survey on how many are kept, how many hatch and how many are reared; she would also be interested to know how they are kept. Her address is: P.O. Box 872, Alleghany, California 95910, USA.

* * *

Fred Barnicoat writes from Johannesburg: "The South African National Championship Show for 1982 was staged in Pietermaritzburg, Natal. It attracted 534 wild birds. No supreme award was made this year, but the

section winners were as follows: South African birds - J. Griffen's Cape Canary *Serinus canicollis*; African birds - Dr. W.D. Russell's Emerald Starling *Lamprotornis iris*; Foreign birds - F.C. Barnicoat's White-breasted Black-headed Gouldian Finch; and Parrotlike birds (always grouped into a separate section on South African shows) - H.H. Hillerman's Blue Ring-neck Parakeet. The medal for the most meritorious breeding of the year was awarded to J.J. Mare for breeding the Shaft-tailed Whydah *Vidua regia*, which was successfully reared in a nest of Violet-eared Waxbills.

* * *

Professor J.R. Hodges writes: "Aviculturists all over the world will be sorry to learn of the death of Dr. L.A. Swaenepoel, a member of this Society since 1966. His success in establishing the Belgian Ornithological Association is well known. Almost 20 years ago his work, with drugs like tetramisole, on the eradication of round worms and hair worms came to the attention of breeders of parrots, particularly Australian parakeets, and he soon developed an international reputation as an authority on Nematology. He had great enthusiasm and flair for keeping and breeding, often to several generations, rare species of parakeets. He was particularly interested in mutations and was the second breeder, after the Keston Foreign Bird Farm, of the albino form of the Indian Ring-necked Parakeet. He also had considerable success with other mutations of the same species, particularly the blue form. In the last few years he has been one of the most successful breeders in Europe of the yellow mutation of the Turquoise Parakeet and the deep pink ('Rosa') form of the Bourke Parakeet. He travelled widely in this country, in South Africa and in Australia where he was received warmly by eminent aviculturists whom he impressed with his charm and courtesy. He was a respected, highly educated and cultured man who will be sadly missed by all who were fortunate enough to know him."

* * *

The Second Ibero-American Ornithological Congress will take place from 4th-10th December, 1983 (note change of dates) at Xalapa, Veracruz, Mexico. Those interested in attending or participating should write to Mario A. Ramos, Apartado Postal 388, Xalapa, Veracruz, Mexico. Deadline for submission of resumes is 15th August, 1983. Formal invitations will be sent only upon request. There will be interesting field trips and tours both before and after the Congress papers sessions.

D.C.

ESTRILDID FINCHES OF THE WORLD by Derek Goodwin

Published by Oxford University Press, price £25.00

Derek Goodwin, until his recent retirement, was a Principal Scientific Officer in the Department of Zoology of the British Museum (Natural History) and is well-known to readers of our Magazine for his regular contributions. His articles are always informative, amusing and sometimes controversial but never dull or boringly written.

"The Estrildid Finches of the World" is truly the triumphant outcome of that rare bird, the scientist who is also an aviculturist, and who can write well. Between its covers is the most comprehensive treatise ever written on this highly successful and attractive family - a group that includes the firetails and grassfinches of Australia, the waxbills and firefinches of Africa, and the munias, avadavats and parrot finches.

The opening chapters describe the nomenclature, the distribution and adaptive radiation, the plumage and coloration, the behaviour and biology and notes on the care of estrildids in captivity. The author then goes on to describe every member of the Estrildidae, each with a distribution map and notes on its physical appearance, field characters, habitat, feeding and general habits, nesting, voice, display and social behaviour, avicultural notes and finally a most useful list of references.

This is a very beautifully produced book, enhanced by the colour plates painted by Martin Woodcock that illustrate over 60 species, as well as numerous line drawings. It is bound to become the standard reference on the Estrildidae and is highly recommended. We would like to wish Derek Goodwin a very long and happy retirement and hope that he is using his newly-acquired leisure to produce more work of this calibre.

M.H.H.

PIGEONS AND DOVES OF AUSTRALIA by H.J. Frith

Rigby International. Price £14.95

During the past decade the number of books covering one particular group of birds has increased greatly, to the advantage of the aviculturist and the ornithologist who require detailed information, and this book is an excellent addition to this category.

It is one of those rare and valuable finds: a book whose author is familiar with his subjects in aviculture and in the field. In the preface he describes how the front wall of his office was removed and replaced by

glass. It formed a large planted aviary in which all the Australian species of doves were kept. Most of them bred there. In addition, the aviary was dotted with microphones which fed into a tape recorder on his desk, which also held a permanently focussed camera.

On reading that, I was confident that the text would be highly detailed and authoritative. Indeed, it is. Furthermore, its value to aviculture is great. Most aviculturists outside Australia are not familiar with the Australian doves, except the Diamond; nevertheless, any dove keeper can apply the information this book contains to species that originate from other countries.

This is a highly readable account of the Pigeons of Australia, and the main part of the book - 25 of the 27 chapters - is given over to the accounts of the species.

These are preceded by a chapter on Biology of Pigeons and another on Aviculture. The latter gives valuable advice on various aspects of management, as well as detailing the requirements and habits of all the Australian species. Each species is covered under the headings of Historical, Descriptions, Relationships, Subspecies, Size, Field Identification, Voice, Habitat, Routine, Distribution and Movements, Food, Display, Postures, Breeding Season, Nest, Eggs, Incubation, Development of Young, and Status.

Unfortunately, the colour plates do not match the high standard of the text. Six of the seven colour plates were drawn from birds in the aviaries of the CSIRO Division of Wildlife Research. While they may accurately convey the plumage and appearance, they are totally lacking in imagination. Where various forms of the same species are illustrated, e.g. female and/or immature, each bird is shown in identical pose. Also, the artist has failed to capture iridescence in plumage. The single plate by F. Knight, which shows juvenile plumages not known when the earlier plates were drawn is far superior.

The section of photographs showing habitat is of outstanding interest and conveys more effectively than thousands of words the types inhabited by the various species. Photographs depicting several species in the wild, their nests, young and feeding habits, are equally valuable. Aspects of behaviour are illustrated in line drawings, also in the 32 pages of photographs, some from captive birds, others in the wild.

This book is quite remarkable value at £14.95; these days one would expect to pay no less than £20 for such a volume. It is a rare item: a readable, scholarly work which does contain, as the jacket notes suggest: "a magnitude of scope and a wealth of detail expressed with clarity, concern and wisdom". How sad that the author did not live to see it in print.

BIRD DETECTIVE by Peter Robinson

Elm Tree Books/Hamish Hamilton, in association with the Royal Society for the Protection of Birds. £7.95 (U.K. only)

The RSPB is Europe's largest wildlife conservation organisation which employs over 300 full-time staff only four of whom are permanently engaged in law enforcement. Peter Robinson is the Senior Investigation Officer of this organisation and in this book he relates a collection of true stories involving these four investigators.

The author investigates theft, the sale of stolen goods, assault and murder on behalf of the wild birds of Britain. Although he is based at the Society's headquarters at Sandy in Bedfordshire, Peter Robinson estimates travelling about 30,000 miles each year in connection with this work.

Chapters include accounts of successful prosecutions for the unlawful taking of Peregrine Falcon chicks and eggs, Golden Eagle eggs, the use of a gin trap, shooting a Kestrel, selling newly-taken species including those incorrectly ringed, and a taxidermist for selling illegally killed wild birds. Further chapters deal with Osprey eggs, the illegal use of poisons, shooting protected species, Fenn traps and the abuse of the licensing provisions for the importation of endangered species. A short chapter deals with the Protection of Birds Acts, notwithstanding the 1954 Act which Mr. Robinson says has "several shortcomings".

This book makes interesting albeit disturbing reading, particularly the chapters concerning those persons illegally importing endangered species and those prosecuted for trapping and selling wild species and who call themselves aviculturists. The manuscript for this book was written before the Wildlife and Countryside Act came into force and hopefully with the introduction of this new legislation, fewer prosecutions will be brought before the courts.

In his summing up on "The Future", the author makes it clear that he has little faith in the bird-keeping fraternity. He states: "I would like to be able to say with confidence that all, or even most, of the existing abuses will come to an end with the introduction of the new Act, but truthfully I cannot see it happening. Parliament is just not making the sort of changes necessary to remedy shortcomings made obvious by past experience - what is about to become law will probably also include a number of new concepts. The passage of time is bound to reveal as yet unforeseen shortcomings in these. To this we must add what I personally view as the most serious threat indeed, for I have heard it suggested that Parliament intend placing a significant degree of responsibility for the adminis-

tration of new controls on possession into the hands of the very people they seek to contain - falconers, aviculturists, egg collectors and the like. Maybe I am being unduly pessimistic - time alone will tell - but were such a system introduced, I would consider it naive and foolhardy in the extreme if it did not embody adequate safeguards in the form of independent observers, if not better".

It is, however, encouraging to report that the Department of the Environment have subsequently sought the advice of the avicultural fancy regarding the administration of the Wildlife and Countryside Act 1982, as far as aviculture is concerned.

R.E.O.

LOOKING AFTER CAGE BIRDS by David Alderton

Ward Lock Ltd. 128 pp, 69 coloured photographs, several drawings

Price £6.95

An attractive and well-produced book, it is printed on glossy paper throughout. The coloured photographs are of a high standard. The drawings, especially those of the birds, are not nearly so good.

David Alderton writes mainly about keeping in cages but also other ways of keeping indoors, Canaries, Budgerigars, Bengalese and an assortment of more exotic birds (seedeaters, parrots and softbills).

In the Introduction, there are very brief descriptions of the early history of keeping birds, current trends, the supply of birds and, choosing a pet bird. Then there are chapters that describe housing, feeding, daily care, breeding and colour inheritance, and health disorders. These contain a lot of sound advice.

In the remaining three chapters, the author writes about the varieties and species. Some have a fairly detailed write-up, several have little more than a mention. All of the commonly kept groups of parrots seem to have been included, many, among them macaws, cockatoos, Amazon parrots and species such as the Quaker Parakeet and Patagonian Conure on the grounds that individuals can make good pets and may talk. The *Forpus* parrotlets (two Guiana parrotlets are the subject of a colour photograph) and Australian parakeets are mentioned, though the advice is that they are not suitable to keep in cages.

By contrast, the coverage of the seedeaters is patchy. There is no mention of such popular "cage birds" as the Avadavat, the Red-billed

Firefinch and the Bronze and Tri-coloured Mannikins, yet included are the Violet-eared Waxbill and the seldom available Cape or Grey-necked Canary, which is also afforded a colour photograph. The photograph on the top left of page 70 definitely is not as the caption states, the wild Canary *Serinus canaria* but is, I feel fairly certain, a Brimstone Canary *S. sulphuratus*. The Zebra Finch apart, the grassfinches are not mentioned, which is curious, considering that some breed regularly in cages and are virtually domesticated. Only two British/European finches are mentioned and only fleetingly with regard to their hybridisation with canaries.

The coverage of softbills is very limited and the least satisfactory. The races of the Hill Mynah have incorrect subspecific names and, if "the" Yuhina is indeed also known as the Flowerpecker, it is not a common alternative name and could lead to confusion with the flowerpeckers of the family Dicaeidae.

A lot of space in this book is wasted on account of the over generous page margins. These mean that on many pages over one-third of the width of the page is blank paper.

M.E.

CORRESPONDENCE

The Red Siskin

We would like to draw your readers' attention to the current status of the Red Siskin *Carduelis cucullata*.

Perhaps some background material would be helpful. The Red Siskin is endemic to Venezuela but due to excess hunting by the bird trade, it is now at the brink of extinction. In the past the male Siskin was crossed with the common Canary to obtain the more profitable red Canary. Although it is now illegal to hunt the Siskin in Venezuela, due to the extreme rarity of the bird, the price has gone sky high and this, in turn, has resulted in increased pressure on the very few remaining wild populations. Audubon de Venezuela, as a conservation group, has taken on the project of encouraging experienced and creditable aviaries in Europe and the United States to breed this species for subsequent sale as we believe this to be the only way the bird will be saved from extinction and, also, the most logical way to augment the gene pool.

We realise that the Red Siskin is very difficult to breed as the female

especially is an extremely sensitive and delicate bird, but among your readers must be many who have bred it in the past, and with the increased price of the Siskin, it would probably be more profitable to breed the Siskin itself, keeping track of blood lines, etc., than to breed the red Canary.

We would like to express our appreciation for any interest you might take in this project and we would be grateful for any encouragement along this line that you might give to reputable aviculturists in Europe. Perhaps just spreading information about the Red Siskin will help in the effort to save it from extinction.

Sociedad Conservacionista
Audubon de Venezuela
Apartado No. 80450
Caracas, Venezuela 1080-A.

Mrs. Mary Goodwin
Conservation Committee

Red and yellow Diamond Doves

Ever since a writer in our Magazine said that red and yellow Diamond Doves had been bred in South Africa, I have been intrigued as to what these birds looked like but had seen no description of them anywhere. Recently, in correspondence with a South African ornithologist, Neville Brickell, I mentioned this and he kindly promised to try to look into this for me.

He soon kept his promise and I received recently a letter from him in which he says: "I have visited Mitchell Park and a few other aviaries and found that the Diamond Doves stated to be *yellow* are, in fact, the silver strain with a buff tint over the mantle, wings and rump. The area around the head and underparts is silver." After some information about the different colours found in the silvers, from silver grey to dark grey, etc., he continues: "The so-called red Diamond Doves are, in fact, chocolate in colour over the mantle, wings and rump. The head area and the underparts are the colour of wild grey Diamond Doves".

From this it sounds as if the "red" is just the reddish brown tinge often seen in wild Diamond Doves (though I myself have never seen it in domestic Diamond Doves in England) and the "yellow" the dilute form of it.

However, by an odd coincidence, another correspondent sent me an advertisement that recently appeared in "Cage and Aviary Birds". This offers red, yellow and *orange* Diamond Doves, all at £90 per pair!

The price asked is reminiscent of the high prices fetched by the first

blue Budgerigars, though the purchasers of new-coloured Diamond Doves could hardly hope to recoup their expenditure through successful breeding owing to the heavy taxation that self-employment or "extra" income of any form now attracts.

I hope that some of our richer readers will purchase these new coloured Diamond Doves and, especially if they prove to be brighter than those that Mr. Brickell saw in Durban, let us have a full description of them in the Magazine.

6 Crest View Drive
Petts Wood,
Kent, BR5 1BY.

D. Goodwin

Unusual Feeding Habits in Parrots

Further to Professor Bertagnolio's letter on Unusual Feeding Habits in a Lesser Sulphur-crested Cockatoo (*Avicultural Magazine* 1979, 85(1):31, I have possessed a cock African Grey Parrot for the past eight years which regularly picks up objects in his foot. When housed in a conventional parrot cage, this bird used to feed regularly by picking up a "fistful" of seeds from the clip-on feeding dish. This was done with the bird facing away from the dish, feeling backwards with the foot until the dish was encountered, whereupon three or four seeds would be picked up together. One or two of these would subsequently be dropped while eating from the foot. The bird always started by feeding in this manner, that is when most hungry, only later changing over to the more normal method of feeding. The bird never seemed to look at the dish, always giving the impression of locating it solely by touch. This same bird will also obtain objects outside the cage by holding on with the bill and one leg while reaching out with the other leg to grasp the desired object.

For the last three years a hen Blue-fronted Amazon has been caged next to this bird. In January this year (1983) I noticed the Amazon attempting to obtain a piece of orange which the Grey had discarded and which lay just inside his cage. At first the Amazon attempted to reach it with the bill but when this failed she rather hesitantly extended one foot out through the bars and just managed to grasp the orange this way. The distance between the cages is four inches and I got the impression that this was the extreme limit of her reach. On several occasions since I have tested

this bird and she has always succeeded in obtaining an object in this fashion but it is only very recently (April 1983) that she has started to steady herself by grasping the cage with her bill while reaching out.

4 South Hill Park,
Booterstown Avenue,
Co. Dublin,
Eire.

E. Callaghan

NEW MEMBERS' LIST

It is proposed to publish an up-to-date list of members in a forthcoming issue of the Magazine. Will any member who does not wish his or her name and address to be included please let me know as soon as possible so that their anonymity can be preserved. Would any member also let me know if their name and/or address is incorrectly printed on the envelope in which this Magazine is mailed, as this will form the basis for the members' list.

Hon. Secretary

The Editor does not accept responsibility for opinions expressed in
articles, notes or correspondence

MEMBERS' ADVERTISEMENTS

(10p. per word - minimum charge £3.00)

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THE AVICULTURAL MAGAZINE welcomes original articles that have not been published elsewhere and that essentially concern the aviculture of a particular bird or group of birds, or that describe their natural history. Articles should be preferably typewritten, with double spacing, and the scientific names as well as the vernacular names of birds should be given. References cited in the text should be listed at the end of the article. Line drawings should be in Indian ink on thick paper or card; photographs which illustrate a particular point in the article will be used where possible and should be clearly captioned.

ADDRESS OF EDITOR

Mary Harvey, Windsor Forest Stud, Mill Ride, Ascot, Berkshire, SL5 8LT, England.



Wellington Evening Post

The adult pair of Tawny Frogmouths undergoing quarantine at the Wellington Zoo. The female is on the left.

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JULY-SEPTEMBER 1983

BREEDING THE TAWNY FROGMOUTH

Podargus strigoides

AT THE WELLINGTON ZOOLOGICAL GARDENS, NEW ZEALAND

By R. GOUDSWAARD (Senior Bird Keeper)

A pair of Tawny Frogmouths was received from Melbourne Zoo on 7th June 1978. The birds started breeding in their second season with us but there is very little detailed literature available on the breeding of frogmouths and it was not until December 1981 that we were successful in rearing chicks. This article describes the husbandry of frogmouths at the Wellington Zoo and subsequent breeding.

Housing

On arrival the birds were quarantined for one month in the Zoo's hospital and then moved to their present aviary. The aviary is small - 5m x 1.75m x 2.5m high - and was traditionally used to house owls. The small size of the aviary allows the public to see the birds roosting in the shelter at the back during the day. The back of the aviary is enclosed on three sides and roofed to provide shelter. The rest of the aviary is open to the weather and boasts a grass floor, two small shrubs, two tree stumps and a single horizontal perch. The shelter has two horizontal perches fitted in such a way that the birds are still visible from the front of the enclosure.

Feeding

The Frogmouths have proved very easy to keep. They are hand-fed two or three freshly killed mice each per day. As the mouse, held by the tail, is raised above the Frogmouth's head, the Frogmouth opens its beak and the mouse is simply dropped in. When on occasions mice are in short

supply, the birds are fed small cubes of meat dusted with bone meal powder. At different times a variety of invertebrates, namely mealworms, *Wetas Hemideina thoracica* and earthworms have been provided but never taken.

The female stops eating during the winter. After a particularly cold night with temperatures below 2°C she becomes sluggish and loses her appetite. At these times feeding is delayed until the female has a chance to warm up in the afternoon sun. Occasionally she may go two or three days without feeding. If freshly killed mice are not available, then thawed frozen mice are heated before being fed to the birds in mid-winter.

A dish of water is provided at all times but I have never seen the birds drink.

Medication

On arrival the female was suffering from a mouth ulcer. The ulcer was treated daily with a paste consisting of ½cc Penbritin and 3g Spercin. Although effective, the problem proved to be a recurring one and it was not cleared until eight months later after a prolonged treatment of 'Frador' applied topically and ¼cc Mycostatin smeared over her food twice daily. Once the ulcer had cleared, the treatment was gradually reduced over a further two month period.

The only other medication they have received was an attempt to include the Frogmouths in the regular worming programme. Aviverm was injected into their mice prior to feeding but once the mouse commenced digestion, the birds must have been able to detect the Aviverm because the partly digested mice were later found on the floor of the aviary.

Breeding

The birds are slightly different in appearance. The male is larger, slightly darker, particularly on the crown, and appears to have a larger head and beak.

Imminent breeding is signified by the birds remaining strangely alert during the day. When they are in this state, they refuse to be hand-fed, the male more so than the female. But if the food is left in the aviary overnight, it has usually gone by morning. At any other time, as in most institutions, food left in the aviary is never touched.

The first time this strange behaviour was noted in the male coincided with spring and on 16th September 1979 a nest consisting of a low sided wire basket lined with twigs and feathers was provided in the shelter. On

23rd September, the female began to reject hand-feeding and four days later she spent most of the day on the nest. During the afternoon she was relieved by the male and he continued to incubate during the day while she incubated at night. Care was taken not to disturb them and the two eggs were not seen until 24th October. At 8.00 a.m. on 28th October, one egg was found to have pipped but the following morning the egg had vanished except for a few shell fragments on the ground. The second egg was proved to be infertile.

On 10th November 1979 the male was again incubating and two eggs were seen on the 16th. Incubation is usually taken to have commenced when the male spends all day on the nest although he may spend several hours on the nest each day for several days prior to the eggs being laid. On 13th December small fragments of shell were found on the ground and only one egg remained in the nest. The egg was transferred to an incubator but failed to hatch. In the following season, two eggs again disappeared on hatching, on 6th November (1980).

Our intention had been to feed the chicks in the nest as we had been advised to do by the Melbourne Zoo. In the light of the recent failures, it was becoming apparent that we would have to remove the eggs to an incubator prior to hatching.

On 23rd November the male was again incubating but this time the eggs proved to be infertile.

In 1981 the first two eggs of the season came to grief on 1st October when the branch supporting the nest collapsed. The male starting incubating again on 7th October and the egg was first seen on 19th October but it had vanished by 8th November. Fortunately the female proceeded to lay for a third time and the male commenced incubation on 19th November. On 15th December the two eggs were placed in the hatcher of a force draft incubator, set at 37.5°C and 75% humidity. The eggs hatched on 17th and 18th December respectively.

When newly hatched, the chicks are too weak to raise their heads although they can shuffle about. The chicks were placed in a cut-down yoghurt pot, lined with paper, which became their nest. In two to three hours the down started to fluff out and the chicks could raise their heads. At this point they were fed two or three small morsels of minced mouse, particularly pieces of lung and liver. The feeds were repeated every two hours and the number of morsels gradually increased. Later in the day, raw egg and bone meal flour were added to the minced mouse. This diet has proved successful for hand-rearing Morepork Owls, Barn Owls and Pukekos. Unfortunately, the chicks were found dead at 6.00 a.m. on 20th December

after a particularly large meal at 9.00 p.m. the night before. They have such large beaks that it is always a great temptation to put too much into them.

On 6th October 1982 another chick was hatched in the incubator and this one was reared to maturity using the minced mouse diet. Although the growth rate was comparable to that described by Kenton C. Lint, of San Diego Zoo, the diet was messy and the bird had to be cleaned at regular intervals. When two further chicks were hatched in the incubator on 13th and 14th November, I took the opportunity to experiment with the diet.

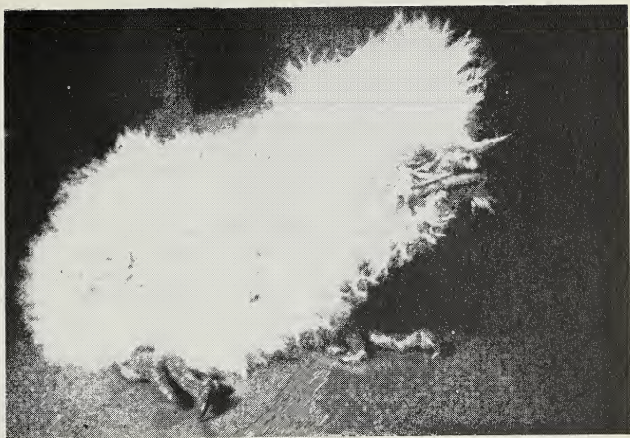
These two chicks were reared entirely on moths and whole mice. Not only was this diet clean and easy to feed but the growth rate was phenomenal - see Table 3. Nocturnal moths were chosen because they would be the most obvious food source for birds in the wild state. The chicks were fed small grass moths and plume moths for the first few days and then progressed to the larger *Porina* species. However, these moths are only 2cm long and when the chicks were two weeks old, they were each consuming up to 16 of these moths at one feed. In the birds' native country of northern Australia and New Guinea moths of 12 cm wingspread would be common and one of these giants would constitute a meal on its own.

To supply the moths, up to four ultra-violet light insect traps were kept operating in the Zoo each night. The traps were placed in sheltered positions, preferably so that the light was visible from downwind. The moths tend to fly up against the wind towards the light. Most of the moths are caught in the first two hours after sunset. Wet windy nights resulted in poor catches although light rain by itself was not detrimental to the catch.

The moth diet was interspersed with baby mice. The size of the mice was gradually increased as the chicks grew older, but the moths appeared easier for the chicks to digest. If the chicks were fed a lot of mice, the faecal sacs became very dark, loose and smelly. If the chicks were fed a lot of moths, the faecal sacs were well formed and the dark waste matter was contained in a bag of jelly which was clean and easily removed.

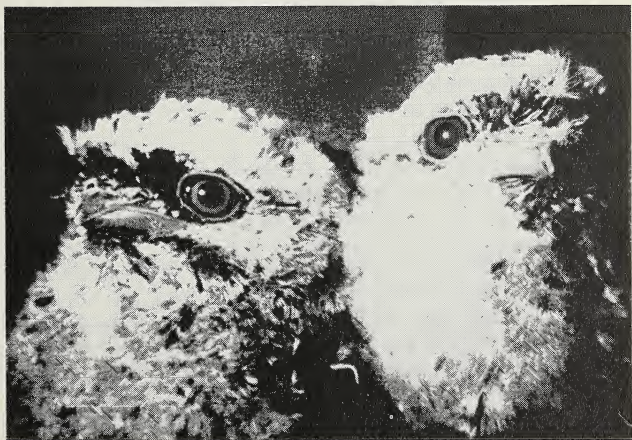
As before, the newly-hatched chicks were placed in a yoghurt pot and they had to be removed from this nest twice a day to allow them to defaecate. The chicks seem to have a natural aversion to soiling their own nest and not providing this liberty to the first two chicks hatched 17th and 18th December 1981, may have contributed to their death. As the chicks grew larger, they were able to raise their posteriors over the side of the nest to defaecate.

The chicks were kept in the hatcher for the first day. They were then transferred to a still-air curfew incubator and the temperature was gradu-



Tawny Frogmouth chick at six days old

R. Goudswaard



Tawny Frogmouth chicks at nearly one month old

R. Goudswaard

TABLE 1 - Pattern of Feeding-for each Frogmouth chick

Day 1	2-3 small moths with wings removed, fed two hourly from 8.0 a.m. to 10.0 p.m.
2	1 newborn mouse substituted for one of the moth feeds
3	Up to four large moths with wings intact at each feed
4	3 larger new-born mice substituted for three of the moth feeds
7	5 new-born mice and 10 moths fed to each chick in one day
8	2 nearly furred young mice substituted for 2 of the new-born mice
9	Feeds now 3-hourly, 7.00 a.m. to 10.00 p.m.
12	10.00 p.m. feeds discontinued
18	8.00 p.m. feeds discontinued - no longer taken home at night
25	3 furred young mice and up to 36 moths to each chick in one day
30	3 feeds per day
36	2 small mice and 2 moths at one feed or more moths if available
40	1 weaned mouse and any moths caught. Fed twice daily.

TABLE 2 - APPROXIMATE WEIGHTS OF FOOD ITEMS

MICE

New-born	2g
Larger new-born	3g
Nearly-furred young	6g
Furred young	10g
Small	16g
Weaned	20g

MOTHS

4 of the largest moths <i>Melanchra ustistriga</i>	1g
---	----

ally reduced over a two-week period. At night the chicks were taken home and placed in a small portable incubator. For the short distance to and from home, the chicks were carried in a bucket containing a warm hot water bottle and covered with a towel.

One the body feathers began appearing, the chicks were transferred to a metal drum of approximately 1m diameter with 30cm high sides. The drum was lined with paper and branches were provided for perching. The first chick had been confined to the drum and its tail feathers had been damaged. These two chicks were allowed to perch on the rim of the drum from an early age and their tail feathers remained intact. A heater element and reflector suspended above maintained a temperature of 25°C. By the time the chicks were four weeks old, the weather was sufficiently warm

TABLE 3 - PROGRESSIVE DEVELOPMENT OF THREE TAWNY FROGMOUTH CHICKS

Age in days	"Kyle"	"Kerei"	"Co"
0	Hatched 6th October 1982	Hatched 13th November 1982	Hatched 14th November 1982 weighed 15g on hatching
1	Already appears twice hatch size		
2	Left eye opening	Passed first faecal sac	
3		Eyes partly open	
4	Using claws to grip		Wing tips becoming dark
5	Wing tips becoming dark	Eyes almost fully open	
6		Feather quills on back and wings	Eyes open
8	Feather tracts appearing on breast		
10	Right eye almost wide open		
11	Exercising wings		
13	Weight 100g		
14	Preening flight feathers		
16		Weight 163g	Weight 137g
17		Head, body and tail quills opening	
21	Weight 169g		
23		Weight 230g	Weight 189g
		Attempting camouflage display	
30		Weight 259g	Weight 233g
33		First upward flight	
48		Weight 368g	Weight 315g
54	Weight 394g		

COMPARATIVE WEIGHTS OF TAWNY FROGMOUTHS ON 12th MAY 1983

Breeding male "Kermit"	650g	First chick "Kyle"	- 570g
Breeding female "Cleo"	500g	Second chick "Kerei"	- 715g
		Third chick "Co"	- 600g

for the extra heat to be no longer required.

At one month the chicks started to fly and three days later they were given the freedom of an aviary during the day. For another week they were returned to the incubator room each night until they were left permanently outside. All three Frogmouths now share a large aviary with 10 Bar-shouldered Doves. The doves were nervous for the first few days but soon learned to accept the 'young Frogmouths' fearsome appearance. Unlike the adults, the young Frogmouths are quite happy to sit near the front of the enclosure during the day and stare at the passing public with big yellow eyes. Consequently the young Frogmouths make a much better display than their parents.

To conclude, I would like to thank my partner Don Goodale for helping to care for the birds, which allowed me some much appreciated time off. I would also like to thank Keith Wood and Paul Barrett who gave up their own time to help supply moths for the ever increasing appetites.

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BREEDING THE CRESTED BLACK BUNTING

Melophus lathami

By MATS TELL (Ljungbyhed, Sweden)

A small consignment of these attractive, but admittedly rather peculiar-looking Buntings was imported unexpectedly into Sweden in the spring of 1978. I was lucky enough to obtain three cocks and two hens. Although the birds were immediately released into outdoor aviaries, they remained in a very poor condition throughout the first year, actually not moulting until November 1979. One of the younger cock birds suddenly became ill soon afterwards. Despite treatment he never recovered completely and died in February 1980. The skin of this particularly fine specimen is preserved in Mr. Allan Norell's collection.

In April it became evident that at least one potential breeding pair had formed. I separated the birds, retaining two fully adult birds in the original aviary and putting a young pair with a pair of Western Rosellas in another. The young pair had attained adult plumage only some six months previously but had not become overweight and looked very fit. The adult birds, however, remained inactive.

The aviaries in which the Buntings were housed were parrot aviaries with no vegetation, save for a few tussocks of the Rough Meadow Grass *Poa trivialis*. I had arranged some nesting sites on the ground by means of rocks, hollow logs and turves, but these were ignored completely by the Buntings.

Despite the small size of the aviary (12 ft.) I could frequently enjoy the display flight of the young cock bird. It is somewhat reminiscent of that of the Tree Pipit *Anthus trivialis*. A different display was performed on the ground: the cock would pick up a small twig in his beak and with drooping wings and fanned tail he would run about in irregular circles, now and then pausing briefly. A cock Black Bunting may also chase his hen at a terrific speed, exactly as do cock Reed Buntings and Yellowhammers.

Rather unexpectedly, on 17th June, I noticed that the hen Bunting had started to build a nest in a wicker canary basket, hung on the front wire of the indoor aviary. Whilst under normal circumstances the hen was indifferent to my presence in the birdroom, now she absolutely refused to visit the nest until I had left. The cock took no part whatsoever but on a few occasions he escorted the hen to the nest.

The nest was completed in two days and three eggs were laid on 21st,

22nd and 23rd June. I expected the hen to start incubating any day but it was not until 27th June that I found her sitting in the nest. On 30th June two eggs disappeared, presumably taken by a very small weaver-like bird whose identity has to this day remained a mystery. Despite these failures, the hen Bunting did not desert and on the morning of 8th July a chick hatched. It was reared by both its parents and left the nest in the evening on 19th July.

On 28th July I noticed that the hen had added a few dry rootlets and some black pony hair to the nest. She laid another three eggs on 30th and 31st July and 1st August respectively. This time she started to sit right away. On 11th August two chicks hatched, the third egg having again disappeared. On 15th August one of the chicks was found dead, but the remaining one flourished, leaving the nest in the afternoon of 21st August. Both of these young Buntings were rather dark in colour and were correctly sexed as cocks soon after fledging.

After moulting, the two adult pairs were reunited and, apart from some initial bickering, they settled down well.

In 1981 the pairs were split up and the partners exchanged. I was pleased to see the old hen coming into breeding condition for the first time, no doubt being stimulated by her new mate. Both pairs nested indoors and at about the same time, the young hen laying on 2nd, 3rd and 4th July, and the old one on 5th, 6th and 7th July.

When checking the young hen's nest on 7th July, one of the eggs was missing but she successfully hatched the remaining ones on 14th and 15th July. The old hen incubated equally well and in the morning of 18th July there were two chicks in her nest - the third egg contained a fully developed, dead chick.

All of these four young Buntings were reared, fledging on 25th and 30th July respectively. They were fine, strong birds, identical to their mothers and easily sexed as females.

On 18th August all four were released into my 50 ft. planted flight, where they obviously felt very much at home. They were rather playful, sometimes chasing a young hen White-throat *Sylvia curruca* about the aviary. The latter somehow had found her way inside and, being impossible to capture, she had to stay for several weeks. I must say I was at times tempted to keep her, as a more lovely aviary bird would be hard to find. The young Black Buntings did, however, agree perfectly well with an adult cock Meadow Pipit *Anthus pratensis* who had been found with a damaged wing.

By the way, after a fortnight the Pipit was released, having made a

complete recovery.

I was so pleased with my Black Buntings that I decided to put them all together despite the fact that the cock birds were still in full breeding condition. As it turned out, this was a mistake for after two days I found the younger cock dead, killed by his stronger rival who had made the large aviary his own territory.

In 1982 the young hen laid in all four clutches of eggs. However, the cock, who had suffered a late moult, did not come into condition at the proper time and consequently the eggs were infertile. The young Buntings were kept with various conures and were not even provided with nesting facilities. A young pair had been given to my friend, Mr. Bengt Nilsson, one of Sweden's most skilful aviculturists.

All of my Black Buntings have moulted well in the autumn of 1982 and at the time of writing (March 1983) they are in excellent condition.

I feed my Buntings on a German "de luxe" finch mixture with an extra dish of Moroccan canary seed. This type of canary seed is quite as good, if not better, than the more expensive Spanish ones. The Black Buntings are very fond of millet sprays, preferring the large, soft Chinese sprays. I feed egg food and a few mealworms every day.

As a rearing food I have used fresh ants' eggs, live locusts (several species), large moths, mealworms and spiders. A regular supply of calcium is of great importance. Small garden snails with soft shells that have not yet become too sticky are eagerly taken. If suitable snails are unobtainable, *fresh* egg shells can be used. Buntings show a preference for snails, while Seedeaters *Sporophila* sp., Redpolls, Linnets and Virginian Cardinals will feed their chicks soft eggshell if given the choice.

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* * *



Cock Black-headed Grosbeak

E. Callaghan



Hen Black-headed Grosbeak at the nest

E. Callaghan

BREEDING THE BLACK-HEADED GROSBEAK

Pheucticus melanocephalus

By E. CALLAGHAN (Co. Dublin, Eire)

The Black-headed Grosbeak is a bird of the western United States. It is migratory, wintering in Mexico and the northern parts of South America. It is regarded as conspecific with the Rose-breasted Grosbeak *P. ludovicianus* which inhabits the eastern United States and where the ranges of the two overlap hybrids may be found (Restall, 1975).

In breeding plumage the cock Black-headed Grosbeak has the head black, the back is brown with darker streaks, the wing and tail feathers are black with two white wing bars and large white tips to the two outer pairs of tail feathers. The breast and upper abdomen are a warm biscuit brown and there is a central stripe of yellow on the breast which fades into a paler yellow on the lower abdomen. The underwing coverts are yellow. The bill is horn-coloured and the legs are blue-grey. Out of the breeding season the black of the head is partially obscured by brown tips to the feathers. The bird measures 7.8 ins. (177-203 mm).

The hen Black-headed Grosbeak is generally brown, lighter on the breast and abdomen. There is a white stripe above and below the eye and the wing bars are duller than in the cock.

A pair of Black-headed Grosbeaks was obtained in the summer of 1980. They were housed in an aviary measuring 25 x 10 x 8 ft. high which contained a mixed collection of seed-eating birds. This flight has no shelter attached but the back and sides are solid and half of the roof is covered. The food available in the aviary consisted of sunflower, white millet and canary seeds, canary-rearing food, bread and milk, chopped apple and regular supplies of chickweed.

In the early autumn of 1980 two more Grosbeaks were obtained, both of which were hens. During the autumn a certain amount of nocturnal restlessness was recorded, as one would expect with a migratory species.

As there was uncertainty regarding the hardiness of the species it was decided to winter the birds indoors for the first winter. Soon after caging the cock became very thin and died. The original hen also died during the winter. While caged the birds showed a preference for sunflower seed, hemp and some plain canary seed. Mealworms were readily taken.

The 1981 Season

The two remaining hens were replaced in the flight in April. On 1st June a cock was obtained. This bird had been successfully wintered outside the previous year. After a short quarantine period the bird was placed with the hens. Within a week of the introduction of the cock, both hens started to pull at twigs and to carry pieces about the aviary. About nine days after his release the cock started to sing. The song consisted of a simple series of rather loud notes and was rather reminiscent of the song of the Reed Bunting *Emberiza schoeniclus*. As the season advanced, this song could be heard frequently at night as well as during the day.

On 14th June one hen started to carry heather twigs in earnest. She gave the impression of wanting to build at a level above the aviary roof, especially attempting to fly up into the branches of an elm tree which overhangs the aviary at one spot. Eventually she began to place a few twigs together in a clump of heather about three-quarters of the way up the back of the aviary.

Throughout the following day little progress was made at this site and later that day the cock began nest-calling at a second site, just below the aviary roof, on top of a clump of heather and in full view. The nest-call was a drawn out nasal note, resembling a muted version of the nasal note in the song of the Greenfinch *Carduelis chloris*. The hen joined the cock at this site and uttered a lower pitched version of this same call. The next day (16th June) some dead twigs of Snowberry *Symphoricarpus albus* were provided. These were immediately accepted by the hen and the main structure of the nest was completed by that afternoon. At this stage the hen started to collect fine heather twigs and a little hay to line the nest. The birds were not at all shy and the hen built quite openly, not being in any way disturbed by my presence only a couple of feet away. By this time the second hen had ceased any attempt at nest-building although not persecuted in any way by either of the other birds.

At 6.00 p.m. on 16th June the hen was on the nest, shaping the cup. She then left the nest and immediately invited mating about 3 ft. from the nest. The posturing was in the usual passerine way, with the head and tail slightly elevated and the partly spread wings quivering. The cock responded by drawing himself up very thin and upright and slowly circled the hen twice before mating. From the front the bright yellow breast stripe and shoulder tufts formed by the underwing coverts were very conspicuous at this time.

The following day the lining of the nest was nearly complete. The nest reminded me of a larger version of the nest of the Bullfinch *Pyrrhula pyr-*

rhula although the lining was much sparser. On the morning of 19th June the hen was sitting on the nest as if laying, but on examining the nest later no egg was present. The next morning the broken remains of an egg were found on the aviary floor, having apparently been laid from a perch. This marked the end of the breeding effort for 1981, with no further interest being shown by any bird, although the cock continued to sing until the moult in September. As the cock had wintered out successfully the previous year in another collection it was decided to leave the birds outside for the winter.

The 1982 Season

The first sign of breeding activity was on 29th March when the cock was seen to chase both hens about the aviary. The following day both hens started to pull at twigs. The cock started to sing in mid-April and for the first time a sub-song was heard. This was far more tuneful than the full song and consisted of many warbled notes. On 30th April both hens began to reply to each song phrase of the cock with a sharp single note. It was decided to leave the trio together until one hen showed an interest in nesting and then to remove the second hen, but events turned out rather differently.

On 10th May the hen that had not nested in 1981 began to carry twigs about, again initially attempting to carry material into the branches of the tree overhanging the aviary. Eventually the hen appeared to settle on a site, again on top of a clump of heather, about 18 ins. below the aviary roof and completely exposed to view. For the next few days the hen was occupied in carrying twigs up to this site and then carrying them away again, thus making no progress whatsoever.

On the morning of 13th May the cock was squatting at the nest site, singing. Throughout the day the hen continued to carry twigs up to the nest site and then away again. Occasionally she actually placed a twig on the heather and attempted to fix it into place but would then pick it up again and carry it away. Usually one twig would be carried up to the site three or four times in succession before being discarded for another. At 7.00 p.m. the birds were seen to mate on the aviary floor and later that evening the cock began to carry twigs up to the site - the only time he was seen to attempt to build - but these were immediately removed by the hen.

The following day the hen began to collect nest-lining material in the form of cocoa-nut fibre. This would be gathered by the beakful and brought to the nest-site and then away again, as had happened with the

twigs. Two days later, on 16th May, the hen was seen squatting on the bare heather where the nest should have been, and later that day a Grosbeak egg was found in a Diamond Dove nest that had been built about 1 ft. below the Grosbeak nest-site. Apparently the egg had fallen directly on to the incubating dove, which had tucked it in with its own two, considerably smaller eggs. The egg was pale blue in colour, with a sprinkling of brown spots which were especially concentrated at the blunt end. On examination this egg proved to have been cracked as a result of the fall.

As a result of this, I decided to place an incomplete Blackbird's nest at the nest-site. This nest had been abandoned before the mud lining had been added and so was made up of straw and finer grasses only. The following morning the hen was wary of this nest and reluctant to approach so I placed a number of twigs around the rim of the cup, whereupon the nest was accepted and the hen immediately began to line it with coconut fibre. The twigs gradually fell away over the next few days for they were not securely anchored in place, but by then the nest had been completely accepted.

On 22nd May the second hen - the one that had built a nest the previous year - suddenly began to line this nest also. Up to this point, she had never been seen to carry nesting material and certainly was not responsible for the destruction of the earlier nest-building attempts. No aggression was shown between any of the birds although the first hen appeared to be dominant over the second. On 24th May an egg was laid in the nest by the first hen. The bird appeared to remain on the nest for most of the day, although when checked in the late afternoon it was the cock that was sitting. While I was present the first hen flew up and stood beside the nest, whereupon the cock immediately left and she took his place. The hen remained on the nest that night. By now, both hens were consuming considerable amounts of chopped cuttle-fish 'bone'.

The following morning the first hen was sitting on the nest while the second was squatting beside her on the rim of the nest. Shortly afterwards there were two eggs in the nest and an egg was balanced on the rim of the nest; this I placed in the nest. Again the first hen appeared to sit for most of the day. By this time the cock was tame enough to take mealworms from the hand, although the hens never became so confiding. That evening, on receiving a mealworm from me, the cock took it up to the nest, carrying it lengthways rather than crossways in its beak. The hen took the mealworm and left the nest with it. The cock was just about to settle on the eggs when the second hen arrived and immediately jumped on

to the nest, giving the impression that she had been waiting a long time for an opportunity to incubate. The cock then left the nest area. This was the only time that the cock was seen to bring food to the incubating hen and somehow one got the impression that it was not fully intentional. No vocalisations appeared to be involved.

Early the next morning a great deal of noise was heard from the aviary. On investigation I found that the second hen had again laid an egg on the rim of the nest and this had attracted the attention of a Magpie, which was attempting to take the eggs. Both hens were jumping about near the nest calling loudly while the cock was suspended from the aviary roof, trying to attack the Magpie. Had the wire not been there, I am quite sure that he would have physically attacked the predator. When I arrived the Magpie flew off, whereupon the birds immediately calmed down. I placed the egg in the nest and the first hen immediately began to incubate. The nest now contained five eggs, the first hen also having laid that morning.

Incubation was shared by all three birds although the cock only took a small part, for while the first hen would not yield to the second, the cock would leave the nest whenever either hen approached. The eggs were never left unattended. Usually the relieving bird flew directly to the rim of the nest and the relieved bird flew straight away.

The first egg hatched on 6th June, indicating that true incubation had begun with the first egg and giving an incubation period of 13 days. The chick was light skinned and covered with pale grey down. The gape was bright red. Mealworms were immediately offered to the birds and were readily fed to the chick. Apparently the food was taken to the nest in the crop and not carried in the beak. At first only the contents of the mealworm were fed to the young, being squeezed into the mouth as if from a tube. Throughout that day mealworms were offered to the birds at intervals of approximately one hour. At one feed during the afternoon the two hens fought seriously for the first time.

The following morning the first chick was very weak and a second egg had just hatched. As the problem was almost certainly the lack of live-food early in the morning, I decided to attempt to provide a constant supply of mealworms by providing them in a glass dish about 1 ft square. A shallow layer of about $\frac{1}{2}$ in of bran was placed on the bottom of the dish and the mealworms placed on top of this. The birds showed no hesitation in entering the dish. The following morning, though both chicks were still alive, the first was very weak and slow to beg, never having recovered from the first night. A third egg hatched during the morning while another was found to have dried up, the shell being dented. At

8.30 p.m. both hens were seen to be brooding the young simultaneously.

The next morning the first chick was dead and the last egg had hatched, leaving three young in the nest. As the birds were feeding the young solely on mealworms, although feeding normally themselves, I decided to supplement the diet of the chicks by hand-feeding. The young were fed three or four times daily with pieces of Purina dog food which had been soaked in water containing Abidec and rolled in SA-37 powder and scraped cuttlefish "bone". The adults did not appear to object to my interference, the brooding bird slipping away as I reached the nest and one or the other returning as soon as I left.

Although all appeared to be going well, on the morning of 12th June the two smaller chicks were found dead in the nest. It was as a result of this that I discovered that the adults would not search among the bran for mealworms, and would only take them if they were readily visible. As I had been adding one or two handfuls of mealworm culture a day, the amount of bran in the dish had become too great, allowing the mealworms to disappear from sight and so the young had starved.

On the evening of 15th June, the eyes of the remaining chick were just starting to open; it was now eight days old. By 18th June the chick was well covered in feathers and the adults had ceased to brood during the day. At this stage the young bird refused hand-feeding, crouching in the nest at my approach. On this day the cock resumed full song. On 21st June, at 14 days old, the chick was on the rim of the nest at 9.00 a.m.; however, it returned to the nest after being fed. At 2.00 p.m. it was still in the nest, but when next checked at 5.30 p.m. it had fledged - a very much paler edition of the hen with hardly any tail feathers visible.

By 23rd June the cock alone appeared to be feeding the fledgeling. At 6.40 p.m. on that date, the subordinate hen was heard to sing in a way that was almost indistinguishable from the cock. At 7.30 p.m. loud distress calls were heard from the aviary and upon investigation I found the subordinate hen attacking the fledgeling. There was no sign of the first hen (she was later found hiding in a clump of heather) and although the cock was very excited he did not attempt to defend the young bird. When the first hen left the heather, she was immediately attacked by the other hen. At this stage both hens were removed from the aviary and the birds given time to calm down. The head of the fledgeling was covered with blood, especially around the beak, and for the rest of the evening it would not respond to the attempts of the cock to feed it. When the 'dominant' hen was returned to the aviary after an hour, she was attacked immediately by the cock, although not as seriously as she had been by the

other hen. This bird was then permanently removed from the aviary. The following morning the chick was still alive but its head was very swollen. With a little prompting it accepted food from me and was also fed by the cock. By 1.30 p.m. however it was lying dead below the perch.

Second Nesting

The same afternoon the 'subordinate' hen was returned to the aviary. As soon as she was placed in the aviary the cock assumed what was probably a courtship display - the only time that this was ever witnessed. Perching about 4 ft. away from the hen the cock slightly raised his tail and spread it fully, so displaying the white tips to the feathers; after a couple of seconds the wing tips were dropped and the head was tilted towards the tail. The whole display was accompanied by a totally different type of song than usual which can best be described as being rather canary-like. The hen appeared to ignore the whole performance.

Two days later, on 26th June, the pair were seen mating and the first egg of a clutch of three was laid in the old nest on the 29th. No attempt had been made to repair the nest in any way. Again the incubation was shared although initially the hen sat for longer periods than the cock. When the nest was inspected at 8.00 p.m. on 11th July, the first egg had just hatched and the second was chipping. The following morning there were two chicks in the nest, the third egg proving infertile. As before the adults would feed mealworms only and so additional hand-feeding was carried out. On 15th July the cock, always the tamer of the pair, remained on the edge of the nest as I fed the young. The following morning both chicks had the tips of the primary feathers broken through the quills.

On 17th July the hen was heard to sing while collecting food and was answered with a burst of song from the cock. This became quite a common occurrence over the next few days. Both parents would now stand on the edge of the nest as I fed the young. If they were not already present when I arrived at the nest both would immediately fly up to the nest. The cock appeared unconcerned while the hen always gave a sharp 'tchick' of alarm as she arrived, but this did not appear to affect the response of the young. Hand-feeding now became more difficult as both parents attempted to prevent the young from receiving food from me, snatching it from the tweezers and either swallowing it themselves or removing it from the vicinity of the nest, treating it, in fact, rather as if it were faecal material.

By 18th July the young had their eyes open, at only six days old. At this stage they were no longer brooded continuously during the day. Unlike the first chick which had refused further hand-feeding once its eyes



E. Callaghan

Fledgling Black-headed Grosbeak, the day after leaving the nest, i.e. 10 days old

opened, these continued to feed readily from the hand until they fledged, possibly due to the presence of the adults on the edge of the nest.

The first chick left the nest on the afternoon of 21st July, at only nine days old whereas the earlier chick had remained in the nest until 14 days old. It was returned to the nest that evening as the chick remaining in the nest was being favoured by the parents. The following day both the young fledged during the afternoon. It was now noticeable that there was a considerable difference in the colouring of the two young. The first was very pale on the breast with fine striations on the flanks, the wings were light coloured and the light central stripe on the head was quite narrow. The second chick was a much warmer brown on the breast with clear flanks, the wings were much darker and the central head stripe was much broader. It was thought that this might represent a sexual difference but it does not.

After the young fledged the adults, for the first time, started to feed them small amounts of canary-rearing food, bread and milk and half-ripe grass seed. However mealworms continued to form the bulk of the food supplied. At this stage the young would no longer accept hand-feeding.

On fledging the young were very small, less than half the size of the adults. They appeared to develop very slowly, in contrast to their rapid growth to fledging, and were especially slow to feed themselves.

From 30th July onwards the bulk of the feeding of the fledgelings was carried out by the hen. On 2nd August one fledgeling was first seen to pick up food for itself - a mealworm dropped by the hen as she was feeding it. By 15th August the young were spending much time calling to be fed but were actually fed much less by the hen. On this date the older fledgeling was first seen to feed itself on canary-rearing food. On 19th August both young were seen to feed themselves and could be considered to be self-supporting, although still fed occasionally by the adults.

The adults started to moult in early September and the second hen was returned to the aviary at this stage. The immatures showed no sign of moult at this time. On 19th November the duller coloured young was found dead. No cause of death could be determined but rather to my surprise the bird turned out to be a cock.

It was not until the end of January 1983 that the remaining young bird started to moult into the plumage of an adult cock. At the same time the older cock had begun to lose the brown tips to the head feathers. Upon completion of the moult the young cock was less brightly coloured than his father, suggesting that the colour of the plumage may intensify with age.

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PRODUCTS MENTIONED

Purina Dog Chow manufactured by Ralston Purina Co.
SA-37: Nutritional Supplement, Intervet Laboratories Ltd.
Abidec multivitamen solution, Parke-Davis.

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BREEDING NOTES FOR 1983

By BRYAN PECK (St. Marks, Cheltenham, Glos.)

The year so far has been very mixed for me - two near misses and two successes. It started with the Coletos or Bald Starling *Sarcops culvus* from the Philippine Islands. The Coletos are black birds with a grey back and white shoulders which are only seen when the wings open, the head is bald, the skin bright pink which changes colour going very reddish when the bird becomes excited. There is a line of feathers running from the beak to the nape, about 1/8 in wide, giving the impression of two large cheek patches. The beak and feet are black, the eyes brown, and the sexes alike. I have two pairs plus a spare hen (all have been surgically sexed). The older pair is from Luzon. They laid on quite a few occasions during 1981 and 1982 but although some chicks hatched, none lived for more than four days.

In February 1983 the parents, housed in a 4 ft x 18 in x 18 in cage supplied with a nestbox 7 in x 7 in x 16 in, with a large entrance hole, through which they could pass very easily, fed one chick for 26 days when it was found dead in the nest-box. The box was filled with newspaper, although other material was offered. The eggs were blue with brown and mauve blotches, heavy around the large end, size 28 mm x 16 mm (other eggs, similarly coloured, had measured 22 mm x 18 mm and 24 mm x 14 mm). I cannot be sure of the incubation period, but based on observations of feeding, it must be within 16 to 24 days.

The chicks hatch completely naked but by two days old they are covered in grey down. The oldest I have had is 26 days. At this age it was nearly as large (body size) as the parents, but only partly feathered and appeared to need about another six days in the nest, but this is only an assumption. From hatching to about eight days old it looked like a typical starling, but at about eight days old it could be identified as a *Sarcops* chick, the line of feathers over the centre of the head being quite visible.

The chick was fed wholly on live food for the first two weeks, then other food was fed, i.e. fruit pulp, bread and milk, etc.

The diet offered to the parent birds is mixed diced fruit, bread and milk, insectivorous soft food and live food, including stick insects.

The cage in which they nested is too small, but *Sarcops* are not strong fliers in captivity. This pair is now housed in a 9 ft x 8 ft x 6 ft high flight, and are now nesting, still using newspaper, but also grass and other plant

fibre.

There are two subspecies, both of which have been imported in recent years, but most of the birds come from Luzon.

My first success of the year was with the Chinese Bulbul *Pycnonotus sinensis*, of which I also have two pairs. The Chinese Bulbul is a grey bird with a black cap and white nape band. The ear patches are brown, the throat is white, the flight feathers are edged with yellow; the legs and beak are black and the eyes brown. As far as sexing is concerned, I have come to know my birds over a long time and have always found that the cocks have a darker grey breast band - so far this method of sexing has proved correct.

One partner in each of my pairs was bred by me, one cock in 1975 and a hen bred in 1978. Both are paired to wild-caught birds, the cock imported in 1973, the hen imported in 1976. Both pairs have reared a number of young in the past.

I decided to release the pair whose cock was aviary-bred in 1975 into a flight containing three pairs of Philippine White-breasted Mannikins *Lonchura leucogastra*. The flight is triangular in shape, being 12 ft x 10 ft x 8 ft and 6½ ft high. The flight was not planted but had a natural earth floor. The decision to use this pair was based on past knowledge that they would use a nest-box, whereas the other pair would not.

I had hung six nest-boxes in various places in this flight. The nest-boxes were of the type used for British tree creepers by the Royal Society for the Protection of Birds. I have found this type of box is very successful for small birds, but instead of using a hole entrance I leave half of one side open.

The bulbuls built a cup nest within a nest-box using grass, coconut fibre and moss. The coconut fibre was used for the nest lining. Two eggs were laid, though only one hatched which I have found is normal for this pair. The eggs are white, spotted and speckled mauve and brown but the egg markings are never consistent; some eggs are marked all over, some only round the larger end. I have found this to be the same with most other *Pycnonotus*.

For the first few days the chicks are fed solely on live food, then until they leave the nest they are fed on the same food as the parents.

The one chick left the nest at 14 days old on 10th July 1983, and was fed for eight days by the parents. On leaving the nest the chick was grey all over, except for the throat and breast which were white; the crown was a darker grey. One month later, the chick had started to moult into adult plumage.

For the first few weeks the parents were very protective to the chick,



B. Peck

Young Pied Barbet four days after leaving nest

driving the mannikins away. On 15th August the chick and parents were transferred to a 4 ft x 18 in x 18 in cage and the older pair released into the flight.

The second success of the year was with Pied Barbets *Lybius leucomelas*. The Pied Barbet is a black and white bird dusted with yellow. There is a red patch on the forehead, which spreads into a yellow eyebrow stripe, the beak and legs are black, there are two teeth each side of the upper beak, the eyes are red-brown, there are two toes forward and two back.

I purchased five birds in 1982 which were, I believe, a family group. One bird died in the winter of 1982/3. They were housed in the middle of a block of three flights, the individual sections of which were 5 ft from front to back, 3 ft wide and 6 ft high. Subsequently, as mentioned later, I removed two of the birds, leaving a pair. In the aviary on the left is housed a pair of Grosbeak Starlings *Sissirostrum dubium* and on the right a pair of Black-collared Barbets *Lybius torquatus*. No fighting through the wire has ever occurred, all three pairs seem quite settled but when making this block of flights, I took the precaution of double wiring the dividing sections. On the floor of the flight two large logs were leant against each

other. Four nest boxes were hung in the flight, three near the roof and one nailed to one of the logs on the floor.

The Barbets were wintered out and stood the cold very well. The nest-boxes were used for roosting all through the winter.

Around 10th June one of the Barbets started to chip a hole in the side of one of the logs, near the top. These logs are about 3½ ft high with a diameter of 10 in; the hole was about 6 in from the top, 1½ in diameter and pushed inward to about 4 in then downwards. From the way the Barbets enter and leave, I would think that the nest cavity is about 12 in down from the hole.

An egg appeared in the water dish; it was pinkish white with no markings and was broken.

From this date one of the Barbets was missing most of the day. The remaining bird of the pair started to attack the other two birds so I removed them, leaving what I thought was the pair and this proved right.

I must have spent three hours a day just watching and listening and had come to the conclusion that one bird was hiding in the nest. On 10th July I noticed the hen Barbet taking food into the log and as she entered, I moved closer to listen but could hear nothing even though the nest hole was about 18 in from the wire. She continued to take in food until 28th July but by this time I had given up hope.

I have to walk past this block of flights to get to my humming bird shed and I had got quite used to one of the Barbets sticking its head out of the hole, but as I walked past at 12.45 p.m. on 28th July I stopped in midstride as the bird looking out of the log had no red forecrown. It quickly put its head back in but that same evening, as I walked past, another head was sticking out of the hole. This one did not pop back but looked directly at me, not shy at all. This time I noticed that as well as lacking the red forecrown, it also had no teeth on the side of the beak.

The next morning (29th July) two chicks were hopping round the flight. They were completely feathered and the same as the parents, except where mentioned. They did not return to the log that evening but roosted in one of the nest-boxes with the bird I had assumed to be the cock. The next day both parents were seen to feed the chicks. Strangely the chicks do not call for food and when being fed make no sound at all. The chicks were removed to a cage 15 days after leaving the nest, and by this time they were feeding themselves; in fact, they were self-feeding by six days after leaving the nest. They were removed because the hen had gone back to staying in the nest and the cock was becoming very aggressive. One month after leaving the nest the red forecrown is just starting to appear

and the teeth have started to take shape. I am now (beginning of September) waiting hopefully for the next chicks to appear.

The second failure was with Grosbeak Starlings *Scissirostrum dubium*, from the Celebes (Sulawesi). This is a dark grey bird, the grey having a wine tinge to it. The tail and wings are black; the rump is streaked with red and orange; the feet and beak are yellow; the beak is large, more like an Oxpecker; the eyes are brown; where the chin feathers meet the lower bill, it has a heart shape that is quite distinctive.

I have three pairs of Grosbeak Starlings: two pairs are housed together in an inside flight measuring 8 ft x 2 ft and are nesting, but these notes concern the pair housed in the outside flight next to the Pied Barbets.

I released them into the flight in May. I must admit I did not have the nerve to winter them out. The flight had three nest-boxes hung near the roof: the first box measured 5 in x 5 in x 10 in, with a 2 in diameter hole, and hung at a 20° angle; the second box measured 9 in x 9 in x 3 in, with a 2 in diameter hole and hung level; the third box measured 4½ in x 4½ in x 8 in with a 1¾ in diameter hole on the side.

All three boxes were used for roosting, but for nesting they settled for the first box and soon started taking nesting material in such as coconut fibre, dried grass and moss, and after taking quite a bit of material into this box, both birds took up residence. On 24th July I found half an eggshell on the floor of the flight. On 25th I found three more pieces which I retrieved for a friend who collects eggshells. The four pieces made up two complete eggshells; their colour was very light blue, speckled round the large end with fawn and brown.

Both parents took mealworms and other food to the nest but on 9th and 10th August the chicks were found dead on the floor. They were about 4 in long, well-formed, completely naked, and looked more like young thrushes than young starlings. I was very disappointed, more so than with the Coletos Starlings, but the pair have now taken to the third box so I am still hoping.

The food supplied to all four species, with slight variations, consists of apple, tomato, boiled carrot, grapes and cabbage - all diced and dusted with SA37 - brown bread and boiled milk with a little sugar. In hot weather this is replaced with bread and nectar. Orlux Soft Food is also given, as well as mealworms and the Coletos and Grosbeak Starlings are also given stick insects. Fresh drinking and bathing water is given daily.

All the flights have feeding doors and covered food trays so that I do not have to enter to feed the birds and all nest-boxes are sealed for privacy.

As described above, the Pied Barbet *Lybius leucomelas* has been reared by Mr. and Mrs. B. Peck and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

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A SECOND BROOD OF DALMATIAN PELICANS *Pelecanus crispus* IN CAPTIVITY AT THE PARK OF VILLARS-LES-DOBES FRANCE

By P. CORDONNIER (Assistant Director)

Breeding of the Dalmatian Pelican at the Park of Villars-les-Dombes in 1981 has been reported earlier (Cordonnier 1981).

The six adults, bought in 1969 and 1971, are pinioned and kept on a pond measuring half a hectare and they nest on a small central island, about 25 m. square, which is covered with shrubs providing abundant nesting material (rushes, small twigs).

In 1982 three nests (Nos. 1, 2 and 3) were built. Here follows a short report of the breeding chronology (the observational visits had to be scattered):

January 10th	Nest 1	2 eggs
	Nest 2	1 egg
February 3rd	Nest 1	2 eggs
	Nest 2	2 eggs
February 10th	Nest 1	2 eggs
	Nest 2	2 eggs
	Nest 3	1 egg
February 15th	Nest 1	1 pipped egg
	Nest 2	2 pink chicks
	Nest 3	1 egg
March 9th. Remote observation made difficult because of the vegetation		
	Nest 1	1 chick the size of a duck
	Nest 2	1 (or ?2) larger chick/s
	Nest 3	1 adult brooding on nest
March 22nd	The chicks were pinioned	
	Nest 1	1 chick (bill length 216 mm tarsus length 200 mm)
	Nest 2	1 chick (bill length 225 mm tarsus length 200 mm)
	Nest 3	2 eggs and another on the ground (put in an incubator but infertile)
April 8th	Nest 3	1 egg left; picked up on May 10th. It contained a decomposed, half-developed embryo.
June 26th	Nest 1	2 eggs
August 2nd	Nest 1	1 pipped egg and one hatching. This chick grew normally and was reared successfully, like the two previous ones.

Makatsch (1974) reports only one yearly brood in the Dalmatian Pelican, as do Crivelli and Vizi (1981) who only mention replacement clutches following egg destruction. Harrison (1975) also reports that no second brood has been observed.

There are no data about successful breeding in captivity (Kramer, 1980).

In this case, it is noticeable that the first clutch was early (10th January), and this was perhaps due to the very mild winter weather that prevailed in southern France (in the previous years the first eggs were laid on 6th June, 1979, 15th February, 1980, and 17th March, 1981).

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GROWTH AND DEVELOPMENT IN A HAND-REARED STRIPED OWL *Rhinoptynx climator*

By JEFFREY SPICKNALL and CHARLES PICKETT
(National Zoological Park, Washington, DC, USA)

The National Zoological Park began efforts in 1976 to establish the Striped Owl *Rhinoptynx climator* in captivity, at which time a single male was acquired. Two females were added in 1977 and an additional male in 1980. This latest male paired with a female and they produced four fertile eggs in 1981, of which two hatched. The nesting behaviour of this species was described by Goodman and Fisk (*Avicultural Magazine*, 79: 158-162) and an account of its breeding was given by R. Krahe (*Avicultural Magazine*, 87: 242-248). The following information is presented to further document growth and development.

Housing and diet

The birds are housed in an indoor exhibit measuring 5 ft. x 8 ft. x 10 ft. with sand-covered floor. Grass clumps are added as decoration and



J. Cohen - National Zoological Park
Striped Owl chick at 23 days old

perching is available. The birds do not seem to consume water, but do take frequent baths when water is available.

Nesting

The nest scrape is located on the ground behind a stump placed in the rear corner of the exhibit for security. The female performed all of the incubation duties when the eggs were left in the nest. Of six eggs produced during 1981, four were fertile and two hatched. The first chick hatched after natural incubation and was left with the parents for rearing. It was found decapitated at six days old, so the second chick was hatched by artificial as well as natural incubation, and was subsequently hand-reared.

Incubation

The egg hatched artificially was taken from the nest after it had been incubated for thirty days by the female. It was placed in a "Roll-X" incubator at a dry bulb temperature of 99.5°F and wet bulb temperature of 87°F, and hatched on 28th November 1981 after 33 days' incubation. The dry temperature reading was decreased to 88°F gradually over the next two weeks, at which time the bird was moved to a rearing unit equipped



J. Cohen - National Zoological Park
Striped Owl chick at 54 days old

with a heat lamp. By moving closer to, or further from, the heat source, the chick regulated its own temperature from this time until grown.

Feeding

The chick hatched on the afternoon of 28th November and feeding began the following morning. Zu/Preem Bird-of-Prey Diet was fed on the first day; chicken breast supplemented with Vionate and calcium powder was fed from the second to the ninth day, at which time pieces of newborn mice were added.

The chicken was dropped from the diet and newborn mice used exclusively from the twenty-fourth day. Whole mice, with the stomach slit open to expose the internal organs, were introduced at 38 days and became the sole diet at 46 days.

At no time was there a problem in getting the bird to eat. A pair of forceps was used initially to feed small bits of chicken and young mice. When the food was brushed or nudged against the side of the beak, the chick would gape for food. For the first few days, it needed occasional help in opening its mouth wide enough to allow food passage, but had no difficulty in swallowing it once it was inside. The chick was fed every two hours for the first month, from 7.00 a.m. until 4.30 p.m. Food was given every three hours from this time until the chick was 38 days old, when it began to eat on its own.

Growth

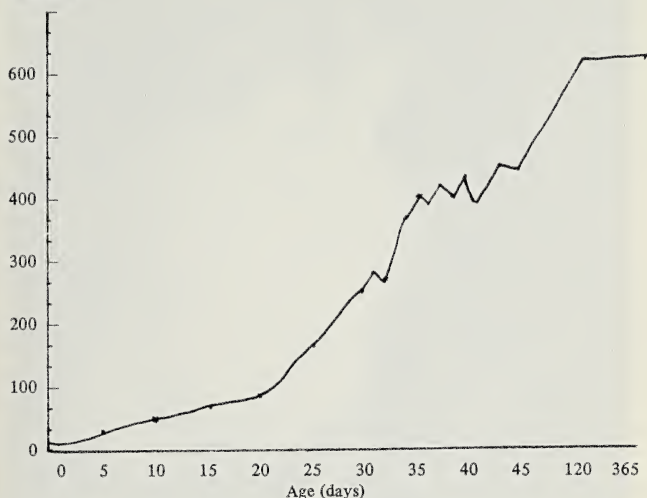
The chick was weighed prior to the first feeding each morning for the first month and a half, and again at four and twelve months of age. As it was flying freely at the end of a month and a half, daily weighing was discontinued to prevent stress. Weight gains are presented in the following table.

Development

8 days	Eyes beginning to open
12 days	First vocalisation noted. Climbing from small bowl
17 days	Walking clumsily
18 days	Jumping from cage floor
20 days	Perching on hand
25 days	Perching on dowel in cage
30 days	First pellet regurgitated
35 days	White facial disc forming bordered by light brown down
	Flying awkwardly
38 days	Feeding on its own on whole mice
43 days	Flying freely

DEVELOPMENT OF STRIPED OWLET

Weight (g)

*Products mentioned in text*

Zu/Preem Bird-of-Prey Diet. Manufactured by Hill's Division, Riviana Foods, Inc., P.O. Box 148, Topeka, Kansas 66601, USA.

Vionate - vitamin/mineral powder supplement manufactured by R.E. Squibb and Sons, Inc., Princeton, New Jersey, 0854, USA.

Roll-X Automatic Incubator. Manufactured by Marsh Farms Inc., 14232 Brookhurst Street, Garden Grove, California 92643 USA.

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Lemon-breasted Canary

Neville Brickell

THE LEMON-BREASTED CANARY

Serinus citrinipectus

By NEVILLE BRICKELL (Natal Avicultural Society, S. Africa)

The Lemon-breasted Canary is probably the last full species new to science that will be recorded for south-eastern Africa. The initial discovery of the species must be credited to Mr. Jack Scheepers, a member of the Natal Avicultural Society, who in 1959 trapped about 40 examples of this unknown canary. The new species was made known to science in September 1960 when specimens were collected near Panda in Mozambique by Dr. P.A. Clancey and Mr. Walter J. Lawson of the Durban Museum, South Africa. In 1970 Mr. Lawson described the unsuccessful nesting of a pair of Lemon-breasted Canaries in one of his aviaries in 1969.

The Lemon-breasted Canary is allied to the Yellow-eye Canary *Serinus mozambicus* and the Black-throated Canary *S. atrogularis*. The male resembles the former, but has the face more boldly patterned; cheek patch yellowish; chin white; throat and breast bright lemon yellow; lower breast and abdomen pale yellow; flanks buff, streaked with grey; eye dark brown; bill dark horn, the lower mandible paler; legs and feet light brown. The female differs from *S. atrogularis* in having the cheek patch grey; chin, throat and flanks buff. Since its original discovery in Mozambique, it has now been found to occur in eastern Zimbabwe and southern Malawi. Its northernmost limits are unknown. In South Africa it extends as far south as Stanger in the province of Natal, and possibly occurs in the lowlands of the eastern Transvaal. Its habitat is savanna woodland and semi-rural cultivation where it occurs in small compact flocks often in the company of Yellow-eye Canaries. I have not heard the song of the male, which is reported to be a "pretty little song", but a female had a sweet twittering call when a male alighted on the same branch. Little is known of its feeding habits in the wild except that it has been observed eating seeds and weeds of low-growing herbs.

In the aviary it takes readily to a finch mixture and insects in the form of mound termites *Trinervitermes* sp. Breeding in its natural state is unknown. In captivity, it constructs a cup-shaped nest of grass and then lines it with feathers. Eggs number three to four and they are white with a few irregular brown spots and fine streaks. The female only incubates for a period of 12-14 days; the nestling period is 14-16 days.

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DERBYAN PARAKEETS

Psittacula derbyana

IN EXTREME CLIMATIC CONDITIONS

By D. PHILIP KING (Assiniboine Park Zoo, Winnipeg, Canada)

The Assiniboine Park Zoo in Winnipeg is one of Canada's major zoos, and must surely rank amongst those with not only the coldest winter temperature but with the greatest range between summer and winter weather. Consequently efforts have been made since development of the Zoo began to concentrate on exhibiting animals that can survive our winters with a minimum amount of protection. While many (though not all) North American species are obviously well-suited, a surprising number of non-native or exotic animals fall into this category.

When thinking of the tougher or more resilient animals thus deemed suitable, it seems that mammals come more obviously to mind. To maintain some semblance of balance at least for winter exhibition though, a reasonable number of bird species similarly resilient is very desirable. To survive outside in temperatures which, during a normal winter, average -16°C and can on occasion dip down to -40°C , requires a special sort of resilience on the part of the birds (not to mention those who care for them). When those birds are non-native the problems and their imagined or anticipated after-effects often seem enormous.

In Winnipeg we have been quite fortunate in our choice of birds for such outside displays. In addition to various pheasants, grouse, native

raptors, owls and corvids, we have, for the past few years, displayed Barn Owls *Tyto alba pratincola*, Eagle Owls *Bubo bubo*, Tawny Owls *Strix aluco sylvatica*, Ural Owls *Strix uralensis*, Hooded Crows *Corvus corone cornix* and Jackdaws *Corvus monedula spermologus*. These species, whilst attractive to those who appreciate them present a rather uninspiring and somewhat bland appearance to the general public. Consequently it was felt that something a little more colourful and visible was needed, but that could be accommodated in our limited facilities. As a result six Derbyan Parakeets *Psittacula derbyana*, whose natural range includes the Himalayan Mountains in western China and north-eastern India, were acquired. After a brief settling-in period (which also allowed us to parrot-proof their intended premises), they were moved to a range of exhibits known for obvious reasons as "The Pheasantry". A description follows of their aviary, one of a number of similar-sized structures in this complex.

The outside aviary is rectangular in shape 24 ft. long, 12 ft. wide and 10 ft. high, with a slightly arched roof. Attached to the rear of this aviary which, like all the others in this complex, is visible by the public from the front only, is an insulated wooden shelter building measuring 8 ft. long, 5 ft. wide and between 6 and 7 ft. high, this latter variation because of a rear-sloping roof. Inside, and not visible to the public, is a cage 4 ft. long, 3 ft high and 3 ft. wide, constructed of 1 in. square weldmesh wire and so arranged that the birds, when entering the building, have access only to this cage. This measure was considered more efficient than protecting the inside of the whole shelter. Access to this cage from the aviary is through an 8 in. by 10 in. hole.

The parakeets were fed a standard diet of sunflower seeds, raw peanuts in the shell, whole wheat bread, Purina monkey chow, rolled oats, wheat and turkey pellets by way of dry food, and small amounts of fruit and vegetables. In addition, fresh branches were provided regularly for them to chew up, and doubtless some amount of the bark was ingested. The sunflower seeds and peanuts were the most preferred items and the fruits and vegetables the least. While part of this lack of preference may be due to the sometime freezing of these items, preferences were not seen to change when temperatures rose above the level at which this would take place. The food and water dishes were placed inside as a protection against the elements and as a routine method of reinforcing familiarisation with the inner cage as a place of shelter.

The winter of 1981-1982 proved to be very long and very severe in terms of cold. According to our weather office it provided the second longest continuous stretch of below -30°C temperatures on record, a

period of 30 days (the longest was 43 days). To give a few details, the coldest temperature recorded was -38.9°C , the average temperatures for the months of December 1981, January and February 1982 were -12.9°C , -25.2°C and -14.5°C respectively. The winter as a whole was the third coldest since 1900, the eighth coldest since records were begun in 1872 and the third windiest since 1921. In addition, on one day the combination of wind and temperature produced a wind-chill equivalent of -89°C , probably a record.

This then was the environment which our parakeets had to withstand, although the impending severity was not predicted on their release in October 1981. A night light was installed to encourage the birds to roost inside, but other than to eat, they were seen to spend little time in the building. As winter progressed a 250-watt infra-red heat lamp was installed, out of reach of the birds, to supplement the existing heat supply and this provided a comparatively warm retreat enabling the building temperature to rise to -1°C with an outside temperature of -24°C , to $+3^{\circ}\text{C}$ when it was -20°C outside, and -6°C with the outside being -30°C , to give a few examples. Still the birds were not seen to frequent the building unduly and, according to our night watchman, they were outside whenever he walked past. This observation was borne out by the fact that no droppings were found inside the shelter, other than a few random ones distributed while feeding and so on.

A flaw in the original aviary design became much more apparent during the severe weather as a wire cable support for the slightly arched roof provided the highest available perching opportunity. This cable, while previously covered in wood to protect the feet of birds perching on it from frostbite due to the conduction of the metal, was quickly exposed by the parakeets. After this initial exposure, the cable was covered with split rubberised hosepipe for ease of installation, and constant replacement of this proved necessary throughout the winter. As the birds did not perch on the aviary wire, such protection was not needed on the rest of the framework.

During that winter we had one loss, and ironically the bird was found inside the building, the temperature of which was above freezing. Externally it appeared in excellent condition and was well-fleshed; a post mortem examination revealed that the bird had a cardiac embolism.

As a result of our experience in keeping these birds outside in such inclement conditions, especially bearing in mind the record-setting nature of their first winter, I feel that we can claim success in this experiment. I should perhaps add that although I have used the word "survive" in this

article, I do not mean to imply that the birds barely existed. From our observations we have no reason to suppose that they were any the less comfortable than if we had moved them to a warm building for the winter, although it is true to say that they were exposed to more risk in a climatic sense. Nor should it be thought that our birds were subject to such extreme temperatures all the time - our summer temperatures frequently reach 30°C and more.

Of course, complete success cannot be said to have been achieved until the complete cycle of breeding has been undergone, but it would, I am sure, be of interest if readers could offer further examples of birds being kept successfully in captivity in climates which differ greatly from those which they would experience in the wild state, and the methods or adaptations involved in such management.

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OBSERVATIONS ON AN AZURE-WINGED MAGPIE

Cyanopica cyana

By COLIN J.O. HARRISON (Harrow, Middx.)

For several years in the nineteen-seventies I kept a solitary male Azure-winged Magpie *Cyanopica cyana* that had been hand-reared alone and become fixated on humans. It enabled me to learn about many aspects of its habits; always allowing for the fact that some birds, and corvids in particular, may learn to vary some aspects of their behaviour in captivity. However, I could set against this the fact that if a bird treats you as a companion you may learn more of its behaviour than by observing it where it may be conscious of you as a potential predator. It was only recently that I realised how little had been recorded concerning the behaviour of this species, apart from Derek Goodwin's (1976) observations on other captive individuals. The following notes may help to give a fuller picture of a bird that can be rather elusive in the wild.

It is a small magpie, about 34 cm (13½ ins.) long. The body colour is light buffish-brown, with a greyish wash above and pinkish tint on the breast. The throat is white and a glossy black cap tapers back on to the nape and extends down on to the ear-coverts. Wings and tail are light blue.

General behaviour

The bird was found by Robin Restall as a nestling offered for sale in a Madrid market. He sent it to Frank Meaden who continued to rear it, and who gave it to me when its feathers were only partly grown and its black cap obscured by pale buff feather tips. At this stage it had begun to feed itself, but would still beg for food with high-pitched, long-drawn squeaky notes and slight wing-fluttering. I kept it in a garden aviary about 15 ft. long, with a shelter shed attached.

As it grew it began to use what were presumably innate calls, or calls it would not have heard since it was a tiny nestling. The typical *zhreeeh* call, long and hoarse with a rising inflection, was used when the bird was flying backwards and forwards, and more particularly when a person was in sight. It was sometimes shortened to a brief rising *zhreeah* when a person was nearby. When the bird was carrying out less vigorous activities, alone or in the presence of someone that it knew, it used a frequent subdued, low-pitched *kaah* note. A stronger *Krraah* version of the latter was used on occasions of annoyance or frustration, sometimes approaching a rattling *churr*.

Movement on the ground and in branches was by rapid hopping. Sometimes when on the ground and in a sudden hurry it might do a half-gallop, a series of large hops with the feet striking the ground successively instead of simultaneously. It could rapidly ascend a rough vertical surface in a series of hops aided by quick fluttering wing movements; using this technique to reach my shoulder when starting on the ground in front of me. It could cling sideways-on to a vertical rough surface while examining crevices or concealing something. It could also fly up and by a quick twist hang back-downwards from the underside of the aviary roof or other horizontal structure to examine it.

Flight was level, with rapid wingbeats. Descending it tended to use long swoops. It showed great agility in confined spaces, able to dodge and turn with the help of the long tail, and would pursue flying insects such as moths in the air or through branches.

Feeding

I fed it on a variety of food, using maggots and some mealworms, grated cheese, and fruit cake as staple diet. When maggots or mealworms were put out, it would take one after another until it had filled its mouth, pouching them in the throat. It would then regurgitate them, sticky and slimy with saliva, and push them into crannies and crevices, usually at some height above the ground. Sometimes it would regurgitate them and lay

in a row before doing this. If I were present it would offer one to me with small squeaky calls, and at other times, when it had none, it might go and recover a hidden one to give to me.

Pieces of cheese might also be hidden, but cake or similar material was not concealed in this way. Items were not kept for long periods, and might be moved around several times after being hidden. It showed little response to nuts or acorns, although it is said to store the latter in the wild. Given acorns it sometimes showed momentary interest, carrying single ones around and tucking them into some long grass in a corner of the aviary, but appeared to show no further interest and left others lying around. Nor did it show interest in hiding sunflower seeds; unlike a young Jay that I kept at an earlier period, that almost relined an old chair in the greenhouse by stuffing innumerable seeds into a crevice provided by a tear at one corner of the seat cover.

On one occasion I saw it make a hole with the bill in a patch of muddy moss on the ground, put a food item into it, and cover it with a leaf; but this was atypical. It would hold larger pieces of food down on the perch with one or both feet while pecking them apart.

As an adult it experienced what were presumably impulses to feed young for a period during the early summer. When I first noticed this the Magpie had been feeding on fruit cake placed in a dish on the floor of the open aviary. The sight of the feeding bird attracted about a dozen hopeful House Sparrows. The Magpie picked up a piece of cake and suddenly pushed it towards a sparrow that had been clinging to the wire netting and that promptly fell off in surprise.

Subsequently I watched the Magpie busily pushing cake through the wire to a resident party of sparrows that had learned to join the feeding session; and for about two months the cake consumption was incredible. On one occasion a single sparrow appeared and flew up on to the wire when the Magpie had no food to hand. After a moment's searching the latter approached the sparrow and offered it something that it took eagerly, but hurriedly dropped, and flew away. When I investigated I found a small sticky black slug.

Alarm behaviour

I do not think the Magpie would have had any opportunity to learn appropriate alarms, but some seemed innate.

It has a loud rapid repetitive *kree-kree-kree-kree...* call, high-pitched and something between the shrieking alarm of a Blackbird *Turdus merula* and the laughing call of a Green Woodpecker *Picus viridis*. It was usually

accompanied by an alert posture and some rapid flying to and fro. It was elicited by the sight of a hawk-sized bird approaching rapidly at fairly low level and was obviously a hawk alarm. However, it might also be given in response to an approaching Woodpigeon or Black-headed Gull. It was also used in moments of excitement and, in its warning context, appeared to be a signal to be on guard rather than an indication of real fear. It would also be used at times when the bird was suddenly startled. It occurred at its most hysterical pitch when a Kestrel swooped into the garden and carried off a sparrow, and for some time after, the daily passage of the Kestrel was announced by very emphatic alarm calls.

The call bore some similarity in tone to the shrieks of small children running and playing in nearby gardens, and the Magpie would reply to these by flying up and down its flight and giving its own shrieking call, but again in excitement rather than alarm. I noticed that, over a two-year period, the bird's calls on these occasions increasingly began to resemble more closely those of the children, and varied from its typical call.

It had a second call for a different type of avian predator. It might squat on a perch with head low on its shoulder, hardly moving but gazing upwards and uttering a soft low-pitched *kah*. By going close to the aviary and peering up I could usually see the cause. It might be a soaring Buzzard; more often a Lanner Falcon used by a local falconer, usually waiting on so high overhead that I could scarcely separate it from flocks of high-flying Swifts. This soaring-raptor alarm was used on several occasions for what turned out to be large dead leaves or scraps of burnt paper from bonfires, carried high into the air and descending slowly in a wide spiral, giving no clear indication of their size. A Hobby that spent an hour or so gliding and circling over the garden on one occasion produced a mixture of the two calls and reactions.

The Magpie appeared to have no immediate inbuilt alarm reaction for mammalian predators. It made no immediate response to early encounters with my cat, an elderly neutered female tabby, with white on chest and paws. The bird appeared to take its cue from me as parent/mate. Since I did not react with alarm to the cat neither did the bird, although the avian predator calls occurred irrespective of my reactions.

The cat would run up the side of the aviary and across the top, while the Magpie sat on a perch and watched it casually. However, if other cats in the neighbourhood tried to reach the bird, or alarmed it at night when it tended to roost on an outside perch, they elicited a harsh *krraaah* of annoyance, together with some effort at avoidance. In reacting to a distant cat the bird discriminated between mine and others that were tabby,

with or without similar white markings. One was so similar that it occasionally fooled me, but the bird appeared to recognise the difference immediately. After a while my cat, a rather aggressive and territorially-minded beast, would recognise the call used by the Magpie that probably indicated that another cat was in view, and if in the house would run out and look around for an interloper to drive away.

The Magpie appeared genuinely frightened when I carried long sticks or large unfamiliar objects, even if I picked them up while in its presence. It would tend to retreat and hide. When I repaired the flight with some long pieces of wood it hurriedly retreated in silence to the shelter shed, and appeared to look around for somewhere to hide. It finally perched in full view at a spot where it could put its head behind a small wooden projection and could not, therefore, see what was happening. It stayed motionless on that perch until I had finished the work; a perfect example of the behaviour attributed to the legendary Ostrich.

Social behaviour

When it first arrived the bird would solicit feeding, and appeared to respond sociably to anyone with slight wing-quivering and drooping, and high-pitched *wee* or *quee* calls. If a finger was pointed towards its head it would erect the head feathers in a bristling mass and lower or tilt its head to be preened and scratched. At this age the neck was almost bare and this bare, scrawny, pink neck and bristling buff-tipped head feathers gave it an odd look. These buff-tipped head feathers were prominent in such a posture, perhaps partly a signal indicating age; and I was interested to see, in this individual at least, that the ear-coverts were the last to lose the colour, so that adolescence was indicated by a black crown and buffish ear-coverts.

The set of the head feathers indicated social mood. Black head feathers relaxed or slightly fluffed indicated a friendly reaction; and bristled for preening indicated friendly submission. Sleeked down, they warned of an aggressive response. There was sometimes an interesting intermediate reaction, possibly in conflict, when the black feathers of the ear-coverts were raised and ruffled, but those of the crown were flattened down.

Throughout the whole period that I kept it, possibly because I was the food provider and possessor, I was always treated as a dominant individual. An extended finger always produced the allopreening response. As I preened and ruffled its feathers it would go into a rigid posture with plumage rather sleeked, making it appear thin. It squatted upright, the lower leg-joint level with the perch. All the black head feathers were

raised in a bristly mass, the neck extended and slightly arched, the head drooped forwards a little and the bill pointing downwards.

The eyes were wide open but the bird appeared to go into a kind of trance. I tested this by scratching and at the same time holding a mealworm in my other hand, and offering it just in front of the bird's head and moving it around. Normally the response to a mealworm would be an immediate snatch; but while being preened the bird appeared not to notice the offering until the session stopped; then as it relaxed it would suddenly notice and seize the mealworm. Allopreening on the head was preferred; it was tolerated on neck and mantle, but if wings, breast or other parts of the plumage were similarly treated the bird appeared to lose interest.

The fact that when preening the bird I could place an open hand over the back and slip a finger on either side of the neck made it a useful way to catch it up. I found that catching it, and occasionally boxing it up, aroused annoyance at the time but no evidence of long-term resentment or recollection.

As an adult its interactions were accompanied by soft, slightly plaintive whistling notes with a rising inflection, small piping *quee* or *quee-u* notes and occasionally mewing calls, rising to a *wee-ow* in excitement.

With my wife the bird's reactions were more ambivalent. When young it solicited feeding and preening, but as an adult it would respond to preening invitations with occasional reluctance, or switch to a slight peck halfway through. Increasingly it began to respond with a hunched aggression posture, more obviously when the wire of the aviary was between them.

The bird crouched with head lowered and the feathers sleeked, making it appear broad-headed. The body feathers were fluffed, those of the mantle being fluffed up in a hump behind the lowered head. The wings were drooped and partly spread, and the tail spread. In this posture it made short, jabbing pecks, sometimes accompanied by a short harsh note. To other visitors the bird responded only in this aggressive fashion. Since the species appears to live in social groups of pairs in the wild, I suspect that there may be some social hierarchy of dominance within the group.

Mercifully I only saw direct aggression once. A friend who had kept a less tame pair of these birds visited me and entered the aviary with me. My Magpie came to join us, flew on to my friend's shoulder, drew itself up with very sleeked plumage and then jabbed at an eye, succeeding in striking it but luckily missing the pupil. There appeared to be no inhibitions involved.

Displays

Derek Goodwin (1976) has described a lateral display from a bird in a zoo, similar to that which he recorded for the common Magpie. The Azure-winged Magpie partly spread the tail and tilted the body sideways towards him, displaying itself broadside but showing both wings and slightly lifting and fluttering the folded wings, using a soft high-pitched *wee-we-wee-u* call. He saw a similar display by the same individual to a female. I have not seen this posture, but this may be merely a lapse of observation or may reflect differences of interaction with the birds concerned.

My Magpie once or twice displayed to me on a perch in a lateral posture, in which it stood up tall with head raised and tail a little lifted, and the body feathers slightly puffed up so that the bird looked larger than usual. It hopped with slow deliberation to another perch, slightly ducking the head and then, sideways-on, it raised the head and turned it away from me, at the same time swinging the tail away laterally. The movement gave an impression of the body being slightly thrust towards me laterally. It was accompanied by whistling and mewing in an excited fashion. The movement was repeated, turning first to one side then the other, several times.

In moments of excitement during interaction with individual people whom it knew and who responded to the high-pitched squeaky calls that it used during feeding, it would occasionally show rising excitement. It increased the rate of calls, then, with wings slightly drooped and spread, tail half-spread, and neck arched, it lowered its head until the bill pointed down, the calls at the same time accelerating into a long shivering trill during which head and bill were lowered with a pronounced shuddering movement. A similar type of trill was uttered during copulation, which it performed at times in early summer when perched on a hand, and on one occasion in response to the sleeve of a dress that was glossy and of a similar blue to its wings and tail, and which seemed to provide a special stimulus.

On no occasion did I see it carry nest material or attempt any obvious building movements.

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TOOL-USING AND RELATED BEHAVIOUR IN BIRDS: YET MORE NOTES

By JEFFERY BOSWALL (Bristol)

Since the publication of my last paper (Boswall, 1983) further observations have come to light. This is the fourth paper in the series (Boswall, 1977, 1978, 1983).

Borderline cases in wild and captive birds

As regards species of birds dropping hard-shelled objects to break them open, a further record of Golden Eagles *Aquila chrysaetos* dropping tortoises, this time in Israel, is given by Leshem (1979). As long ago as 1905 Reiser (p. 367) reported that tortoises were dropped in Greece by Golden Eagles and were an important part of their diet (p. 369). Varshavsky (1968) confirms both these points for eagles in the Ust Urt desert of Turkmeniya in the USSR. Leshem (pers. comm., September 1982) has also observed an Egyptian Vulture *Neophron percnopterus* dropping a tortoise; this is a first record. So too is the same author's note (Leshem, in preparation) of an Osprey *Pandion haliaetus* dropping conch shells in Israel.

Two detailed studies of food-dropping behaviour are those of Beck (in press) on the Herring Gull *Larus argentatus* and of Zach (1979) on the Northwestern Crow *Corvus caurinus*.

Yet another case of baiting by a Green Heron *Butorides virescens* has been reported from the southern USA. This time the bird fished with Mayflies. Keenan (1981) writes: "At 1815 EDT on 16 August 1975 at Lake Murray near Chapin, South Carolina, I saw a Green Heron standing on a rock at the edge of the water about 120 feet from where I stood. Behind the heron and 2 yards back from the water, a swarm of mayflies was circling. While I watched through binoculars, the bird walked to the insects, caught one, and, holding it crosswise in its beak, returned to the water where it dropped the mayfly in the shallows. A small fish rose to the fly and was caught by the heron. Four of us watched as the bird repeated the process. After catching a third mayfly, the bird went to a different perch by the water and was hidden from our view by a large boulder. The heron flew away a few moments later." Mr. Keenan tells me in a letter that the bird was a young Green Heron.

Another individual of this species, watched in Africa, in Upper Volta on 10th May 1981, dropped a flower on the water surface in a way and in circumstances that left the observers unanimous in the view that the bird was attempting to lure fish with dummy bait (Walsh and others, in preparation). On 26th and 27th January 1983 in the Niger Republic a Green Heron was seen to lure and successfully capture a fish with an object (possibly a beetle) placed on the water (*op. cit.*).

In Western Australia a Black Kite *Milvus migrans* (Roberts, 1982) was seen to pick up a piece of bread from the bank of a river, drop it into the water and then fly to a perch from which it then dived - unsuccessfully - upon fish that had been attracted. The whole performance was twice repeated but still without success. The bird did catch a crayfish (a chera-bin) but one which rose to the surface well away from the floating bread. Although the use of the bait was not demonstrated, in that the bird was not seen to catch a baited fish, there can be little doubt about the purpose of the behaviour.

Douthwaite (pers. comm., August 1979), who has studied Pied Kingfishers *Ceryle rudis* in Africa, reacted to the record of the bird reported earlier that baited fish with bread (Boswall, 1983) as follows: "The behaviour of the Hunter's Lodge Pied Kingfisher is the functional development of behaviour which, until now, I had assumed was play. I have frequently seen kingfishers - usually juveniles - pick up twigs, leaves or dead fish from the surface of the water, toy with them in the air or at a perch and then drop them again. Sometimes they have immediately dived after the object and repeated the process, but on other occasions they gazed down intently for some time before losing interest. I sometimes felt the length and intensity of that gaze, at an object deliberately dropped, was somewhat overdone, but if fish were attracted to the object then it is understandable. However, I never saw a kingfisher dive in after dropping an inanimate object and come up with a live fish."

To the list of birds that use anvils upon which to break hard-shelled prey must be added pittas of the species *Pitta versicolor* the Buff-breasted Pitta (Hindewood, 1966), *P. erythrogaster* the Red-bellied (Blue-breasted) Pitta (McDonald, 1974), *P. guajana* the Banded Pitta (Chasen, 1939), and *P. moluccensis* the Lesser Blue-winged Pitta, and *P. sordida* the Green-breasted Pitta (Robinson, 1927). In Madagascar the now extinct Delande's Coua *Coua delandei* was known to smash snails on anvils. Its name in the local language, Malagasy, is "Famakiakova" which means "snail axer"! (Milne-Edwards, 1879). Richards (1977) implies that he saw snail bashing by the Redwing *Turdus iliacus* and confirmed to Walsh and Walsh (1983)

that he twice witnessed a Redwing, perhaps the same individual, using an anvil. Walsh and Walsh (as cited) produce circumstantial evidence for the use of anvils to break open snails by the Kurrichane Thrush *T. pelios* in Upper Volta.

True tool-users in captivity

Reid's paper on the tool-using Rook *Corvus frugilegus* has now been published (Reid, 1982).

When I visited the Lincoln Park Zoo in Chicago in 1982 I was told by Kevin J. Bell that their Moluccan Cockatoo *Cacatua moluccensis* often used little twigs and other pieces of material to scratch itself. The bird also grabs one of its primary feathers with a foot, bends it (tool-making?) and uses the end to scratch under its bill and around the lower part of the head. The barbs were missing from the end of the feather.

Bruce Hoad (pers. comm., 1983) owns a Lesser Sulphur-crested Cockatoo *Cacatua sulphurea* of the race known as the Citron-crested, which scratches itself with a spoon. Ten years earlier he owned a Blue and Gold Macaw *Ara ararauna* that scratched itself with a chop bone.



Kevin J. Bell

A Moluccan Cockatoo at the Lincoln Park Zoo, Chicago
using a piece of bent wire to scratch itself



Kevin J. Bell

Two views of a Moluccan Cockatoo at the Lincoln Park Zoo, Chicago holding one of its primaries in its foot and scratching its head with it

A parrot of the genus *Amazona*, owned by Gloria Cashin (pers. comm., 1980) regularly and often scratched itself with a spoon over a number of years. It was an individually caged bird.

An African Grey Parrot known to Pamela Halford (pers. comm., 1981) was naked due to an infection of the feathers and wore a specially knitted bodice. The bird would use an object, for example part of a comb, to scratch itself, apparently alleviating an irritation of the skin under the "jersey".

Janzen and others (1976) report an African Grey Parrot *Psittacus erithacus* that used splinters prised by the bird from the pine posts of its cage to scratch the skin on the posterior part of its head.

An African Grey Parrot *Psittacus erithacus* owned by Mrs. Rosemary Low (pers. comm. 1983) regularly scratches itself with almost any object put in its cage.

Another case of the transportation of water in a hollow object is reported by Beck (1980). "A Common Crow *Corvus brachyrhynchos* which was kept at the Allee Laboratory of Animal Behaviour at the University of Chicago was regularly supplied with various toys and trinkets for novelty. Among these was a small plastic cup. Part of the crow's diet consisted of dried mash. The laboratory assistants sometimes forgot to wet the mash slightly to make it more palatable. The crow compensated for this oversight by dipping the plastic cup in a watering trough, carrying the filled cup up to 5 metres to the food pan, and emptying the water on to the mash. This behaviour was repeated until the mash was saturated and the crow began to eat. If the water was spilled accidentally, the crow would return to the trough for a refill rather than proceed to the food pan with an empty cup".

A captive female Eclectus Parrot *Eclectus roratus* at the Brookfield Zoo, near Chicago, was seen to use a segment of palm frond to excavate a burrow in the sand and gravel substratum of her cage. No nest-box was available and the parrot subsequently laid eggs in the burrow (Dennis DeCourcey, quoted by Beck, 1980).

Derek Wood (pers. comm., 1979), a keeper of birds at the London Zoo, had in his charge a Wedge-tailed Eagle *Aquila audax* that regularly dropped bones and other objects apparently "on" him and other keepers in her cage. In her detailed discussion of avian play, Ficken (1977) makes it clear that birds of prey very commonly play with sticks. The attribution of tool-use to such behaviour therefore requires care, though, of course, if tool-use it be, it could have evolved from play.

True tool-users in the wild

A case of apparent tool-use by a Mountain Chickadee *Parus gambeli* is reported by Gaddis (1981). The bird was seen in Arizona and the incident described as follows: "The chickadee was foraging about seven metres up on a dead, barkless tree. It began very excitedly probing with its bill a vertical crack about one cm wide and about one half metre long. It pecked at the side of the crack and pulled off a splinter about five cm long, having a grip on the splinter about two cm from one end. It then pushed the long end of the splinter back into the crack and probed several times. It moved down the crack again and probed with the splinter once more before flying to an adjacent tree, still carrying the splinter in its bill. It held the short end of the splinter with its foot and pulled it through its bill until it had the other end in its bill. It then made several chewing movements on the splinter before discarding it and flying off. I had seen nothing impaled on the end of the splinter before the chickadee pulled it into its bill.

"Mountain Chickadees frequently excavate in decayed wood, usually flipping removed chips over their shoulder. In over 100 hours' observation of this species, this was the first time it was seen to use one of the removed pieces as a tool." It would be difficult to interpret this observation as anything other than tool-use, though the bird was not seen to succeed in any sense with the implement (Boswall, 1981).

A remarkable case of tool-use by a Grey Flycatcher *Bradornis micro-rhynchus* was described to me over the telephone in 1982 by Sam McNaughton. The following summarises his observations: "In 1975 during my residence in the Serengeti National Park I twice observed a piece of bird behaviour that despite the lapse of time and the fact that I took no notes I have been strongly advised to place on record. The event was so memorable that I believe I remember the details well.

"There had been an emergence of winged termites, and the front porch of my house was littered with these animals which had by now lost their wings. A bird that I am quite certain was a Grey Flycatcher cleaned up all those that were available for the picking up. But there were others in little holes in the concrete that were apparently not accessible to the bird's bill. On each of the two days concerned one bird (possibly the same individual) flew to the adjacent lawn, picked up about five different grass stems in its bill in turn, and then having rejected all but one flew back to the porch with that one. The bird then poked the end of the stem into a "pit" - a spike hole - (maybe 2-3 cm deep and a few mm across) containing a termite; the termite grabbed the stem and was pulled out. The stem was then put down and the termite eaten. This process was gone through eight or ten times on each day."

Tool-use by Green Jays *Cyanocorax yncas* has been observed by Gayou (1982) in Texas. He writes: "While studying this species at the Santa Ana National Wildlife Refuge near Alamo, Texas, I saw use of "tools" by a family of adult and juvenile Green Jays on 6th June 1981. I first observed an adult Green Jay (sex unknown) on the ground pick up a small twig in its beak and fly to a branch of a dead tree approximately 4m above the ground. The bird inserted the twig under a piece of bark and moved it back and forth for approximately 5 secs. The jay then withdrew the twig, placed it under its feet, and proceeded to consume an insect that was attached to the twig. The bird then reinserted the twig under the bark and repeated the sequence of events four consecutive times, lasting about 2 mins. The jay dropped the twig and flew a short distance to another tree. A few minutes later, the same adult flew back to the branch with another short twig in its beak and again inserted it under the bark. This time, however, the bird prised off a piece of bark, dropped the twig, and consumed the exposed insects. Whether the jay intentionally used the twig as a lever in this instance is unknown, since this behaviour was not observed again.

"A juvenile Green Jay attempted to use twigs to capture insects in a similar manner. One of the apparent offspring (which had been seen begging for food earlier) of the previously mentioned adult jay picked up a twig and flew to the same branch on which the adult had been feeding. The juvenile inserted the twig several times under pieces of bark and removed it each time but did not capture any prey item. The total time spent attempting to feed in this manner was about 45 secs. The bird then dropped the twig, flew to the ground, picked up another twig, flew back to the same branch and tried again. After three unsuccessful attempts lasting about 2 mins. the bird dropped the twig and flew to another tree. Due to the inaccessibility of the branch on which the jays were feeding, the types of insects being consumed were unknown."

Brook (1979) quotes two 19th century cases of crows dropping stones from a height on to eggs of the Ostrich *Struthio camelus*. The first is taken from De Mosenthal and Harting (1877) who in turn quote a paper by Atherstone (1874) in *Proc. Acclim. Soc. Victoria*. "Of sixty eggs, nineteen were destroyed by black crows, which were seen from the house to hover over the nest and let stones fall on the eggs (on running up on one occasion to the nest, about 600 yards off, he (my brother, John) found three stones in the nest, the eggs cracked and the yolk strewn about". Brooke presumes that the "black crow" concerned is the Cape Raven (or Black Crow) *Corvus capensis*. Atherstone did not say whether the stones were

carried in the bill or the feet. It is noteworthy that corvids are among the comparatively few kinds of birds known to drop hard-shelled objects to break them open, and that the Cape Raven in particular is known to drop small tortoises in South Africa.

The second 19th century account is by Martin (1890) who wrote of the Ostrich: "Having thus set her nest in order, she walks off, to fortify herself with a good meal for the duties of the day. And now comes the white-necked crow's chance;An ostrich-egg is to him the daintiest of all delicacies; but nature not having bestowed on him a bill strong enough to break its hard shell, he is only able, by means of an ingenious device, to regale on the interior. He carefully watches till the parent's back is turned, and she is a good distance from the nest; then, flying up into the air, he drops a stone from a great height with a most accurate aim, and breaks an egg. He makes good use of his quarter of an hour; and he, no less than the hen ostrich, has had an ample meal by the time the latter returns to the nest". The "white-necked crow" is probably the Pied Crow *Corvus alba* suggests Brooke.

Beck (1980) quotes Sclater in Schaller (1974) as giving an additional instance of stone-dropping from the air by an Egyptian Vulture; in fact, it is clear that Sclater was referring to the Andersson account that he, Beck, quotes earlier in the same paragraph and to which I have referred (Boswall, 1977). Schaller (1974) says that "James Stevenson-Hamilton related in 1912 a similar incident from the Athi Plains in Kenya". Despite quite a hard search I cannot trace this reference. Can anyone help?

Further records of Egyptian Vultures throwing stones at Ostrich eggs are reported from the Khaibar north of Eilat in Israel. Further, on 26th May (no year given) at 6.30 a.m. a vulture of this species was seen to bring a stone to a garbage dump at Sede-Boger in the Negev and drop it on to a tennis ball, presumably mistaking the tennis ball for an egg. Later other vultures standing by picked up the ball itself and dropped it on the ground - no doubt again mistaking the ball for an egg (Anon, 1980a). The throwing of rocks at eggs by Egyptian Vultures is believed to have evolved from the throwing of eggs, to smash them (Alcock, 1970).

Stone-throwing by a captive immature Egyptian Vulture is part of a public entertainment at Kintzheim in Alsace. The bird appears in an arena surrounded by scores of spectators, picks up stones, throws them at an

alabaster "Ostrich" egg until it breaks and then claims the reward from inside - a lump of steak! (Martin Saunders, 16mm film for BBC Natural History Unit).

Dow (1980) gives a remarkable account of the use of primitive weaponry by wild Brush Turkeys *Alectura lathami* in Queensland, and quotes an earlier comparable case concerning a captive individual of the same species. He wrote: "Brush-turkeys visit the house regularly to feed on kitchen scraps. I have seen as many as eleven birds there at one time. Six Brush-turkeys individually marked with coloured plastic leg bands are regular visitors. The first was banded on 6th February 1974. The open vegetation and tameness of the birds makes observation easy.

"Another common resident is the Lace Monitor *Varanus varius*, which also partakes of the food supplied. I first saw a feeding Brush-turkey approached by one of these Goannas on 12 December 1976. The Brush-turkey was a large banded male; the Goanna about 1.5 metres long. As the Goanna rapidly approached the feeding site, the Brush-turkey turned his back on the Goanna and suddenly set up a barrage of sand, stones and litter with alternate powerful strokes of the legs. This halted the Goanna's advance. The Brush-turkey then turned its right flank to the Goanna and, while watching it with more direct gaze, proceeded with a series of sideways kicks, like a logrunner, to fire quite accurately another jet of debris into the face of the Goanna. The incident lasted six minutes, during which time the Brush-turkey held the Goanna at bay. Most of the kicking was done from the left or right flank, with about seven rapid kicks between changing sides. Then the Goanna retreated, the Brush-turkey followed, resuming to kick sand in the face of the Goanna when it turned towards the food.

"I thought this an interesting but isolated event until 17 March 1977, when I saw the performance repeated by an unbanded male to a different Goanna. To date, I have noted this defensive behaviour directed against Goannas by five Brush-turkeys, both males and females, on fourteen occasions. Thus it may well be a significant form of defence used by the species.

"The barrage of litter and debris and its effectiveness are not to be underestimated. Goannas recoiled under such attack and quickly retreated. The Goanna's behaviour was of interest too in these circumstances. Normally the tail is held straight, close to or dragged on the ground, as it is when chased by a human. As soon as a Goanna turned away from a Brush-turkey, the tail was held in a tight curl as the beast made an ungraceful exit. Once I saw a Brush-turkey peck the tip of the tail of a less careful

Goanna"

"It is interesting not only that Brush-turkeys have learned to use this defensive behaviour against Goannas but that Goannas have learned to withdraw their vulnerable appendage, which suggests that such interactions are far from rare. The Brush-turkey's use of simple but effective weaponry is startling when first encountered but on reflection not unpredictable because precisely the same motor patterns are used by these birds in building their nest mounds. Certainly over much of the Brush-turkey's range outside rainforest, goannas of this or other species would be encountered and could well be major predators of eggs or chicks dug from the mound. Thus the use of such a simple weapon could be a significant adaptation against a specialised ground predator.

"I have been unable to find any published account of this anti-predator behaviour in wild Brush-turkeys. Fleay (1937) described a captive male that '.....deliberately showered me with dirt and leaves and persisted in doing so, no matter which side of the mound I endeavoured to approach.' "

What must surely be regarded as an even more remarkable use of a weapon by a bird was recently reported (Anon, 1980b). In May 1980 in the Mivtahim region of the western Negev an adult Egyptian Vulture was seen to swoop down upon and grab in its beak a young Monitor Lizard *Varanus griscus*. The bird flew up to a height of about 100 metres and dropped the lizard which " was hurt but still alive. The vulture came down, looked at its prey for a moment, flew off a few metres, and returned with a stone in its beak with which it proceeded to beat the Monitor on the head till it was dead". That a bird should drop a vertebrate animal with the apparent intention of subduing if not killing it may be without precedent in itself (though there is hearsay evidence of the Kookaburra *Dacelo novaeguineae* doing the same thing with snakes). The use of an external object as a cudgel is a rare form of tool-use in wild birds.

Montevecchi (1978), writing under the heading "Corvids using objects to displace gulls from nests", cites two happenings as examples of tool-use. In the first case a Fish Crow *Corvus ossifragus* dropped a stalk of dried marsh grass *Spartina* toward a nesting gull. The object fell about 1 metre from the gull which remained on the nest. On the basis of the account given no "use" occurred, and the "intention" of the crow is hardly beyond doubt. In the second case a Raven *Corvus corax* perched about 1 metre above a Kittiwake's *Rissa tridactyla* nest, pulled a tuft of grass from the cliff face and dropped it. It fell on the gull which took flight and the Raven rummaged through the nest which was empty. Ravens at this location frequently supplant nesting Kittiwakes by suddenly approaching

them closely while calling loudly, or sometimes by physical attack. In this case an object released by one bird hit another which then departed. On the basis of the one instance it is again difficult to be sure that the behaviour was not displacement activity and the effect gratuitous.

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A LORY COLLECTION

By F.C. BARNICOAT (Johannesburg, South Africa)

It is unusual in this country to find a bird keeper keen to specialise in a single group of birds, but such is Luch Luzzato. He has chosen the Loriidae, and the resolution not to yield to the temptation of bringing any other type of bird into his collection is paying a rich dividend in terms of success and depth of experience with his speciality. He started keeping lorikeets 11 years ago with a pair of the Ornate, which he considered the most beautiful bird he had seen. With this pair he mastered the art of keeping and breeding this type of bird with such success that this pair eventually reared 21 young through the years and, when these birds died within a few days of each other, it was estimated that they

were 18 years old by including the time they had been in the possession of their former owner. Both these birds were submitted to a taxidermist who arranged them on a branch in a pretty set piece, which has a place of honour in the dining room and forms an appropriate introduction to the fine collection of lories maintained in three extensive ranges of aviaries outside in the lovely terraced garden in the hilly eastern suburb of Johannesburg, called Observatory.

Luch Luzzato has found that lories do not require very large aviaries to breed successfully. His aviaries are a standard width of 1 m. and height of 2 m. and vary in length from 2.5 to 6 m., the average length being 3 m. The best breeding results are sometimes obtained in the shortest aviaries, and his first breeding success with the Ornates was in a cage .5m wide, 1.4 m. long and 1.3 m. high on a flat balcony.

Secondly, as most lories are associated with tropical climates, they are surprisingly insensitive to cold. All shelters are fully open in the front and this hilly part of Johannesburg gets very cold on winter nights, being exposed to the icy south winds, and water bowls are frequently frozen solid by morning. The fact that ninety percent of lories roost in a nest-box may help to keep them free from trouble in spells of cold weather.

The feeding programme is methodical. On four days of the week the proprietary breakfast cereal "Pro Nutro" and honey are blended together in the approximate proportion of 12:1 and boiling water is added to bring the mixture to the consistency of fairly thick porridge. On the other three days of the week, Luch's wife prepares a mielie-meal (ground maize) porridge, taking care not to get it lumpy as lories like it very smooth and sweetened with honey or sugar. Each aviary is also supplied daily with a small dish of honey-water (1 teaspoon honey to 4 tablespoons water, i.e. approximately 1:16) and a bowl of pure water in case the lories feel like drinking or bathing, which some species do. The lories are also given fruit in season, the sweet varieties of apple being the staple and most other fruits except banana being accepted. Fruit is not necessarily fed every day, but in general each pair consumes one large apple per week or the equivalent in other fruit. Each pair also has a dish of sunflower seeds available at all times, and some of them seem to enjoy this.

Luch stresses that the commonest mistake made in the feeding of lories is to use too strong a concentration of honey, which he did originally with his Ornate Lorikeets. These were kept on a food mixed at the rate of 1 tablespoon honey to 3 tablespoons "Pro Nutro", i.e. 1:3 and although the birds lived on this diet, their first two broods failed, the chicks dying a few days after hatching. Then the amount of honey was reduced to 1 tea-

spoon to 3 tablespoons of "Pro Nutro", i.e. 1:12, and from then on the young were reared without trouble. The feeding is kept as simple as possible and vitamin additives are used at infrequent intervals. Cytaccon (vitamin B) and Abidec (multivitamin) are the ones used, and wheat germ oil is occasionally added to the "Pro Nutro" mixture. The addition of Brewer's yeast powder, especially in the cold season, is considered beneficial, and has been notably successful in restoring birds showing arthritic symptoms to full health. Tapeworm and roundworm infestation has been experienced in odd specimens of various species and the problem has always been discovered through the observation that the affected bird was eating far more than usual. The normal deworming procedures have been applied to the lories with complete success.

The inspection of nest boxes is not shunned; on the contrary, it is considered desirable on an almost daily basis when there are youngsters. Not only can a dead chick be removed in time to save the life of a nest-mate, but the progress of all chicks can be monitored, and if the growth rate of any one starts to deteriorate, it is removed for hand-rearing. They are easily fed on much the same food as is used for the adults, but this must be done almost two-hourly throughout the day and early part of the night. Many a chick has been saved in this manner.

Another type of inspection that has paid dividends is the nightly one of each of the aviaries, carried out with a torch at 9.00 p.m. Each compartment is checked to see if both birds are roosting safely in their nest-box or at least on a perch under cover. If there has been some disturbance such as that caused by mice, the birds may be found clinging to the wire and be resettled on a perch in an adequately sheltered position or even taken into the house for the night, and the source of the disturbance can be looked into. The lories have become quite used to this inspection, much is learned about their habits and individual personalities, and their welfare is safeguarded.

Here follow brief notes on the species in the collection:

Black Lory. One pair from which it is hoped to breed in time.

Yellow-streaked Lory. One pair has got as far as laying eggs, but young have not yet been hatched. Another pair has recently been acquired as a determined effort is being made to breed this species. A sexual difference that has been noted is that the yellow ring in the eye appears to be much brighter in a male than in a female.

Red (or Moluccan) Lory. Two pairs which breed almost all the year round. In 1981 four young were reared per pair and the success was repeated in 1982.

Black-winged Lory. There is one pair of this most beautiful species. In 1981 their eggs were infertile. In 1982 they looked to be an extremely promising breeding proposition, the cock frequently displaying to the hen and feeding her, but no eggs were laid.

Blue-streaked Lory. Two pairs, both of which have bred. An incubation period of 26 days was recorded and the chicks spent 75 days in the nest. When nesting, this species throws most of the sawdust and earth out of the nest-box it chooses. Both pairs were successful parents again in 1982.

Dusky Lory. A pair of the yellow-bellied form breeds every year. Some of their offspring are orange-bellied. Another pair are of the orange-bellied form and produced four chicks in 1980 and two chicks in 1981 and again in 1982. The third pair is also orange-bellied and consists of an old widowed hen, a good breeder, now mated to a young cock bred the previous year. Their eggs this year were infertile, indicating that the male was too immature for breeding. So far, orange-bellied pairs have thrown only orange-bellied youngsters. They are easily sexed, the mature male having a small strip of orange skin above the eye.

Ornate Lorikeet. One breeding pair and a young hen are currently in the collection. This very beautiful species is a particularly successful breeder, giving two or three rounds per year. They take three years to mature for breeding.

Edward's Lory. Two pairs. These have been bred without trouble since 1975 and a pair had two newly-hatched chicks at the time of my visit. Plucking is quite a problem with this species.

Swainson's (or Rainbow) Lory. Two breeding pairs and three fine hens for which mates cannot be obtained. One pair, which was again down on eggs, had six young to its credit for the previous year. In two and a half years ten chicks had been produced and surgical sexing had shown them to be nine hens and one cock.

Scaly-breasted Lorikeet. One pair, which breeds more or less continuously, producing two or three rounds per year with one or two chicks at a time.

Perfect Lorikeet. An excellent breeding pair has bred from 1976 to date. They lay up to four eggs in a clutch.

Goldie's Lorikeet. A South African-bred pair had been bought but both birds had died within a fortnight. The intention is to replace these later in 1983.

Chattering Lory. Three breeding pairs. This species usually breeds only once per year about October, rearing two young. Sometimes, if the weather is particularly favourable in the early spring, they start breeding earlier

than usual and then they may produce a second round. As usual they bred well in 1982.

Black-capped Lory. Two pairs. These are also good breeders. The amount of purple on the belly and neck tends to vary slightly with the individual, perhaps indicating that more than one subspecies has been incorporated in this stock. When the young leave the nest, they are almost entirely purple in the front and the red area increases in size gradually until they reach maturity after three years.

Purple-naped Lory. One pair was purchased late in 1982. They have not yet bred.

Stella's Lorikeet. At the time of going to press a pair of this beautiful and easily sexed species had just been imported from Germany.

* * *

NEWS AND VIEWS

A survey carried out by Simon Stuart of Cambridge University on behalf of the World Wildlife Fund in the forests of Usumbara, Uluguru and Uzungwa in Tanzania, has uncovered a new bird species and the rediscovery of another after a 20-year lapse since the last sighting in East Africa. The discovery of the new Sunbird, popularly known as the Rufous-winged, is of considerable interest and it is said to be quite distinct from any species previously described. Uzungwa Forest is the home of the rediscovered White-winged Apalis.

* * *

The first nesting of Sea Eagles in Britain for 67 years occurred on the Rhum National Nature REserve this year. Although the eggs failed to hatch, it constitutes the first attempts by any of the 62 young eagles released on the reserve since 1975.

* * *

How fast can birds fly? A recent snippet from *The Times* states that two eagles (species unknown) chased a Soviet passenger aircraft over the Caucasus Mountains, and furthermore attacked it when it landed, leaving dents and scratches on the wing.

Four California Condor chicks have been hatched at San Diego Wild Animal Park this year, all from eggs taken from the wild. Two were from a pair that has previously failed to incubate their eggs; one was the result of a successful case of "double clutching", and one from a pair that was still feeding a chick. (*Audubon*, Vol. 24, No. 12). Numbers of this critically endangered species are believed to be below 20 in the wild.

D.C.

* * *

THE WHITE-BREASTED GUINEAFOWL

Agelastes meleagrides

A REQUEST FOR INFORMATION

We are investigating the current status of this very rare species, formerly recorded in West Africa, from Sierra Leone to Ghana, and would like to ask for any information that your members may have concerning it. In particular, we would be most interested to know of any specimens that may exist, or may recently have existed, in captivity, either in private or public collections. In view of this bird's probable impending extinction in the wild, any information about captive populations, particularly if they are breeding, is of great importance and I would be most grateful to hear from anyone with such knowledge, at the address given below.

If we cannot trace any viable populations in captivity, then we are considering proposing an expedition to capture some birds in order to start such a population since we believe that the future of the species would be more secure with a well managed captive stock.

International Council for Bird Preservation
219c Huntingdon Road,
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S.N. Stuart

INTERNATIONAL ZOO YEARBOOK. VOLUME 22

Published by the Zoological Society of London. Ed. P.J. Olney

488 pp. Black & white illustrations and line drawings

Price: £23.75 hardback; £18.50 paperback

This annual publication produced by the Zoological Society of London is the most important outlet for the dissemination of knowledge and ideas within the zoological world, as well as being readily accessible to "outsiders". The present volume lives up to the standards set previously and contains a wealth of interesting papers covering many aspects of zoo management, although sadly the interest is limited from an avicultural viewpoint.

The layout follows previous volumes in being divided into three sections. Section I contains a series of twenty specialised papers on New World primates, mainly of captive origin but also touches on status and conservation in the wild (Birds of Prey will feature in the specialised section for Volume 23).

Section II covers developments in the zoo world and is subdivided further to encompass breeding, husbandry, hand-rearing and new buildings. It is here that the only three papers on birds appear. These cover breeding the Scarlet Cock-of-the-Rock and Renault's Ground Cuckoo at Houston Zoo and Metro Toronto Zoo respectively, and data on artificial incubation of Cassowary eggs. Articles on birds, except when a group is covered by the specialist first section, always come a poor third behind mammals and reptiles; it seems that zoo curators are just as reluctant as are private aviculturists to write up their notes - what a terrible waste of information.

The third part is devoted to the reference section and contains a wealth of items. A list of zoos and aquaria of the world is given with all relevant information on personnel, plus a numerical summary of animals in the collections during 1980. Details are also given of studbooks and world registers of wild animals in captivity and a census of all rare animals held in public collections in 1981 is included. Lists of birds, mammals, fish, amphibians and reptiles bred during 1980 brings up the tail of this excellent publication.

Despite the limited appeal it has for the majority of aviculturists, it is well worth borrowing from a library, if obtainable, especially for the reference section.

D.C.

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WATER BIRDS AND PARK BIRDS

JOINT EDITORS: MARY HARVEY AND DAVID COLES

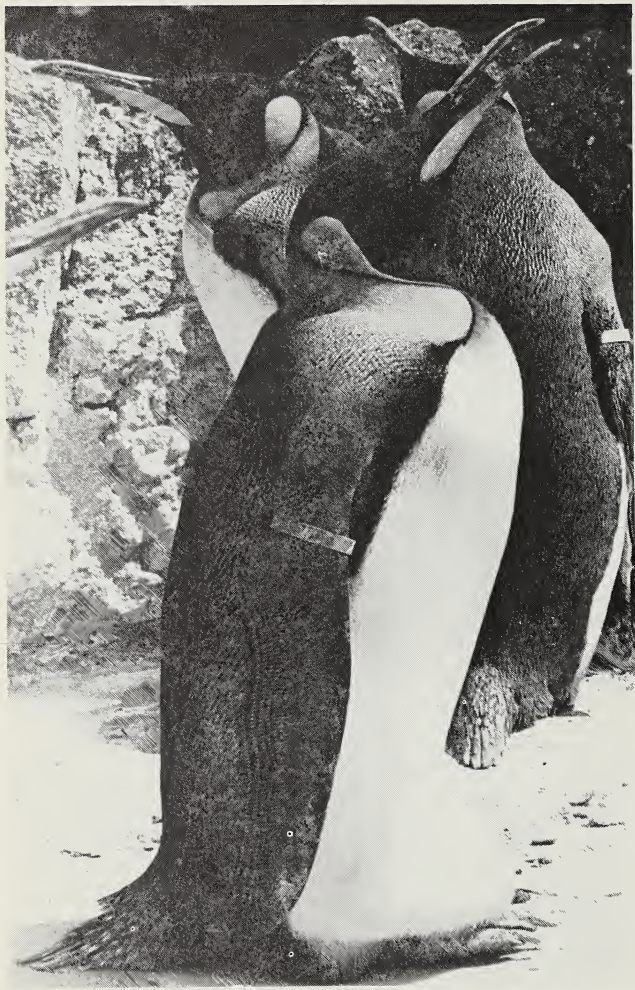
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Mary Harvey, Windsor Forest Stud, Mill Ride, Ascot, Berkshire, SL5 8LT, England.



Royal Zoological Society of Scotland
Fig. 1. King Penguin incubating egg

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OCTOBER-DECEMBER 1984

WATER BIRDS AND PARK BIRDS ISSUE

PENGUINS IN CAPTIVITY

By MIRANDA F. STEVENSON (Curator of Animals)

Royal Zoological Society of Scotland, Edinburgh

Penguins (family Spheniscidae) are a group of flightless seabirds which occur only in the southern hemisphere. They have a wide distribution, breeding on many of the sub-Antarctic islands ranging from the Galapagos to the Antarctic mainland. They spend most of their lives at sea, coming to land mainly to breed and moult. Six genera are recognised, which can be divided into 18 species (Stonehouse, 1975).

Penguins have always been popular exhibits in zoos, and although most collections include a small group, relatively few establishments breed them successfully. According to the records published each year in the International Zoo Yearbook, only nine species have been bred between 1975 and 1980 - these are listed in Table 1. Sea World, San Diego, hatched and reared the first Emperor Penguin chick in 1980. The number of institutions breeding each species is also listed in the Table but these must represent a small proportion of the total that are keeping captive penguins. Table 1 shows that the only species that are really successfully bred are the Blackfoot and Humboldt's; these are undoubtedly the most commonly kept.

Edinburgh Zoo has been connected with penguins since the inception of the Zoo and was one of the first institutions to take the captive breeding of penguins seriously. The first penguins, four Kings, arrived in 1914, and the first King chick to be hatched in captivity was reared in 1919 (Gillispie, 1932). Apart from one year after World War II, there have been King Penguins at the Zoo ever since, and a total of 126 chicks have been successfully reared.

Edinburgh Zoo's association with penguins came about through the generosity of the Salvesen Whaling Company, who brought back birds from the regions of the Falkland Islands and South Georgia to the Zoo. Birds were obtained from this source from 1914 until the last import in 1963. Over this period a total of 856 birds from six species were imported

(Table 2). The table shows that although four of the six species bred, only two, the King and Gentoo, were really successful: these two species were also imported in the largest numbers, and were collected on South Georgia. Over the years, three other species that were obtained from other sources have been kept at the Zoo (Table 2). However, the only species that have had viable breeding results, in that the captive populations have increased through breeding alone, are the King and the Gentoo Penguins.

Since 1971 the Zoo has kept three species of penguin: King, Gentoo and Rockhopper. All birds in the King and Gentoo colonies were either imported from the wild up until 1963 or captive-bred in the Zoo: the majority of the birds are now captive-bred stock. The Rockhopper Penguins were acquired between 1971-73. These three species present different maintenance and breeding problems, and will be dealt with separately.

King Penguin

This species is difficult to breed in captivity and a recent survey, based on the information published annually in the International Zoo Yearbook and the results of questionnaires sent to zoos, showed that of the 23 institutions that keep King Penguins, only nine had reared chicks, and a further three had hatched chicks but not reared them. A more detailed analysis of 16 colonies showed that although the chick survival rate was good (average 71%), hatchability was poor (average 25%), indicating either a high level of infertility or early embryo death (Stevenson, 1983).

The birds in the King Penguin colony at Edinburgh Zoo were flipper-banded in 1979, thus four years' data on pair behaviour at breeding is available. The birds were sexed by cloacal examination in 1982 (Samour, *et al*, 1983), and during the four-year period the number of adult birds averaged 30.

Kings are the only species of penguin to moult prior to breeding, and at Edinburgh Zoo moulting takes place from mid-March to April. The birds then move to the area in the large penguin enclosure which they use for breeding: the King Penguins are kept in the same enclosure as the Gentoos but move to the same spot for breeding each year. Most of the eggs are laid from mid-May to late July. King Penguin females only lay one egg, which is incubated on the feet, with the brood patch forming a pouch that covers the egg (Fig. 1). Chicks hatch after an incubation period of 51-56 days, in July and August, and are fed on regurgitated fish by the parent birds. Chicks have few feathers on hatching and are brooded under the pouch, on the adult bird's feet.

In the wild, King Penguins rear their chicks for almost 12 months and, therefore, can rear only two chicks every three years (Stonehouse, 1960). In captivity this pattern can be changed. Some zoos remove chicks at a few



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Fig. 2. King Penguin chicks at five months old

months old, others leave them with the parent birds (Stevenson, 1983). The current policy at Edinburgh Zoo is to remove chicks at about two months old and hand-feed until about eight months (Fig. 2) when they are re-introduced to the adults. This policy results in the maximum survival rate of chicks and puts less strain on the adult birds. It should also mean, in theory, that the adult birds can breed once a year. Table 3 gives details of the breeding performances of 13 females that were of breeding age and in the colony for each of the four years from 1980-83. Only one female laid and hatched every year, and only four females (31%) laid each year, 54% laid for three of the years. There was no indication that birds that hatched a chick one year did not lay the next. Five females had the same partner for two of the four years, but none had the same partner for more than that. Of the four females that laid each year, two had the same mate for two years and the other two, including the most successful breeder, had a different mate each year. These data suggest, therefore, that captive King Penguins do not show a strong degree of monogamous bonding,

which may also be the case in the wild (Stonehouse, 1960).

Not only do the birds not show strong monogamous bonding, but many birds form triangular relationships, which may result in an egg being passed between as many as six different birds. In 1983 the pair that produced one egg kept it for 46 days, then it passed to another pair, which had the egg when the chick hatched. The chick has been cared for by these two birds and another four since hatching. There was a similar occurrence in 1982 when a chick that hatched with its parents, was subsequently cared for by at least two other birds: all caretakers feed the chick. Gillispie (1932) reports similar happenings with the first chicks to be hatched at the Zoo. These phenomena may be partly due to the fact that although between 10 and 12 eggs are laid each year, only 2-4 chicks actually hatch; thus many birds showing brooding behaviour do not have chicks of their own.

King Penguin chicks at Edinburgh Zoo moult into the juvenile plumage at about eight months old, which is slightly earlier than in the wild (Stonehouse, 1960). They do not obtain their adult plumage until the second moult, at almost two years old. Although it is unusual, two-year old birds have produced fertile eggs at the Zoo: in the wild King Penguins do not breed until five years old (Stonehouse, 1960).

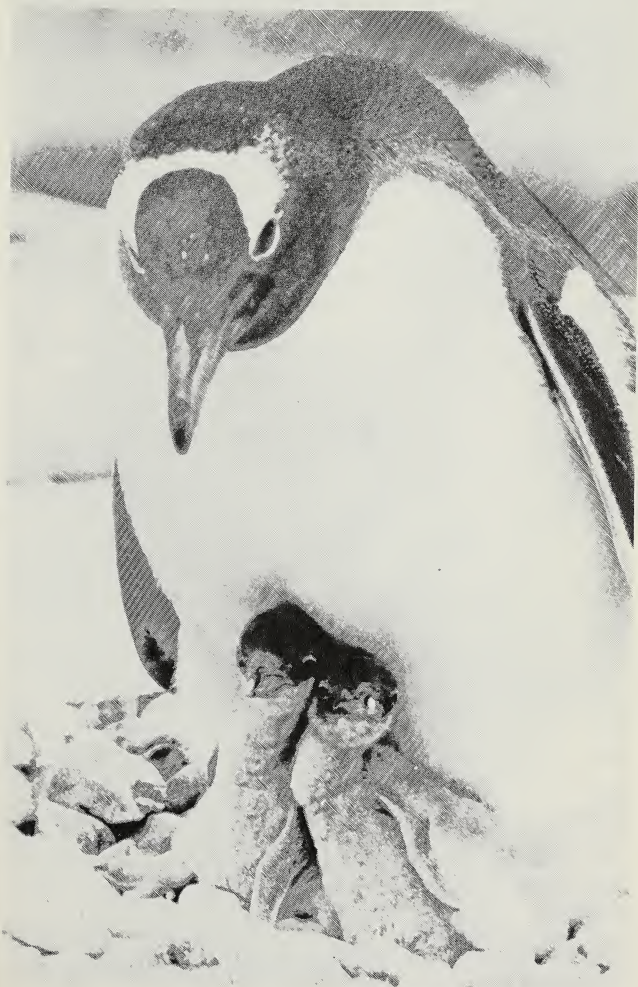
Gentoo Penguin

The colony of Gentoo Penguins started in 1947, with the importation of 11 birds: all the previous birds had died off during the war. The first chick had hatched in 1937. The management of Gentoo Penguins at the Zoo has been described by Wheeler (1976).

The Gentoo Penguins are fed whole, ungutted Whiting, as are the Kings. Although no supplements had been given to either species until 1983, the Zoo is now experimenting with some supplementation, and reconsidering its policy. The birds are fed twice a day, with an extra morning feed being given to birds rearing chicks.

The colony size of adult birds varies between 80 and 90 birds, although between 1979 and 1983 the actual number of successful breeding pairs varied from 19-21 (Table 4). Some birds do not breed and some form female-female pairs as there is an excess of female birds; at the beginning of 1983 there were 33 males, 48 females and eight unsexed birds.

Nest rings are put out in mid-March each year and the first eggs are laid at the end of March/beginning of April. Both members of pairs sit on eggs; the incubation period from 133 eggs had a mean average of 35.28 days with a range of 32-39 days. Females lay two eggs, and data over a five-year period ($n=152$) give a laying interval of 3.3 ± 0.8 days: both this and the incubation period agree well with the figures given by Gwynn



Royal Zoological Society of Scotland

Fig. 3. Gentoo Penguin chicks at six days old

(1953). When two chicks hatch, they hatch within 24 hours of each other, thus the first egg must not be incubated for the first two or three days after laying.

Like the Kings, the Gentoos are also flipper-banded and there are now data on pairing and breeding success for five years, from 1979-1983. In that period, 36 heterosexually paired birds had the same partner each year. Of these 18 pairs, only seven had the same nest site each year, although the nest layout was the same each year. Most changes in partners could be attributed to the death of a bird, but six birds habitually changed mates over the five-year period. The most successful breeders had the same partner each year but there was no indication that the more successful breeders stayed in the same nest sites each year. Birds do pair again after a mate dies, and some female birds that had paired with another female for several years, paired with a male and bred after the death of a female mate.

Both parents incubate eggs, brood and feed chicks. Pairs defend the territory of their nest area from adjacent pairs and birds walking past. The chicks are fed regurgitated fish: chicks beg for food by vocalising and tapping the bill of the parent. The parent responds by feeding the chick (Fig. 4). About 50% of successful pairs hatch two chicks (Fig. 3). The chicks are brooded by the adult birds until they are over one week old, when a secondary darker grey down forms. Newly hatched chicks weigh about 80 grams, increasing to 300 g. by the end of the first week and 800 g. by the end of the second. By six weeks old, when they are moulting into adult plumage, the chicks weigh about 6 kg. From four weeks old, chicks chase parents around the enclosure, demanding feeding (Fig. 5). In the captive environment the parent bird cannot escape the chick, and this puts a certain amount of stress on the adults, especially as the weather is getting hotter at this time of year. Gentoo chicks would, in the wild, form a creche at this stage (van Zinderen Bakker, 1970): it has thus been found to be to the advantage of both chicks and parents to remove the chicks to a separate enclosure at between five and seven weeks old. There the chicks are accustomed to being hand-fed small Whiting from their keepers, and after about two weeks, when they are feeding well three times per day, they are given access to a pool. Between 18-25 chicks are reared each year, most post-fledging deaths are due to aspergillosis. Some chicks are sent to other collections and others are re-introduced to the adult colony at about 10 months old.

The adult birds moult in August, at an equivalent time in relation to chick rearing, as in the wild.

Edinburgh Zoo's Gentoo Penguins have founded most of the captive Gentoo colonies in world zoos.



Royal Zoological Society of Scotland

Fig. 4. Gentoo Penguin chick aged 3 weeks, being fed by parent



Royal Zoological Society of Scotland

Fig. 5. Gentoo Penguin chick aged five weeks, chasing parent for food

Rockhopper Penguins

Although many collections keep Rockhopper Penguins, few breed them and when chicks are hatched, the rearing success is poor. Table 1 shows that only 27% of chicks were reared from the period of 1976-80: the cause of this is unclear (Stevenson, 1983).

The present colony at Edinburgh Zoo was founded in 1971, with more birds arriving in 1972 and 1973. In 1982 four female Long-crested birds were received on breeding loan from Bristol Zoo. At present there are 16 birds: four males of the Short-crested race, and seven females and five males of the Long-crested race. It is possible that these two forms, which originate from different geographical areas, constitute two distinct species (Jouventin, 1982) and mixing the two may accentuate breeding problems. Unfortunately, many institutions are unaware of the existence of the two races.

The enclosure consists of a natural rock face with nesting crevices, and a pool in the foreground. The birds are fed once per day on sprats with the addition of 100 mg Thiamine per bird per day. When sprats are not avail-

able, they are fed small Whiting without the Thiamine supplement. In 1983 a supplement of Mazuri Fish Eater Powder was given to each bird each day, and it is intended to continue this practice.

The birds are given stones in March, from which they construct their own nests. There were three breeding pairs up until 1983, when the loss of one female resulted in two. Two of the Bristol females paired with two Long-crested males in 1983 but did not lay; it is hoped that they may do so in 1984. Eggs are laid at the end of March, beginning of April. Rockhopper females lay two eggs, the first being smaller than the second. The number of days between egg-laying was 5.1 ± 1.1 ($n=13$), which falls within the range given by Williams (1981). The incubation period ($n=14$) ranged from 31-37 days with a mean of 34.1 ± 1.5 , which agrees with that of Warham (1975) and Williams (1981) from studies of wild birds.

Both male and female birds incubate eggs to the same degree, but the bird not incubating usually stands in attendance (Fig. 6). Male Rockhoppers are very aggressive, attacking everything that comes within range of the nest. In the Zoo there have been only three cases of both eggs hatching, and in the wild Rockhopper Penguins are reputed to rear only one chick. On hatching Rockhopper chicks have a brown natal down on the back and head with white on the ventral surface. The beak is dark with a conspicuous light-coloured egg tooth (Fig. 7). The feet are dark and the eyes open within three days of hatching.

The two chicks that were successfully hand-reared were removed from the parent birds at hatching and kept in separate plastic cake containers with paper towelling as a substrate, which was changed after each feed. Full details of the method can be found in Stevenson (1981) but an outline will be given here. The diet was a gruel, based on that used by Sea World (Todd, 1980). This was as follows:

2	Mazuri Fish Eater Tablets
1	Teaspoon Calcium Lactate Powder
2	Tocovite Vitamin E Tablets (100 i.u. per. tab.)
1	Teaspoon sea salt (about 6 grams)
1	Benerva Vitamin B1 tablet (150 mg)
1	Dessertspoon Complian
1	Dessertspoon Casilan
250	Chopped filleted Whiting
150ml	Water (approx.)
150ml	Milk ..

These ingredients were mixed in a liquidiser, to the consistency of a milk shake. The gruel was fed five times per day for the first two weeks.



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Fig. 6. Rockhopper pair nesting, male bird standing beside female



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Fig. 7. Rockhopper chicks aged six days

The frequency of feeds was decreased as the chicks grew and fish was introduced in the third week. For the first week the temperature was kept within a range of 21°C to 28°C, being reduced as the chicks grew. Although the hand-rearing programme was very successful in 1981, problems have been encountered in subsequent years, and no chicks were reared in 1982 or 1983. It is thought that these failures were due to either overheating the chicks or contamination of feed. However, hand-rearing penguin chicks can be very successful once the problems have been resolved (Todd, 1980).

The hand-reared chicks started moulting in the seventh week, and were not fully moulted until 90 days old. Nelson (1980) cites 67-72 days as the age of complete moult, thus the development of the hand-reared chicks might have been somewhat slower than that of parent-reared chicks. Fully moulted chicks have a juvenile plumage with a black superciliary stripe, unlike the yellow tassels of the adults. These and the yellow stripe are not produced until the second moult when the birds are one year old; adult Rockhoppers in the Zoo moult in September.

With increased drilling for undersea oil and proposed developments in the Antarctic regions, no species of penguin can be considered safe, and two are already considered endangered - the Black-footed or Jackass Penguin and Humboldt's Penguin. Man has in the past been responsible for the carnage of thousands of penguins (Paterson, 1978) and we must try to rectify this by not only conserving wild stocks but by a sensible and scientific approach to captive management. It is vital that captive colonies are self-supporting and breeding well. Although there have been considerable advances in the management and husbandry of captive Spheniscidae in recent years, many problems remain, one of the most important being captive diet and correct supplementation of the fish (Gaily-Phipps and Sladen, 1982). It is important that zoos like Edinburgh pool their knowledge and continue to research methods of husbandry and management in order to improve breeding performance.

Products mentioned in the text

Tocovite '100': Vitamin E tablets by Arnolds Veterinary Products Ltd., Reading, Berkshire.

Benerva Vitamin B1: thiamine hydrochloride tablets manufactured by Roche Products Ltd., Welwyn Garden City.

Mazuri Fish Eater Tablets and Powder: vitamin supplement manufactured by Special Diet Services, Ltd., Witham, Essex.

Casilan: protein concentrate, manufactured by Glaxo-Farley Foods, Glaxo Laboratories Ltd., Torr Lane, Plymouth.

Complan: protein multivitamin concentrate, manufactured by Glaxo-Farley Foods.

ACKNOWLEDGEMENTS

I would like to thank Caroline Bayliss and Sue Taylor for helping to search out old records and analyse those and current ones. Thanks also go to Sue Taylor and the keepers of the Penguin Section, past and present, for collecting data on the birds. Bernard Stonehouse provided the initial stimulus which encouraged me to examine the penguin records and the birds in more detail. I am most grateful to Chris Morris for printing the photographs.

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TABLE 1 - NUMBERS OF EACH PENGUIN SPECIES HATCHED AND REARED IN CAPTIVITY FROM 1975-1980

SPECIES	1975			1976			1977			1978			1979			1980			No. of Institutions
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	
King Penguin	6	3	50%	7	3	43%	9	8	89%	10	8	80%	7	5	72%	8	6	75%	8
<i>Aptenodytes patagonica</i>																			
Gentoo Penguin	40	29	73%	47	29	56%	37	29	78%	24	9	32%	41	31	75%	46	31	67%	7
<i>Pygoscelis papua</i>																			
Adelie Penguin	-	-	-	-	-	-	20	16	80%	25	15	60%	60	56	93%	-	-	-	1
<i>Pygoscelis adeliae</i>																			
Black-footed or Jackass Penguin	80	50	62%	70	38	54%	101	61	60%	115	64	56%	108	72	67%	142	98	69%	43
<i>Spheniscus demersus</i>																			
Humboldt Penguin	75	34	45%	125	55	44%	116	56	48%	118	58	49%	153	73	48%	171	91	53%	65
<i>Spheniscus humboldti</i>																			
Magellanic Penguin	-	1	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>Spheniscus magellanicus</i>																			
Rockhopper Penguin	-	7	3	42%	5	3	60%	10	2	20%	6	0	0	0	0	9	2	22%	12
<i>Eudyptes crestatus</i>																			
Macaroni Penguin	-	-	-	-	-	-	-	-	-	-	-	-	1	1	100%	2	1	50%	2
<i>Eudyptes chrysolophus</i>																			
Fairy or Little Blue Penguin	8	0	0	9	2	22%	17	0	0	8	0	0	4	0	0	8	2	25%	6
<i>Eudyptula minor</i>																			

A = Number hatched B = Number reared beyond 30 days C = Percent reared

TABLE 2 - PENGUIN IMPORTS TO EDINBURGH ZOO FROM 1914 - END 1982
With details of breeding until end 1982

SPECIES	NUMBER	TOTAL	
	IMPORTED	HATCHED	REARED
King Penguin	351	149	126
Gentoo Penguin	262	681	378
Adelie Penguin	9	0	0
Black-footed or Jackass Penguin*	18	20	9
Magellanic Penguin	5	0	0
Rockhopper Penguin*	25	13	2
Macaroni Penguin	105	26	12
Fairy or Little Blue Penguin*	4	0	0
Chinstrap Penguin	124	13	2

* = Not acquired from Salvesson Whaling Company. These data are taken from the records of Edinburgh Zoo and are as accurate as possible.

TABLE 3.
Breeding success of 13 King Penguin females, over a four-year period

No. of eggs laid per female	No. of eggs hatched per female					Total females
	0	1	2	3	4	
0	1					1
1	1					1
2						
3	5	2				7
4		3			1	4
Total females	7	5			1	13
Total females	7	5			1	13

TABLE 4 - BREEDING OF GENTOO PENGUINS OVER A FIVE-YEAR PERIOD

Year	Eggs laid	Hatched	Survived*	No. of successful pairs
1979	85	32	28	19
1980	89	39	33	20
1981	91	36	30	19
1982	96	34	26	20
1983	85	32	22	21

*No. of chicks that survived first 30 days

* * *

NOTES ON BREEDING THE WATER RAIL *Rallus aquaticus* IN CAPTIVITY AT THE PARK OF VILLARS-LES-DOBES, FRANCE

By P. CORDONNIER

No record has been found of a captive breeding of this common species in the ornithological literature such as the International Zoo Yearbook and Records of First Breeding under Controlled Conditions in Europe (Kramer, 1980). This last author reports that only two out of nine species of European Rallidae have not been bred in captivity - the Water Rail and the Little Crake *Porzana parva*. Nevertheless, other parks or private persons may have achieved this breeding as recent results have not been published yet.

Our breeding pair of Water Rail consisted of two birds found injured (probably knocked by a vehicle) in the autumn of 1981. They were placed in an aviary measuring 16 x 8 m. which had thick grassy and bushy vegetation and sheltered various waders and song birds.

The nest was built in a tuft of rushes and the five eggs were incubated by the parents. Four chicks hatched on 18th July, 1982. Some 12 hours elapsed between the first and the fourth hatching. The fifth egg was infertile.

Immediately after hatching, the chicks were placed into an incubator with three Purple Gallinules hatched on 21st July. Rearing techniques were the same as those used for waders: the chicks were placed into an aquarium measuring 50 x 30 cm, heated to 36°C at one end, and the bottom covered with soft paper. When ten days old, they were transferred into a larger breeding box lined with turf layers. When six weeks old, they were able to live in an unheated aviary.

Their food was composed of minced meat, dog pellets and small pieces of fish. Unlike other young waders, they had to be hand-fed for the first week, even though live food (maggots and very young crickets) seemed to cause a lot of excitement and swift movements in the chicks. One of the four chicks died at a week old.

Details concerning growth and feather development have been described elsewhere (Cordonnier, 1983).

The young have been kept in an aviary smaller than that of their parents in order to watch their possible breeding behaviour which completely escaped notice in 1982 (no song reported, birds very secret, date of laying unknown).

We would appreciate any remarks and observations from other people keeping this species.

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HAND-REARING AND GROWTH OF THE PURPLE GALLINULE *Porphyrio p. porphyrio* AT THE PARK OF VILLARS-LES-DOBES, FRANCE

By P. CORDONNIER

Our breeding pair of Purple Gallinules was purchased in 1978 and placed in an aviary 7 m. square, together with some 15 exotic birds such as toucans and parrots. Both Gallinules belonged to the nominal form *Porphyrio p. porphyrio* (L.) and did not show any grey or green hue in their feathers (Cramp *et al.*, 1980). The sexes look alike.

The aviary floor was covered with sand and earth. Purple Gallinules destroy low vegetation, and even the strong leaves of *Hevea* (Holyoak, 1970). Indeed, this species plays a useful part in the wild by mowing and destroying vegetation (Geroudet, 1978).

The food given in the aviary was quite varied: seeds, a mash made up of insects, fruits, and, specifically for the Purple Gallinules, small fish and minced meat. Live insects (mealworms, crickets) were also given regularly. The Gallinules' diet seems to be very catholic.

All aspects of behaviour that could be observed (bathing, feeding habits, displays, matings, etc.) tally with those described by Holyoak (*op. cit.*). We also noticed that the birds roosted on branches 4-5m high to sleep.

Building the nest, or more precisely carrying materials to build it, kept the birds busy nearly all the year round. Bunches of rushes were given every week and displays and matings occurred very frequently.

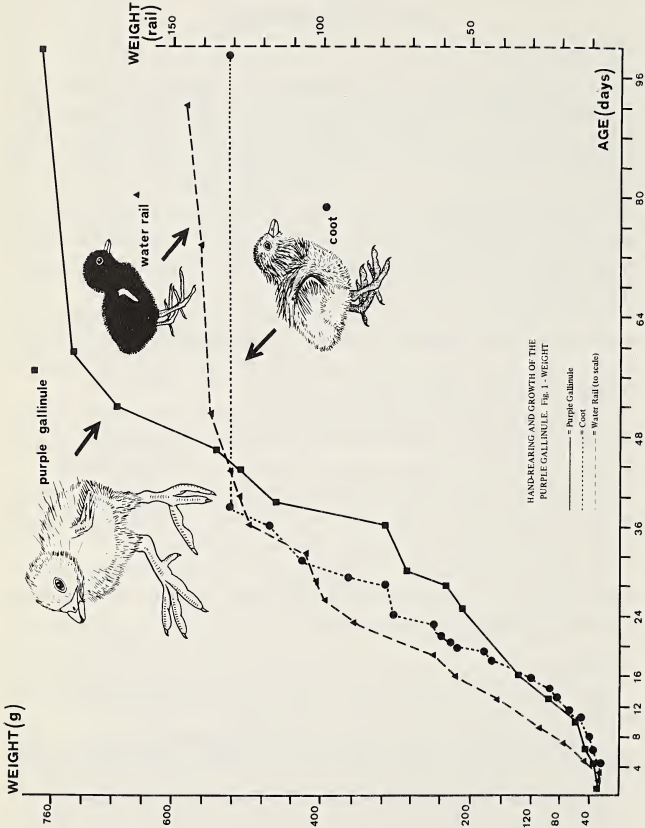
As reported by Harrison (1975), the nest was small (inside diameter about 17 cm) and was built in one of the aviary corners, behind a clump of rushes, the tops of which formed a roof.

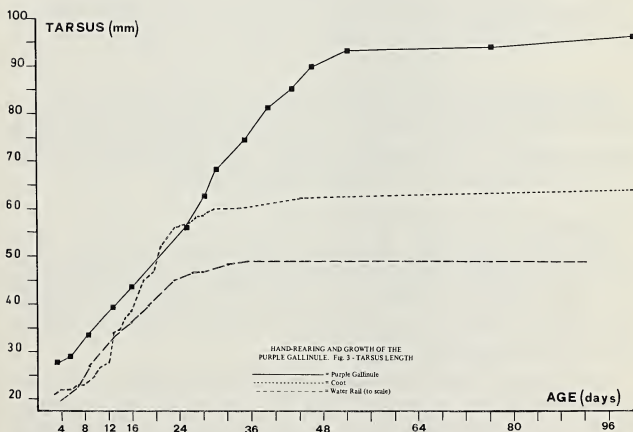
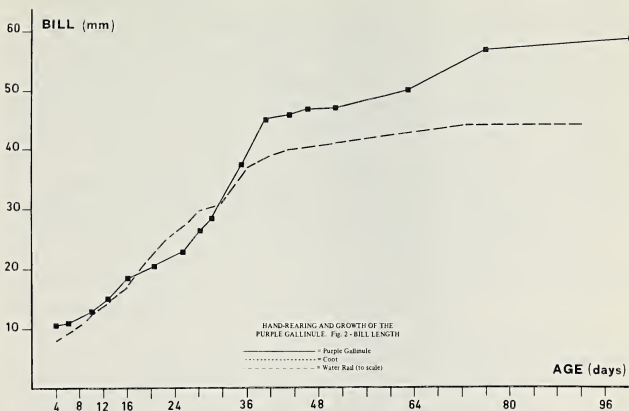
Laying

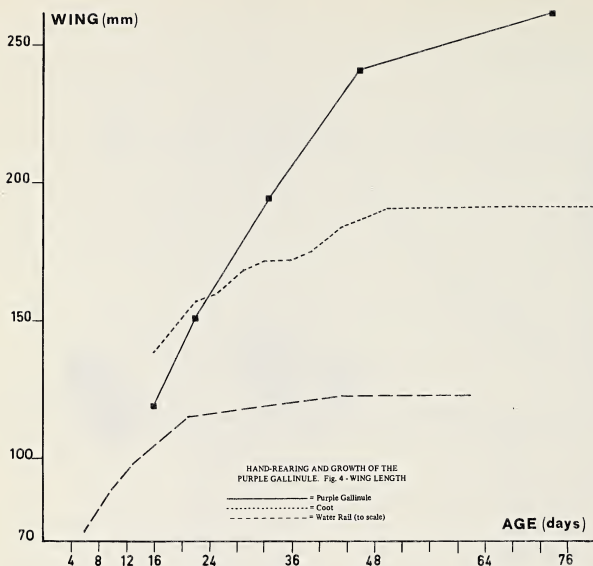
The hen laid for the first time in 1981: the first egg was noted on 21st June and was followed by two more, all infertile.

In 1982, as early as 16th June, one of the adults kept staying on the nest. The first egg was laid on 20th June and the clutch of four eggs was completed on 25th June. Both adults took turns to sit on the eggs.

The first chick hatched during the morning of 21st July, the second at noon and the third in the night. The fourth egg was infertile. Thus incubation lasts from 26 to 31 days (26 days is a minimum if the first egg is incubated immediately after it was laid). According to Cramp *et al.* (*op. cit.*) and to Harrison (*op. cit.*) incubation lasts 22 to 25 days, and to Geroudet (*op. cit.*) 24 to 25 days.







The young left the nest soon after hatching, and the parents seems to take no further interest in them. An adult sometimes seized a chick by its leg and shook it. This behaviour, together with the presence of toucans in the aviary, persuaded us to rear the chicks artificially.

Rearing

The chicks were reared together with three Water Rails, hatched on 18th July. Rearing techniques were the standard ones used for waders (e.g. Goss-Custard *et al*, 1971): the chicks were placed in an aquarium measuring 50 x 30 cm, heated to 36°C at one end, and the bottom of which was covered with soft paper.

Food (minced meat, dog pellets, bits of fish, maggots and young crickets) was put into a dish 1 cm high, filled with water. When ten days old, the chicks were transferred to a larger breeding box lined with turf layers. When six weeks old, they were able to live in an unheated aviary. Unlike most young waders, they had to be hand-fed during the first ten days. One of the three chicks, which had remained very small, died when 30 days old.

Growth of the chicks

The growth of the young Purple Gallinules was comparable to that of Water Rails and a Coot reared at the same time - for weights see Fig. 1.

Since weight fluctuates during the day (Blake, 1956), the measurements were made in the morning. The weight at hatching (29 g) was similar to the one reported by Fjeldsa (1977), i.e. 30 g. Growth was slower for the Purple Gallinules than for the two other species. The definitive weight was reached only when the birds were about four months old.

Bill length and frontal shield length were both measured (Fig. 2). The frontal shield appeared from the 28th day and was well formed by the 35th. It started reddening from the 76th day. Although bill growth was complete when the birds were three months old, the plain red colour only appeared when they were over four months old.

The tarsus is very long and grows quickly to maximum length at two months (tarsus length - Fig. 3). The legs were pink at hatching and became greyish afterwards. At four months, they still retain a grey-blackish hue.

Folded wing (maximum extension) was measured as soon as flight feathers started appearing from the sheaths up to one-third of their length (46th day) (Fig. 4). Flight feathers appeared simultaneously at 13 days. Their development was almost over at 76 days. The rest of the wing feathers were completed by then, but the birds were not able to fly before they were 90 days old. It seems doubtful whether the birds can fly when 60 days old, as Cramp *et al* (op. cit.) have suggested.

The long white filament visible among the first down had almost completely disappeared at 13 days. Thigh feathers and wing coverts appeared at 28 days, belly feathers at 35 days.

At 39 days, cheeks, chest and scapulars took on a bluish colour, while the undertail coverts were white.

At 43 days, a few white feathers had dotted the blue colour of the belly, and the chest was entirely blue. This colour had spread over the whole head at 52 days. The iris, which was brown at hatching, got lighter around the 100th day.

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REFLECTIONS ON POOR HATCHABILITY OF WATERFOWL EGGS AT THE WILDFOWL TRUST (Slimbridge, Gloucestershire)

By MICHAEL OUNSTED (Curator)

The hatchability of waterfowl eggs when laid by captive birds presents different challenges from those that arise when considering hatching eggs of poultry or game birds.

The Wildfowl Trust is concerned with the order of birds known as Anseriforms, and particularly the family Anatidae - the swans, geese and ducks. Also included in our collection of birds are the Phoenicopteridae, the flamingos, which have slightly different egg hatching requirements from those outlined in this paper. There are 247 described forms of swans, geese and ducks, comprised within 151 full species. These full species can be divided into 12 different tribes. Of the 247 described kinds, 180 are represented in the Trust's collection, some 6,000 in all. The collection is maintained at the Trust's five centres in England. One hundred and forty of the 180 kinds maintained will breed and about 1,800 birds will be reared each year for restocking purposes and for the enjoyment and education of our public visitors.

Many birds breeding with us are only one or two generations removed from their wild ancestors, whose natural way of life is far removed from that at the New Grounds in Gloucestershire. Re-stocking from the wild is important if we are consistently to breed true to type. Eggs taken from the wild under licence are transported to the Trust in portable incubators during their middle incubation period and hatch under quarantine conditions. We have recently hatched eggs successfully that have been thus transported from South America, the Falklands, Alaska, Australia, Africa, Finland and Iceland. The hatching success with correctly handled wild-taken eggs is normally high, though low if eggs are transported fresh or newly set. In this case, embryos may become weakened or broken. Alternatively, if near hatching, they may become overheated through self-generated heat. Suffocation through lack of oxygen may also occur.

For the most part, however, we are concerned with the hatching of eggs laid in captivity. Here the problems surrounding fertile egg production are numerous, for in the management of non-domestic birds, attempts have to be made to simulate natural conditions.

Diet, pair compatibility, flock size, day length, disease, stress, disturbance and so on are our continual considerations. If inbreeding is avoided, a high rate of egg hatchability can be achieved after successive generations of captive breeding. This necessarily involves some measure of artificial selection and the "evolved" characteristics in the individual may mean that the species no longer reproduces true to type. This aspect needs to be carefully monitored.

Even following fertile egg production, the variation of incubation requirements within the waterfowl group is enormous. This particularly concerns nest microclimate and there may be other variations in species' body temperatures and humidity requirements. Brent Geese nest above arctic permafrost where the ground temperature is near zero degrees: Egyptian Geese obviously incubate under quite contrary conditions. Hawaiian Geese in nature have no access to water; Barnacle Geese nest on tundra islands and will swim to gain access to their nests. External climatic conditions are also significant. Tropical waterfowl may not truly incubate or may even deliberately cool their eggs as part of incubation. Arctic Eider ducks may stay on their nests for several consecutive days. Egg size too varies considerably within the waterfowl group. A teal's egg weighs 25 grams and that of a Black Swan some 300 grams. Shell composition, and thus water vapour conductivity, is similarly very variable and incubation periods span from 20 days for the parasitic Black-headed Duck to 36 days for a Trumpeter Swan. The equation drawn up round the egg weight/shell conductivity/incubation period constants are of great importance to us, but the practical problems of using this knowledge

during the relatively short egg production period in England are great when catering for the variables described.

Most artificial waterfowl hatching is based on inherited keeping tradition and on art rather than science. However, there is usually logic in traditional practices but it often occurs that incorrect artificial incubation is not detected until the point of hatch. For this reason, eggs at the Wild-fowl Trust are hatched in a high humidity incubator so that the atmosphere inside and surrounding the eggs is similar. Such humid conditions do not occur in nature but by the reduction of the natural drying process, some corrective surgery is possible to overcome incubation errors. Forty per cent of eggs hatched artificially at the Trust are "manipulated" at hatching.

A summary of our basic hatching routine follows:-

1. Eggs are generally gathered daily. The first four eggs in a clutch are replaced by artificial eggs (the clutch size of waterfowl species varies from 3-18 eggs). Second broods are encouraged from established birds.
2. After basic cleaning with water, where appropriate, eggs are stored on sterile sand at room temperature. No other form of cleaning is now undertaken, for in the past this proved to have no advantage. Indeed, throughout the incubation process and during subsequent chick development we are concerned to produce birds that have some immunity to the "natural" conditions they will later encounter. Stored eggs are turned daily.
3. On completion of the clutch, eggs are set in one of the following ways:-
 - a) returned to the natural parent
 - b) set under a similar type foster parent
 - c) set under broody bantams or hens
 - d) set in a forced-air Anderson-Brown incubator

The complete incubation process follows a variation of these systems but all birds that are to be hand-reared are hatched in our own forced-air incubators in 90%+ humidity. A typical incubation example would be: fresh eggs set under broody bantam and removed after ten days to an Anderson-Brown incubator (low humidity 40%). At this point, the eggs are candled. They are removed after a further 15 days to a small 40-egg forced-air incubator, where humidity is increased to 60%. On pipping, they are moved to a high humidity hatcher (90%), and the chicks removed to a drier an hour after hatching.

Incubator temperatures are a constant 36.5 degrees which is considered low by some aviculturists but improves the opportunity for humidity reduction in the middle hatch period. A particular problem is to reduce humidity in the incubator sufficiently for the correct water conductivity to occur when the external humidity is high.

Experiments have shown that most incubating waterfowl move their eggs every half-hour. Our automatic incubators are similarly programmed but controlled conditions have shown that bantam hens rarely turn their eggs, if at all. In pre-hatch incubators, eggs are hand-turned each time they are monitored. When the chick turns in the egg, the egg is positioned with the beak uppermost where it remains until hatching.

On setting, all eggs are marked on their air space end by species and setting date. Incubation periods of the waterfowl species are constant and known and provide a useful guide to pipping dates. Eggs may be airholed after turning or carefully fractured during incubation to ensure eggshell conductivity allows correct water loss. Abrasing the shell of over moist eggs has also been undertaken with apparent success. An experienced eye can judge, to some degree, embryo condition at candling and all eggs in incubators are candled every day.

The bantams that we use are selected for their broody qualities and are mainly a Silkie crossbreed. Poultry body temperature is a degree above that of most waterfowl. Since it became known that avian tuberculosis bacillii could be transmitted through eggshell pores by infected birds, bantams are maintained only to two years old and regular T.B. tests are carried out on all stock. The fungal disease aspergillosis can similarly be transmitted through the shell pores and nest hygiene is important. Many waterfowl, especially sea duck, are susceptible to this disease.

At pipping, or if an egg is artificially chipped, the time of chip is recorded on the egg which is then transferred to the humid hatcher. Time of chip is invaluable if the chick later needs artificial manipulation. Two hatching incubators are used in a two- or three-day rotation in the high season and are in turn cleaned, disinfected and fumigated with potassium permanganate/formaldehyde. During the hatching process, various surgical practices may be employed to ensure a successful hatch but these require great operator experience and generally only become necessary through a genetic failure or errors at some other stage of infection.

Generalisations could mislead, but an example of the Mandarin Duck *Aix galericulata* serves to illustrate several points common to many waterfowl species. The Mandarin is commonly bred in captivity and breeds freely in the wild or a 'feral' state in England. An endangered species in China, it now may be more abundant in Western Europe than in its native land.

In the wild the fertility of Mandarin eggs will be high because of the natural selection of healthy adult pairs. Losses during incubation from predators or disturbance are small (10%) and it is almost certain that the remaining eggs will hatch. The actual hatch rate is 89%.

When captive-laid Mandarin eggs are left unmanaged, the disturbance risk is higher. Fertility may be as low as 50% and losses during incubation increase. The hatch rate is only 29%. When wild-laid eggs and captive-laid Mandarin eggs are managed in different ways, the factors affecting hatchability vary. Managed wild-laid eggs are less likely to be lost by disturbance under a bantam or in an incubator than under a foster duck. But losses through poor incubation are heavier in an incubator than under the foster duck. A combination of techniques seems to produce the highest hatch rate.

Similarly, managed captive laid eggs have varying hatch rates dependent on the incubation method employed. Here, however, losses during incubation are heavier as poor incubation increases losses of already weak embryos and yolk infections become a significant loss factor. It is apparent, however, that once the embryo is well developed, frequent monitoring in an incubator increases hatchability by reducing the possibility of infections spreading and by increasing actual hatching by manipulation. A combination of techniques again produces an improved hatch rate.

	Hatch rate
Wild-laid eggs, unmanaged	89%
Captive-laid eggs, unmanaged	29%
Wild-laid eggs, foster parent incubated	70%
Captive-laid eggs, foster parent incubated	28%
Wild-laid eggs, Bantam incubated	80%
Captive-laid eggs, Bantam incubated	38%
Wild-laid eggs, incubator incubated	50%
Captive-laid eggs, incubator incubated	20%
Wild-laid eggs, Bantam/incubator incubated	84%
Captive-laid eggs, Bantam/incubator incubated	43%

Thus a combination of incubation techniques produces the best hatching of captive-laid waterfowl eggs. The comparatively low hatchability of these eggs occurs mainly through poor egg production which augments a subsequent deterioration in embryo development or embryo deaths.

Further study could quickly improve incubation techniques and equipment. More information is required on the natural onset of incubation, the possibility that certain antibiotic secretions are transferred from an

incubating bird to the eggshell, the effect of vibrations on eggs in forced-air incubators and the relevance of heat variations across the eggshell. Further a "safe" sterilisation process for eggs at varying stages of embryo development would greatly improve hatchability. The incubation of waterfowl eggs is at present based on traditional techniques and needs to be more scientifically based and documented.

* * *

HAND-REARING A SCARLET IBIS
Eudocimus ruber
AT PADSTOW BIRD GARDENS, CORNWALL

By KEVIN EVANS

Our colony of Scarlet Ibis comprised five individuals at the start of the 1983 breeding season. Several attempts ensued in which most of the eggs were found smashed on the aviary floor. After one such attempt, when the male was observed to knock two eggs out of a nest, immediate action saved the third egg of the clutch. This was placed in an incubator set at 101°F. The egg measured 63 mm x 37 mm and was greyish-green, covered in chocolate-coloured spots and smears. Incubation lasted for 23 days and for the last 24 hours the chick became very vocal. Indeed, he was clearly audible in the next room.

The Ibis chick was covered in a thick black down which, when a drop of food was accidentally spilled on his back, was seen to have certain water repellent qualities, as some ran off. His bill was approximately 2½ cm long and was pink in colour with a black tip; by the age of three weeks he had three pink and three black stripes down his bill.

The Ibis started to call and gape for food at about 10 hours after hatching. Slight pressure from two fingers on either side of its bill resulted in it pushing up between them, gaping vigourously without which he would not respond. The rearing food for the Ibis was made up in bulk, enough to last two days, and was kept refrigerated. Small amounts, i.e. 6 ml, were taken out each feed time and warmed slightly to take away the chill. The Scarlet Ibis rearing diet consisted of the following:-

- 30 large snails
- 1 handful of mealworms
- 1 handful of ant eggs, crickets, moths and any other available insects
- 2 calcium lactate tablets, crushed finely
- 1 teaspoon of Vionate - multi-vitamin powder
- 2 tablespoons of cold water

The snails were shelled, and the flesh washed in cold water. All the ingredients were liquidised in a blender for about 30 seconds. The resulting soup was then forced through a fine wire mesh sieve to remove any fragments of shell that would otherwise block the feeding syringe. A 6 ml syringe was used, to which was attached a small piece of soft rubber tubing, about 5 cm long, to lessen the risk of damaging the chick's bill or getting some of the mixture into its wind pipe.

At first, 3-4 ml of this mixture every hour was enough to silence his incessant calling.

The temperature in the incubator was gradually reduced by a degree or so daily until there were no signs of the chick overheating, i.e. panting or restlessness. The ideal temperature seemed to be 85°F, indeed at 83°F he began to shake and seemed lethargic and the temperature was immediately restored to 85°F. The chick was placed in a cardboard box measuring 5 cm x 15 cm x 10 cm, inside the incubator. The box was lined with limpet shells which gave the chick's feet a good grip and helped to stop them from splaying.

At four days old he could support his body off the ground for a couple of seconds at a time. This he would do dozens of times a day, strengthening his legs and sometimes pecking his feet and preening his underside.

By six days old he had begun to shuffle about on his legs so his box was changed for one which was twice as long, to give him more room. It was at this stage of his development that we noticed his legs and feet were beginning to change colour from a pale pink to a greyish black. This process took about two weeks to complete.

After the first week he began to get more and more adventurous, often being found out of his box when checked.

Black and white feathers started emerging to replace the black down. His wings and rump began to swell with the developing feathers under the skin. Once they emerged, they began to grow tremendously fast - nearly 6 mm a day. By three weeks old he was completely feathered.

At two weeks old, the chick was getting too tall for the brooder and so the brooder temperature was gradually reduced to room temperature, when the chick was removed to a large cardboard box, lined with news-

paper and provided with perches of varying sizes which were firmly attached to the inside. He soon settled down and began to exercise his wings.

As the Ibis grew, his diet was altered slightly to make it lumpy and contain more roughage. Ox heart, day-old chicks and mackerel were added to the mixture described earlier, but this was now liquidised for only ten seconds. The syringe was replaced with a plastic meat baster which enabled us to feed the thicker mixture.

Considering that the young Ibis had only had contact with humans, he was very shy and retiring, and usually preferred hiding in a quiet corner with his head tucked between his legs. When the Ibis was placed in an outdoor aviary with a hand-reared touraco, his temperament changed immediately. He would clamber about the aviary, jumping from perches and it was not long before he was flying perfectly.

Occasionally the two young birds would squabble, the touraco usually coming off the better, but these confrontations never became serious enough to warrant the removal of one or the other and so they were left together for two months. Then the Ibis was introduced to our group of five Scarlet Ibis; on no occasion did the adults show any hostility towards him and he soon became totally independent of us.

At five months old the young Ibis was fully grown. but his plumage will remain black and white for nearly two years before moulting out into the vivid scarlet hues of this species.

In Volume 88, No. 2, of the *Avicultural Magazine*, Dr. G. Wennrich describes the sunbathing behaviour of five species of ibis (not including Scarlet Ibis) kept at the Walsrode Bird Park, West Germany. Our group has not been seen sunbathing but our hand-reared bird does so frequently, his neck stretched out, feathers erect, his head turned to one side with his bill open, and both wings stretched out horizontally. This posture is maintained for anything up to three minutes. His favoured location for sunbathing is in his pool but occasionally he has been seen sunbathing on grass.

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RECORDS OF WATERFOWL BRED IN CAPTIVITY IN THE BRITISH ISLES

By DAVID COLES (Ascot, Berkshire)

Waterfowl have a long tradition as avicultural subjects and probably constitute one of the first groups to attract the attentions of the specialist. As waterfowl have been bred in British collections for many years and early documentation seems sparse, no claim is made in compiling these records that they constitute first breedings for the species concerned, although in many instances they are likely to be just that.

Each entry is the earliest reference that I could trace relating to that species but because of the time factor involved and lack of access to much of the early specialist literature, it is only a tentative list and undoubtedly in need of much revision by someone more waterfowl-orientated than myself. Therefore, if members can update any of the references or suggest relevant early literature worthy of study, I would be grateful if they could contact me at Windsor Forest Stud, Mill Ride, Ascot, Berkshire.

References relate to either parent-reared or artificially incubated, captive-laid eggs, not those taken from the wild.

Reference abbreviations

A.M. - *Avicultural Magazine*

A.S.B.R. - *Avicultural Society Breeding Register*

W.T.A.R. - *Wildfowl Trust Annual Reports* (Past)

Wildfowl - *Wildfowl Trust Annual Reports* (Present)

W.O.T.W. - *Waterfowl of the World* by Jean Delacour (Country Life)

E.H. - *Records of Birds bred in Captivity* by Emilius Hopkinson (Witherby)

I.Z.Y. - *International Zoo Yearbook*

Waterfowl (Ducks, Geese and Swans) Seaworld Press.

ACKNOWLEDGEMENTS

I extend my thanks to Michael Ounsted and Richard Martin for their help and comments.

SPECIES	First Bred		Source reference
	Year	Collection	
Magpie Goose <i>Anseranas semipalmata</i>	1956	Slimbridge	W.T.A.R. 1954-56, p. 38.
Spotted Whistling Duck <i>Dendrocygna guttata</i>	1959	Slimbridge	W.T.A.R. 1958-59, p. 11
Plumed or Eyton's Whistling Duck <i>D. eytoni</i>	1967	Leckford	A.M. 1968, 52.
East Indian Whistling Duck <i>D. a. arcuata</i>	1939	Leckford	A.M. 1940, 67
Fulvous Whistling Duck <i>D. bicolor</i>	1872	London Zoo	W.O.T.W. Vol. 1, p. 42
Cuban Whistling Duck <i>D. arborea</i>	1932	Lilford	A.M. 1934, 240
Javan Whistling Duck <i>D. javanica</i>	1975	Slimbridge	Wildfowl 27, p. 170
White-faced Whistling Duck <i>D. viduata</i>	1914	McLean & Wormald	E.H. quoting <i>The Field</i> 16/1/1915
Northern Red-billed Whistling Duck <i>D. a. autumnalis</i>	1930	Lilford	A.M. 1932, 47
Southern Red-billed Whistling Duck <i>D. a. discolor</i>	1950	Slimbridge	W.T.A.R. 1950-51, p. 38
Coscoroba Swan <i>Coscoroba coscoroba</i>	1913	Woburn	A.M. 1914, p. 53
Black Swan <i>Cygnus atratus</i>	?	Lord Derby's collection at Knowsley	W.O.T.W. Vol. 1, p. 61
Mute Swan <i>C. olor</i>	?	?	
Black-necked Swan <i>C. melancoryphus</i>	1857	London Zoo	W.O.T.W. Vol. 1, p. 69
Whistling Swan <i>C. c. columbianus</i>	1976	Slimbridge and Flamingo Gardens	A.S.B.R. 1976, p. 7
Bewick's Swan <i>C. columbianus bewickii</i>	1914	Woburn	A.M. 1933, p. 100
Whooper Swan <i>C. cygnus cygnus</i>	1839	London Zoo	W.O.T.W. Vol. 1, p. 74
Trumpeter Swan <i>C. cygnus buccinator</i>	1870	London Zoo	W.O.T.W. Vol. 1, p. 78
Swan Goose <i>Anser cygnoides</i>	1937	R. & N. Stevens (genuine wild stock)	W.O.T.W. Vol. 1, p. 98

Western or Yellow-billed Bean Goose <i>A. f. fabilis</i>	1942	F. Mosford Esq.	W.T.A.R. 1948-49, p. 37
Russian Bean Goose <i>A. fabilis rossicus</i>	1963	Slimbridge	W.T.A.R. 1962-63, p. 13
Eastern or Thick-billed Bean Goose <i>A. fabilis serrirostris</i>	1975	Slimbridge	I.Z.Y. Vol. 17, p. 264
Pink-footed Goose <i>A. brachyrhynchus</i>	1918?	Major P. Hammond	W.O.T.W. Vol. 1, p. 125
European White-fronted Goose <i>A. a. albifrons</i>	1843	London Zoo	E.H. p. 123
Pacific White-fronted Goose <i>A. albifrons frontalis</i>	1975	Slimbridge	I.Z.Y. Vol. 17, p. 265
Greenland White-fronted Goose <i>A. albifrons flavirostris</i>	1955	Slimbridge	W.T.A.R. 1954-56, p. 36
Gambel White-fronted Goose <i>A. albifrons gambelii</i>	?	?	
Tule White-fronted Goose <i>A. albifrons elgasi</i>	1975	J. Hall, Esq.	A.S.B.R. 1975, p. 8
Lesser White-fronted Goose <i>A. erythropus</i>	1918	W. St. Quintin	A.M. 1919, p. 129
Western Greylag Goose <i>A. a. anser</i>	?	Has long been domesticated	
Eastern Greylag Goose <i>A. anser rubrirostris</i>	1951	Slimbridge	W.T.A.R. 1951-62, p. 56
Bar-headed Goose <i>A. indicus</i>	?	Herbert Astley	E.H. p. 123
Lesser Snow Goose <i>A. c. caerulescens</i>	c.1900	Woburn	W.O.T.W. Vol. 1, p. 132
Greater Snow Goose <i>A. c. atlanticus</i>	Pre-1914	Woburn	W.O.T.W. Vol. 1, p. 134
Ross's Goose <i>A. rossii</i>	c.1930	R. and N. Stevens	A.M. 1938, p. 106
Emperor Goose <i>A. canagicus</i>	Pre-1926	Woburn	W.O.T.W. Vol. 1, p. 140
Ne-Ne <i>Branta sandvicensis</i>	1824	Lord Derby's collect- at Knowsley	W.O.T.W. Vol. 1, p. 149
Atlantic Canada Goose <i>B. c. canadensis</i>	17th century		
Todd's Canada Goose <i>B. canadensis interior</i>	1951	Slimbridge	W.T.A.R. 1951-52, p.55
Giant Canada Goose <i>B. canadensis maxima</i>	1963	Slimbridge	W.T.A.R. 1962-63, p. 13
Moffitt's Canada Goose <i>B. canadensis moffitti</i>	1949	Slimbridge	W.T.A.R. 1949-50, p. 46
Lesser Canada Goose <i>B. canadensis parvipas</i>		Slimbridge	
Taverner's Canada Goose <i>B. canadensis taverni</i>	1952	Slimbridge	W.T.A.R. 1952-53, p. 36

Vancouver Canada Goose <i>B. canadensis fulva</i>	1962	Slimbridge	W.T.A.R. 1961-62, p. 4
Dusky Canada Goose <i>B. canadensis occidentalis</i>	1950	Slimbridge	W.T.A.R. 1950-51, p. 38
Aleutian Canada Goose <i>B. canadensis leucopareia</i>	1941	A. Ezra, Esq.	W.T.A.R. 1948-49, p. 37
Cackling Canada Goose <i>B. canadensis minima</i>	c. 1900	Woburn	W.O.T.W. Vol. 1, p. 176
Richardson's Canada Goose <i>B. canadensis hutchinsii</i>	1909	Duchess of Bedford	A.M. 1910, p. 36.
Barnacle Goose <i>B. leucopsis</i>	1848	London Zoo	W.O.T.W. Vol. 1, p. 180
Russian or Dark-bellied Brant Goose <i>B. b. bernicla</i>			
Atlantic or Light-bellied Brant Goose <i>B. bernicla hrota</i>	1973	Slimbridge	Wildfowl 25, p. 172
Black or Pacific Brant Goose <i>B. bernicla orientalis</i>	1958	Slimbridge	W.T.A.R. 1957-58, p. 7
Red-breasted Goose <i>B. ruficollis</i>	1926	Duchess of Bedford	A.M. 1927, p. 67
Ruddy Shelduck <i>Tadorna ferruginea</i>	1859	London Zoo	W.O.T.W. Vol. 1, p. 251
Cape Shelduck <i>T. cana</i>	1930	St. James's Park	W.O.T.W. Vol. 1, p. 248
Australian Shelduck <i>T. tadornoides</i>	1939	Lilford	A.M. 1939, p. 202
Paradise Shelduck <i>T. variegata</i>	1865	London Zoo	W.O.T.W. Vol. 1, p. 246
Common Shelduck <i>T. tadorna</i>	1897?	probably before this date	A.M. 1902, p. 256
Australian Radjah Shelduck <i>T. radjah rufiterum</i>	1940	Leckford	A.M. 1940, p. 213
Egyptian Goose <i>A. aegyptiacus</i>	?	Long bred	
Orinoco Goose <i>Neochen jubatus</i>	?	Lord Derby's collection	W.O.T.H. Vol. 1, p. 234
		ion at Knowsley	
Abyssinian Blue-winged Goose <i>Cyanochen cyanopterus</i>	1952	Slimbridge	W.T.A.R. 1952-53, p. 38
Andean Goose <i>Chloephaga melanoptera</i>	1915	London Zoo	A.M. 1916 p., 300
Lesser or Upland Magellan Goose <i>C. p. picta</i>	1901	London Zoo	A.M. 1903, p. 184
Greater Magellan Goose <i>C. picta leucoptera</i>	1863	London Zoo	W.O.T.W. Vol. 1, p. 220

Ashy-headed Goose <i>C. poliocephala</i>	1852	London Zoo	W.O.T.W. Vol. 1, p. 213
Ruddy-headed Goose <i>C. rubidiceps</i>	1865	London Zoo	W.O.T.W. Vol. 1, p. 215
Cereopsis Goose <i>Cereopsis novaehollandiae</i>	?	Lord Derby or London Zoo	W.O.T.W. Vol. 1, p. 201
Falklands Flightless Steamer Duck <i>Tachyeres brachypterus</i>	1975	Slimbridge	Wildfowl 27, p. 172
Patagonian Crested Duck <i>Lophonetta s. specularoides</i>	1964	Slimbridge	W.T.A.R. 1963-64, p. 12
Andean Crested Duck <i>Lophonetta specularoides alticola</i>	1948	Leckford	A.M. 1948, 196
South African Black Duck <i>Anas s. sparsa</i>	1953	Slimbridge	W.T.A.R. 1952-53, p. 41
European Wigeon <i>A. penelope</i>	1872?	Cecil Smith Esq	E.H. p. 129
American Wigeon <i>A. americana</i>	1906	W. St. Quintin	A.M. 1907, p. 203
Chiloe Wigeon <i>A. sibilatrix</i>	1913	H. Wormald Esq	A.M. 1914, p. 335
Falcated Teal <i>A. falcata</i>	1916	W. St. Quintin	A.M. 1917, p. 249
Gadwall <i>A. strepera</i>	1849	London Zoo	W.O.T.W. Vol. 2, p. 112
Baikal Teal <i>A. formosa</i>	1840	London Zoo	W.O.T.W. Vol. 2, p. 104
European Green-winged Teal <i>A. c. crecca</i>	1913?	H. Wormald Esq	W.O.T.W. Vol. 2, p. 99
American Green-winged Teal <i>A. crecca carolinensis</i>	1924	H. Wormald Esq	A.M. 1925, p. 150
Chilean Teal <i>A. f. flavirostris</i>	1909	London Zoo	W.O.T.W. Vol. 2, p. 92
Sharp-winged Teal <i>A. flavirostris oxyptera</i>	1954	Slimbridge	W.O.T.W. Vol. 2, p. 93
Cape Teal <i>A. capensis</i>	1939	C. McLean, Esq.	A.M. 1940, p. 151
Australian Grey Teal <i>A. gibberifrons gracilis</i>	1882	London Zoo	W.O.T.W. Vol. 2, p. 75
Andaman Grey Teal <i>A. gibberifrons albogularis</i>	1909	London Zoo	W.O.T.W. Vol 2, p. 95
Chestnut Teal <i>A. castanea</i>	1909	London Zoo	A.M. 1939, p. 87
New Zealand Brown Teal <i>A. aucklandica chlorotis</i>	1960	Slimbridge	W.T.A.R. 1959-60, p. 8
Mallard <i>A. p. platyrhynchos</i>	?	Long domesticated	

Greenland Mallard <i>A. platyrhynchos conboschas</i>	1977	Slimbridge	Wildfowl 29, p. 173
Florida Duck <i>A. platyrhynchos fulvigula</i>	1949	Slimbridge	W.T.A.R. 1949-50, p. 48
Mexican Duck <i>A. platyrhynchos diazi</i>	1969	J. Williams, Esq.	Wildfowl 21, p. 138
Hawaiian Duck <i>A. platyrhynchos wyvilliana</i>	1951	Slimbridge	W.T.A.R. 1951-52, p. 55
Laysan Teal <i>A. platyrhynchos laysanensis</i>	1959	Slimbridge	W.T.A.R. 1958-59, p. 12
Mottled Duck <i>A. platyrhynchos maculosa</i>	1949	Slimbridge	W.T.A.R. 1949-50, p. 48
North American Black Duck <i>A. rubripes</i>	1911	London Zoo	W.O.T.W., Vol. 2, p. 55
Meller's Duck <i>A. melleri</i>	1931	A. Ezra, Esq.	W.O.T.W. Vol. 2, p. 68
South African Yellowbill <i>A. u. undulata</i>	1859	London Zoo	W.O.T.W. Vol. 2, p. 69
Abyssinian Yellowbill <i>A. undulata ruppelli</i>	1961	Slimbridge	W.T.A.R. 1960-61, p. 10
Indian Spotbill <i>A. p. poecilorhyncha</i>	1874	London Zoo	W.O.T.W. Vol. 2, p. 58
Chinese Spotbill <i>A. poecilorhyncha zonorhyncha</i>	1958	Slimbridge	W.T.A.R. 1957-58, p. 8
New Zealand Grey Duck <i>A. s. superciliosa</i>	1959	Peakirk	W.T.A.R. 1958-59, p. 15
Pelew Island Grey Duck <i>A. superciliosa pelewensis</i>	1968	Slimbridge	Wildfowl 20, p. 162
Australian Grey Duck <i>A. superciliosa rogersi</i>	1869	London Zoo	W.O.T.W. Vol. 2, p. 64
Philippine Duck <i>A. luzonica</i>	1952	Leckford	A.M. 1953, p. 11
Bronze-winged Duck <i>A. specularis</i>	1964	Slimbridge	W.T.A.R. 1963-64, p. 13
Northern Pintail <i>A. a. acuta</i>	?	Long bred	
Kerguelen Pintail <i>A. acuta eatoni</i>	1962	Slimbridge	W.T.A.R. 1961-62, p. 14
South Georgia Pintail <i>A. g. georgica</i>	1983	Slimbridge	W.M. July 1983, p. 259
Chilean Pintail <i>A. georgica spinicauda</i>	1872	London Zoo	W.O.T.W. Vol. 2, p. 128
Lesser Bahama Pintail <i>A. b. bahamensis</i>	Either this or <i>A. b. rubirostris</i> was bred at London Zoo in 1853		
Greater Bahama Pintail <i>A. bahamensis rubirostris</i>			

Red-billed Pintail <i>A. erythrorhynchus</i>	1856	London Zoo	W.O.T.W. Vol. 2, p. 139
Northern Versicolor Teal <i>A. v. versicolor</i>	?	Earl Grey of Fallodon	E.H. p. 131
Southern Versicolor Teal <i>A. versicolor fretensis</i>	1976	Slimbridge	I.Z.Y. Vol. 18, p.338
Puna Teal <i>A. versicolor puna</i>	1946	Leckford	A.M. 1946, p. 194
Hottentot Teal <i>A. hottentota</i>	1938	R. & N. Stevens	A.M. 1938, p. 105
Garganey Teal <i>A. querquedula</i>	1908	W. St. Quintin	A.M. 1909, p. 15
Atlantic Blue-winged Teal <i>A. discors orphosa</i>	1914	H. Wormald	A.M. 1914, p. 335
Argentine Cinnamon Teal <i>A. c. cyanoptera</i>	1952	Slimbridge	W.T.A.R. 1952-53, p. 41
Northern Cinnamon Teal <i>A. cyanoptera septentrionalium</i>	?	Unable to trace early records	
Argentine Red Shoveler <i>A. platalea</i>	1934	Wormald & McLean	W.O.T.W. Vol. 2, p. 179
Cape Shoveler <i>A. smithii</i>	1952	Slimbridge	W.T.A.R. 1952-53, p. 41
Australian Shoveler <i>A. r. rhynchotis</i>	1975	Slimbridge	I.Z.Y. Vol. 17, 270
New Zealand Shoveler <i>A. rhynchotis variegata</i>	1961	Slimbridge	W.T.A.R. 1960-61, p. 10
Common Shoveler <i>A. clypeata</i>	?	Long bred	
Pink-eared Duck <i>Malacorhynchus membranaceus</i>	1980	Slimbridge	A.M. 1981, p. 115
Marbled Teal <i>Marmaronetta angustirostris</i>	Early this century by Lord Lilford		
Ringed Teal <i>Calonetta leucophrys</i>	1914	Wormald	A.M. 1914, p. 334
European Eider Duck <i>Somateria m. mollissima</i>	1841	London Zoo	W.O.T.W. Vol. 3, p. 29
American Eider Duck <i>S. mollissima dresseri</i>			
King Eider Duck <i>S. spectabilis</i>	1961	Slimbridge	W.T.A.R. 1960-61, p. 10
Fischer's Eider Duck <i>Somateria fischeri</i>	1976	Slimbridge	A.S.B.R. 1976, p. 14
Red-crested Pochard <i>Netta rufina</i>	After 1874	when first imported into the U.K.	

South American Pochard <i>N. e. erythroptalma</i>	1961	Slimbridge	W.T.A.R. 1960-61, p. 10
African Pochard <i>N. erythroptalma brunnea</i>	1951	Leckford	W.O.T.W. Vol. 3, p. 56
Rosy-billed Pochard <i>N. peposaca</i>	1870	London Zoo	W.O.T.W. Vol. 3, p. 52
Canvasback <i>Aythya valisineria</i>	1924	H. Wormald	W.O.T.W. Vol. 3, p. 60
European Pochard <i>A. ferina</i>	?	Probably been long bred	
Redhead <i>A. americana</i>	1924	H. Wormald	A.M. 1925, p. 150
Ring-necked Duck <i>A. collaris</i>	?	"Bred several times by A. Ezra"	A.M. 1941, p. 142
Australian White-eyed Duck <i>A. australis</i>	1959	Slimbridge	A.M. 1960, p. 69
Baer's Pochard <i>A. baeri</i>	1964	Slimbridge	W.T.A.R. 1963-64, p. 12
Ferruginous Duck <i>A. nyroca</i>	1908	W. St. Quintin	A.M. 1909, p. 147
Madagascar Pochard <i>A. innotata</i>	1935	Name of breeder omitted	A.M. 1939, p. 135
Tufted Duck <i>A. fuligula</i>	1848	London Zoo	W.O.T.W. Vol. 3, p. 78
		Probably much earlier	
New Zealand Scaup <i>A. novae-seelandiae</i>	1958	Slimbridge	W.T.A.R. 1957-58, p. 6
Greater Scaup <i>A. marila</i>	1924	H. Wormald	A.M. 1925, p. 150
Lesser Scaup <i>A. affinis</i>	1924	H. Wormald	W.O.T.W. Vol. 3, p. 84
Lesser Brazilian Teal <i>Amazonetta b. brasiliensis</i>	1878	Probably the race bred by London Zoo	W.O.T.W. Vol. 3, p. 93
Greater Brazilian Teal <i>A. brasiliensis ipecutiri</i>	1962	Slimbridge	W.T.A.R. 1961-62, p. 14
Maned Goose <i>Chenonetta jubata</i>	1910	London Zoo	A.M. 1910, p. 337
Mandarin Duck <i>Air galericulata</i>	1834	London Zoo	W.O.T.W. Vol. 3, p. 108
Carolina Duck <i>A. sponsa</i>	?	Probably bred for several centuries	
Hartlaub's Duck <i>Pteronetta hartlaubi</i>	1959	Slimbridge	W.T.A.R. 1958-59, p. 12
White-winged Wood Duck <i>Cairina scutulata</i>	1971	Slimbridge	Wildfowl 22, p. 135

Muscovy Duck <i>C. moschata</i>	?	Genuine wild stock only	recently imported
Old World Comb Duck <i>Sarkidiornis m. melanotis</i>	1931	Lilford	A.M. 1932, p. 47
South American Comb Duck <i>S. melanotis sylvaticus</i>	1956	Slimbridge	W.T.A.R. 1954-56, p. 40
Spur-winged Goose <i>S. g. gambensis</i>	1933	Whipsnade Zoo	A.M. 1933, p. 362
Black Spur-winged Goose <i>S. gambensis nigra</i>	1971	Flamingo Gardens	I.Z.Y. Vol. 13, p. 297
Harlequin Duck <i>Histrionicus h. histrionicus</i>	1979	Sir Max Williams (and others?)	M. Ounsted (pers. comm.)
Long-tailed Duck <i>Clangula hyemalis</i>	1971	Miss B. Locker Lampson	
			A.M. 1972, p. 1
European Black Scoter <i>Melanitta n. nigra</i>	1978	Lunga Wildlife Reserve & Slimbridge	I.Z.Y. Vol. 20, p. 392
European White-winged Scoter <i>Melanitta f. fusca</i>	1975	Slimbridge	I.Z.Y. vol. 17, p. 271
Bufflehead <i>Bucephala albeola</i>	1970	Sir Max Williams	A.M. 1971, p. 58
Barrow's Goldeneye <i>B. islandica</i>	1937	R. & N. Stevens	A.M. 1938, p. 104
European Goldeneye <i>B. c. clangula</i>	1932?	A. Ezra, Esq.	A.M. 1939, p. 135
American Goldeneye <i>B. clangula americana</i>	1957	Slimbridge	W.T.A.R. 1956-57, p. 23
Smew <i>Mergus albellus</i>	1935	R. & N. Stevens	A.M. 1939, p. 96
Hooded Merganser <i>M. cucullatus</i>	1962	R.A. Copley, Esq.	A.M. 1962, p. 166
Red-breasted Merganser <i>M. serrator</i>	1958	Slimbridge	W.T.A.R. 1957-58, p. 9
Eurasian Goosander <i>M. m. merganser</i>	1956	Slimbridge	W.T.A.R. 1954-56, p. 42
American Merganser <i>M. merganser americana</i>	1975	Slimbridge	Wildfowl 27, p. 174
Black-headed Duck <i>Heteronetta atricapilla</i>	1977	Slimbridge	A.S.B.R. 1977, p. 16
North American Ruddy Duck <i>Oxyura j. jamaicensis</i>	1937	R. & N. Stevens	A.M. 1938, p. 104
White-headed Duck <i>O. leucocephala</i>	1973	Slimbridge	I.Z.Y. Vol. 15, p. 332

Maccoa Duck <i>O. maccoa</i>	1974	Slimbridge	A.M. 1975, p. 53
Argentine Ruddy Duck <i>O. vittata</i>	1975	Slimbridge	Wildfowl 27, p. 175
African White-backed Duck <i>Thalassornis l. leuconotus</i>	1978	?	Waterfowl, p. 385
Madagascar White-backed Duck <i>T. leuconotus insularis</i>	1933	A. Ezra, Esq.	A.M. 1933, p. 361

Notes - Amendments and further information :



D. George, Phoenix Zoo

The adult Ostriches at the Phoenix Zoo, the male display dancing to the female

HAND-REARING OSTRICHES *Struthio camelus* AT THE PHOENIX ZOO (Arizona, USA)

By MARGARET SPRECKELS (Aviculturist)

Included in the Phoenix Zoo collection is a compatible pair of Ostriches. Their present enclosure is small (55 ft x 100 ft) but within three years, their new exhibit, a spacious multi-species African Veldt, should be completed. Because of the size of their present exhibit and their inability to find safe refuge from the public, they have never successfully incubated their eggs, many of which, if left in the enclosure, are broken. Therefore, in the past three years that I have worked with the Ostriches, we have incubated the eggs artificially and hand-reared the young.

The eggs are collected as soon as they are laid, usually every other day, and stored at 55°F for seven days. All eggs collected within that time, usually two or three, are incubated together. This allows the chicks to communicate and encourage one another at hatching time. It also results in hatchlings of the same age which makes it easier for them to learn to eat and provides valuable socialising companionship.

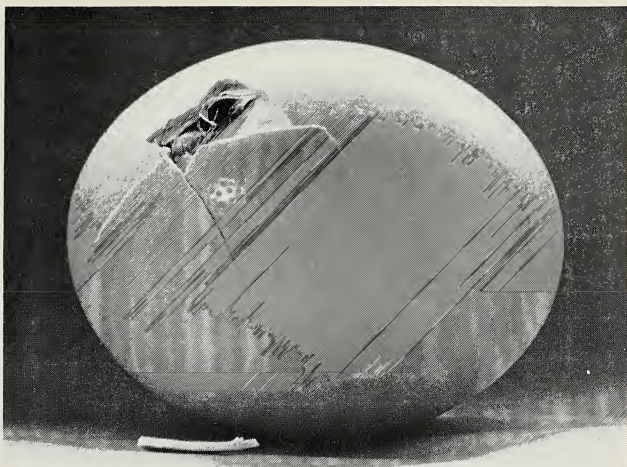
We incubate the eggs in our ratite incubator at 97.5°F and a relative humidity of 50%. The incubation period is 40-42 days. In past years we found that very few fertile eggs actually hatched. There are several possibilities as to why an Ostrich chick fails to hatch:

1. Phoenix's hard water produces extra hard shells.
2. The adults lack a mineral found either in their food or in the local soil, and this produces weak chicks.
3. Vocalisation by adults, which may encourage the chicks to hatch, is absent.
4. The adults may actually assist hatching by cracking the shell.
5. Just before pipping, the adults may raise their incubating temperature, thus stimulating hatching.
6. Chicks are too weak to survive and are not meant to hatch.

In 1982 I decided to open the eggs manually in an attempt to increase our hatchings. The following is an account of the 16 eggs worked with.

1. Infertile
2. Infertile
3. Infertile
4. Infertile

5. Dead in shell on Day 42 at 1:00 p.m. Day 42 was used as a reference point to start opening eggs and to give the egg an opportunity to hatch on its own. The chick was alive until the late afternoon of the previous day. One can tell if the chick is alive by listening with a stethoscope or by holding the egg in the hand for a time, because it will move. Always handle the egg with a cloth to prevent hand-oils from getting into the shell. When I opened this egg, I found the head at the end of the egg opposite the air sac. The neck was swollen to three times its normal size, possibly from the struggle to break out. The yolk was not totally absorbed.
6. Extracted manually on the morning of Day 41. The head was at the end of the egg opposite the air sac and the yolk was not all absorbed. Eggs 6 and 7 were originally placed in the incubator at the same time.
7. Extracted manually on the morning of Day 41. The head was at the air sac end and the yolk was more absorbed than that in the sixth egg.
8. A hole approximately $1\frac{1}{2}$ in (4 cm) was opened in the air sac end on the morning of Day 41. The next two days I was off work so I made an incubator by placing a heating pad above and below the egg in a styrofoam box and carried the egg home with me. I also placed a lightly dampened towel over the air sac end but not covering the hole I had made. It was interesting to discover that the chick was very vocal at this stage. Vocalising by return seemed to excite the chick and cause it to kick and try harder to break out. The chick gradually positioned its beak at the hole I had made. I continued to vocalise to the chick about once an hour until I retired for the night at which time I moved the box into the bedroom. At 3.00 a.m. I was awakened by loud vocalisations coming from the chick. The chick had broken away the top third of the shell, and I picked away the remaining shell which was completely dry. This chick lived until $7\frac{1}{2}$ weeks old when it died of a congenital heart problem.
9. Rotten.
10. Dead in shell on Day 40 at 5.00 p.m. A $1\frac{1}{2}$ in hole was hammered in the shell at the air sac end, but the chick was dead. Its neck was very swollen. It was alive on the morning of Day 40. Eggs 10 and 11 were originally placed in the incubator at the same time.
11. On Day 40 at 5.00 p.m. a $1\frac{1}{2}$ in hole was hammered in the shell at the air sac end and it was placed in the homemade heating pad hatcher. The chick was very inactive and did little kicking or chipping of its shell. By the morning of Day 41 it had advanced no further. I began breaking the dry parts of its shell away myself. I continued this all day until by 6.00 p.m. the chick was out. There was unabsorbed yolk at the bottom of the egg, but its body appeared to be normal. (The



D. George, Phoenix Zoo

Ostrich egg with a pip hole



Tom Blackledge, Phoenix Zoo

The four Ostrich chicks from the 1982 hatch

unabsorbed egg yolk was inside the bodies of the first two chicks, from Eggs 6 and 7). This chick lived to be six weeks old when it died of crop impaction due to public feeding.

12. On Day 40 at 8.00 a.m. a 1½ in hole was hammered in the shell at the air sac end. It was taken home in the afternoon in the heating pad incubator. The chick made no progress on Day 40 except to position its beak at the hole I had made. During the night it began chipping its shell away, until by morning its head and shoulders were out. During the morning its shell completely dried out and I was able to lift it out of the shell. It was quite active and vocal during the entire process. It is still alive and is very strong and healthy. Eggs 12 and 13 were originally placed in the incubator at the same time.
13. On Day 40 at 8.00 a.m. a 1½ in hole was hammered in the shell at the air sac end. The egg was taken home in the afternoon in the heating pad incubator. The chick did little during the day except position its beak at the hole I had made. The next morning there was no change. The chick was very inactive and not very vocal. At 5.00 p.m. it hatched on its own by kicking the shell open. It died at seven weeks due to crop impaction from public feeding.
14. Infertile.
15. Dead embryo, about one-third developed.
16. On Day 40 at 8.00 a.m. a 1½ in hole was hammered in the shell at the air sac end. The egg was placed in the heating pad incubator and taken home. The chick made no vocalisations, though it was breathing. Nothing ever happened, and I was at a loss as to what to do as the shell never dried out, so I could not peel it away. On Day 43 the chick was dead. I opened the egg and the chick had a cord seemingly made of the egg yolk wrapped around its neck, so I assume it strangled. It also had unabsorbed yolk inside its body.

It must be kept in mind that I have no way of knowing if the chicks that hatched would have hatched anyway without my help. Nonetheless, my experience this year led me to some theories which I would like to continue to investigate in following years. It seems that the head is at the end of the egg opposite the air sac until approximately the last day before pipping. Perhaps the act of turning the head to the air sac end and the struggling and kicking involved uses up most of the remaining egg yolk. This struggle is probably essential. Then, as the chick continues to work his way out (head in position), the remaining yolk is absorbed. This last struggle is still critical, though not as much so as the struggle to turn the head around. Each chick seems to use a different method to break out. I

think that each chick must be given time and patience to help it in its own way. Vocalising to the chicks is essential, as it very definitely excites them. It might be beneficial to be able to leave the hatching chick in the incubator with the other eggs as quite possibly they would be stimulated by experiencing the entire process. This might lessen the incubation period of some eggs, however, so when to open the eggs should remain flexible. I am looking forward to next year with hopes that every fully developed chick will be saved.

From the Avicultural Magazine:

- BORMAN, Major F.W. (1929). Some notes on captive birds breeding in the Giza Zoological Gardens (Egypt) during the years 1925-7. 5th ser. Vol. 7: 250-1.
- DELACOUR, J. (1939). Birds bred at Cleres (ostriches hatched in an incubator). 5th ser. Volume 4: 348.
- WACKERNAGEL, Dr. H. (1957). Notes on captive-bred Ostriches at Basel Zoological Gardens, Switzerland. Volume 63: 113-115.
- RISDON, D.H.S. (1973). The hatching of an Ostrich chick at the Tropical Bird Gardens, Rode, Bath, in 1972. Volume 79: 47.

* * *

NOTES ON AN INJURED CURLEW

Numenius arquata

By PHILIP SCHOFIELD (Weymouth, Dorset)

I have often admired waders in the various public and private collections that cater for these delightful birds, but have never had really suitable accommodation for the group in my own aviaries. Consequently, my practical experience of the Charadriiformes is largely confined to a few months' caring for an injured Curlew some ten years ago.

One mid-June afternoon in 1973, I was birdwatching on an estuary in Suffolk where few birds were in evidence apart from odd family parties of

Shelduck. Suddenly a Curlew leapt up at my feet with the peculiar rasping squawk that this species reserves for moments of extreme terror, and made off at speed across the salt marsh. Its terrestrial, rather than aerial mode of progression, combined with a dragging wing tip, proclaimed that here was an injured bird in need of care and attention. I caught it with some difficulty, losing my binoculars in the chase; placed on the ground for safety, they proved impossible to relocate after I had secured the bird, and were presumably claimed by the next high tide.

On arriving home, the Curlew was placed in a small outside aviary some 10 ft long x 6 ft wide, already housing an assortment of native and foreign Passerine species and a few doves. The wader was left there overnight with a large shallow pan of water containing several earthworms of varying sizes. The following morning these had disappeared, so I continued to feed the bird in this fashion for several days. However, this aviary was some distance from the house, and consequently the Curlew became agitated on the rare occasions that it saw anyone - usually myself with the daily pan of worms. At such times it would walk up and down the far side of the aviary, sticking its beak through the $\frac{1}{2}$ in wire netting - this caused an unpleasant raw patch to develop halfway along that organ.

In view of the Curlew's nervousness, and the damage done to its beak, I removed the bird to a larger aviary nearer the house, which had solid sides for the first 18 in from the ground. Here it was unable to injure its beak further, and soon became completely steady, as people were constantly passing the aviary. This enclosure already housed a pair of Lady Amherst's Pheasants, who appeared not to object to their new companion.

Within a fortnight of moving the Curlew, the damaged beak had healed completely, and it was feeding readily on chunks of canned dog food and wholemeal bread, with only an occasional earthworm. The changeover from live food had been made very gradually until all food items were taken dry from a dish. It moulted successfully on this regime in the course of the summer, and kept in excellent feather, bathing freely in a plastic washing up bowl placed in the aviary for the purpose. The characteristic call was often to be heard, especially on clear moonlit nights. The bird now bore little resemblance to the emaciated creature I had found in June. However, its wing injury was sufficiently severe to preclude a return to the wild, and at the time I was unable to provide suitable permanent wader accommodation. Late in the autumn, therefore, I passed the now completely tame Curlew on to a fellow aviculturist who had extensive facilities for this type of bird.

NEWS FROM CHESTER ZOO

By PETER J. BLOOMFIELD (Assistant Curator of Birds)

The last year has seen the arrival of several new and interesting species at Chester Zoo. The most notable newcomers are two pairs of Lesser Vasa Parrots *Coracopsis nigra* which were obtained from the private collection of Mr. Werner Eichelberger in Switzerland. We are grateful to Mrs. Marie Louise Wenner, Curator of Birds at Naples Zoo, and to Mr. Mario Albek who kindly acted as translator, for their help in obtaining these parrots.

The birds arrived in England on 30th July 1982 and after completing quarantine were housed in an aviary measuring 50 ft x 20 ft x 10 ft which had been specially built for them. This aviary was carefully sited so as to give the birds as much privacy as possible, with public viewing only from one end which was itself protected by a 6 ft wide shrubbery. Indoor quarters were provided by a large shed adjoining the aviary.

Unfortunately three weeks after introducing the birds into the aviary we lost one of the males to a Stoat. The remaining three birds were left in the aviary throughout the winter and proved to be very hardy, not using the inside quarters provided for them.

Early in 1983, nesting boxes, consisting of one grandfather clock-type and a small barrel on a supporting pole with a top entrance, were provided for the Vasas. Both boxes were instantly inspected by the two females together but no eggs were laid. Although it was perhaps too much to expect them to breed in their first season here, we are hopeful for the future, especially as we are now in the process of importing three more Lesser Vasa Parrots from Mr. Eichelberger, which will give us three pairs of these extremely interesting birds. In 1984 we plan to split the six birds into individual pairs. For the information of those readers who know Chester Zoo, the birds will be housed in the Oakfield Aviaries which, if necessary, can be fenced off to avoid disturbance should they go to nest.

Other new arrivals at Chester include nine Red-fronted Macaws *Ara rubrogenys*; seven females were kindly placed at Chester Zoo by H.M. Customs and Excise, and we are grateful to Jersey Zoo for the donation of their two males. Further interzoo co-operation enabled us to acquire a pair of Palm Cockatoos *Proboscigar aterrimus* and we hope to obtain a second pair of these magnificent birds in the near future. A pair of Hawk-headed Parrots *Deroptyus accipitrinus* arrived from Birdland, Bourton-on-the-Water. We were presented with a pair of Keas *Nestor notabilis* from the Auckland Zoo, New Zealand. Other new arrivals include two pairs

of Lilacine Amazons *Amazona lilacina*, one pair of Goldie's Lorikeets *Trichoglossus goldiei*, one pair of Hartlaub's Touraco *Tauraco hartlaubi*, 12 Oriental White Eye *Zosterops japonica*, one pair of Chestnut-bellied Starlings *Spreo pulcher*, seven Hildebrandt's Starlings *Spreo hildebrandti*, four Pekin Robins *Leiothrix lutea*, and one male Emu *Dromaius novae-hollandiae* and a Kea, both of which came from Bristol Zoo.

Notable hatchings for 1983 include two Blue-eyed Cockatoos *Cacatua ophthalmica*, 11 Slender-billed Parrakeets *Enicognathus leptorhynchus*, 14 Chilean Tinamous *Nothoprocta perdicaria*, one Red-sided Eclectus Parrot *Eclectus roratus*, one Red-masked Conure *Aratinga erythrogenys*, one Crimson-winged Parrakeet *Aprosmictus erythropterus*, three Yellow-faced Parrotlets *Forpus xanthrops*, one Derbyan Parrakeet *Psittacula derbiana*, a Kookaburra *Dalco novaeguineae* and two Crested Guans *Penelope purpurascens*.

* * *

NEWS AND VIEWS

The Freckled Duck *Stictonetta naevosa*, probably Australia's rarest duck, has been the subject of a census sponsored jointly by the Victorian, South Australian and Queensland governments and the World Wildlife Fund. The census took place between 29th January and 6th February 1983, at the height of a drought, with some 600 people participating. The certain population of the Freckled Duck is 7,800, however, allowing for gaps in coverage in proportion to the areas not visited, the actual population size is likely to be in the region of 12,000.

* * *

For those interested in birds of prey and owls, the Winter 1983 issue of *The Living Bird Quarterly* should prove of interest. Articles cover mainly American species and are illustrated with superb colour photographs. Owls particularly are well-represented and some interesting shots are also included.

An interesting article on the Orange-cheeked or Barraband's Parrot *Pionopsitta barrabandi* is contained in the September 1983 issue of *Bird World*. This particular species is infrequent in captivity so the article is especially informative, containing data on both the captive care and the natural history of this species.

* * *

The Oilbird *Steatornis caripensis*, a relative of the Nightjars, which uses a type of echo-location to navigate to and from its feeding groups at night time, is in danger of extinction in Bolivia because of exploitation of its staple diet, dates. A concession was granted six years ago to harvest date palm shoots for canning purposes. The harvesting causes a rapid decline in palms and there has been no replanting. The Bolivian Wildlife Society estimates that at least 10,000 US dollars is needed just to protect one colony (*Birds*).

* * *

Amongst the many exotic softbills kept and bred at Winged World during its existence was the Little Bee-eater *Merops pusillus*. The pair, which ultimately bred, provided me with a fascinating introduction to the behaviour of this elegant family of birds. One aspect noted was the habit of both birds, periodically, while flying over their pool to drop to the water and momentarily submerge themselves beneath the surface, immediately rising again to continue their flight. A short note outlining this water-diving behaviour is contributed by C.H. Fry in *Ostrich*, Vol. 54 No. 4, p. 244. Six species, namely the European *M. apiaster*, Blue-cheeked *M. superciliosus (persicus)*, Little *M. pusillus*, Little Green *M. orientalis*, Blue-throated *M. viridis* and Bay-headed *M. leschenaulti* Bee-eaters have now been observed water-diving, the exact reason for which is unknown but it is most likely to be in the main a cleansing process. However, evidence of occasional fishing has been found by Fry who discovered fish bones in regurgitated pellets from Blue-cheeked and Blue-breasted *M. variegatus* Bee-eaters.

* * *

New species continue to be discovered, even in relatively well-explored parts of the world. The highland rainforest of the Clarke Range, Queensland, is the home of the latest addition to the Australian avifauna, the Eungella Honeyeater *Meliphaga hindwoodi*. A detailed outline of its dis-

covery and systematic data is contained in a paper by N.W. Longmore and W.E. Boles in *The Emu* Vol. 83, part 2, p. 59-65.

* * *

Yet another, this time from an isolated, 400-hectare island in the southern Indian Ocean, midway between South Africa and Australia, is the Amsterdam Albatross *Diomedes amsterdamensis*. Named after the tiny island on which it breeds, it rates as one of the heaviest of flying birds but sadly the colony is believed only to number between 30-50.

* * *

After study of the Cape Verde and Madeiran populations of the Petrel *Pterodroma mollis* Dr. W.R.P. Broome, in a recent issue of the bulletin of the British Ornithologists' Club, advocates that the two races be regarded as two separate species, the Gon-gon *P. feae* and the Freira *P. madeira* with the specific name *mollis* covering the distinct race from the southern oceans. Both new species are vulnerable, with decreasing populations, and *P. madeira* is considered to be down to a "few dozen pairs" (*British Birds*).

* * *

Besides documenting the excellent work done with the Peregrine Falcon, *The Peregrine Fund Newsletter* also outlines the involvement of Cornell University Laboratory of Ornithology staff with other projects. Studies of species cover many countries, amongst which are the Philippines, Mauritius, Iceland, Greece, Spain and several of the Middle East countries. For their captive breeding programme a pair of nestling Orange-breasted Falcon *Falco deiroleucus*, an illusive South American species, was obtained in 1980 from Ecuador. When mature, it is hoped that these birds will form a base for the formation of a viable captive population. It is hoped that a detailed account of Cornell's involvement and success with the Peregrine Falcon will be included in the *Avicultural Magazine's* special issue on the role of aviculture in conservation, projected for the October/December 1984 issue.

* * *

The World Working Group on Storks, Ibises and Spoonbills was one of ten specialist groups established in 1981 by the International Council for Bird Preservation. The first report is now published and contains pre-

liminary status reports and conservation priorities for species within the group that are considered endangered, threatened, or rare, in part or all of their range, or where the status is unknown either through a paucity of data or range limitation. The report comes as a supplement to *Flying Free* the first newsletter of the recently-formed W.W.B. Fund for International Bird Conservation, whose headquarters are at the world famous Walsrode Bird Park. The aims of the Fund are to promote and finance conservation projects which are bird-orientated. Amongst programmes either planned or underway are parrot conservation in Dominica, research on the Madagascar Crested Ibis and Mauritius Echo Parrakeet, and population surveys of wading birds in South America and Asia. The Fund promises a worthwhile contribution to conservation in the future and it is hoped that an update of its activities will periodically appear in this column.

* * *

For those readers following Jeffrey Boswall's series of articles covering tool-using in birds, the following extracts which appeared in the newsletter of the Papua New Guinea Bird Society, July-August 1982, p. 29, should prove of interest. The observations on 14th June 1982 by Brian Finch centred on Sulphur-crested Cockatoos *Cacatua galerita* using small branches for intimidation:-

"Two Sulphur-crested Cockatoos were screeching away at two passive Bat Hawks *Machaerirhynchus alcinus* sitting some three feet apart on a lower branchwhilst the Hawks refused to budge, and the cockatoos kept their distance but continued their vocal harrassment, one of the cockatoos flew to a branch some 12 ft directly above the limb on which the Hawks perched. The bird then snapped off small twigs containing several leaves and dropped them on to the Hawks with a sideways flick of its head.I thought it was an isolated incidenceTo my astonishment it proceeded to rain leafy twiglets up to six inches in lengthAfter a time the Hawks flew off pursued by the Cockatoo".

* * *

The Hawk Trust Newsheet for September 1983 gives details of the progress achieved by the Trust's project to try to establish the status of the Barn Owl in Britain. Numbers of this beautiful bird have been in decline during recent years and it is hoped that observations made by the Trust's members will throw some light on the situation. About 2,000 reports of sightings and breeding pairs were received during the year and these are now being collated.

A natural phenomenon seems to have accounted for the disappearance of 17 million birds of 18 species from the world's largest coral atoll, Christmas Island. The birds are either thought to have left the area or perished following the effects of El Nino, the warm Pacific current which once every seven to fourteen years displaces the cold, nutrient-rich Humboldt current from the Antarctic, thus affecting the food on which the birds live, the Anchovy. The El Nino of 1965 accounted for the lives of some 27 million seabirds (BBC Wildlife).

* * *

Mats Tell writes about the 1983 breeding season in Sweden: "We again enjoyed a dry, hot summer and consequently most aviculturists were successful. For instance, no less than five species of cockatoo were bred (Galah, Goffin's, Major Mitchell, Umbrella and Triton), as were two species of Mousebirds (Blue-naped and Speckled) and some rarely-bred gamebirds - Satyr Tragopan, Elliott's Pheasant, Capercaillie and Blackcock.

"My own birds produced the following: Californian Quail - 3, Sun Conure - 3, Bourke's Parrakeet - 14 and Bluish Seed-eater - 1.

"A pair of Crimson-crowned Bishops *Euplectes hordeacea* nested for the first time, but the single chick that hatched was thrown out of the nest when only five days old. A pair of Zosterops nested three times but their eggs were infertile, as were those of Mesia, Black and Golden-breasted Buntings."

* * *

THE CARE AND BREEDING OF SEED-EATING BIRDS

Finches and Allied Species - Doves, Quail and Hemipodes

By Jeffrey Trollope. Published by Blandford Press. 336 pages, 50 colour photographs, some line drawings.

Price: UK £9.95; USA 17.95 dollars; Canada 22.95 dollars

I write this review with the advantage of being closely acquainted with the author's ideas regarding the keeping of small seed-eaters and having observed his methods and witnessed several of his breeding successes. The latter includes five first breedings in Britain, for which he was awarded Avicultural Society medals. His most recent success, an account of which has still to be published in the Magazine, is likely to prove yet another first breeding. He brings to this book over 30 years' experience of bird-keeping.

After the Introduction, Part One, titled General Care, has chapters headed: Accommodation; Nutrition and Food; Obtaining Stock and Management; Breeding. Within these four headings, the coverage is very comprehensive. An idea of this can be gained from some of the sub-headings, eg., Planning an Aviary; Cage and Aviary Furniture; Plant Foods; Live Food; Collected Live Food; Buying Birds; Rodent Control; Record Keeping and Ringing; Catching and Handling; Sickness and Health; Pair Formation; Breeding Stimulus.

Part Two, Descriptions of Species and their Maintenance, accounts for approximately three-quarters of the book. All of the main groups of foreign seed-eaters (British species have been omitted) are included and a large number of species. With some exceptions, Jeff Trollope concentrates on species which he has kept, many of which have nested in his aviaries, and a good deal of the information and data relates to his own experience. He writes informatively about each group and species. First are given the English name, scientific name, other English names if any are applicable, and then for many of the species he provides some general information before writing about the species under the headings: Description; Distribution and Habitat; Breeding; Voice; Behaviour.

The style is similar to that which he uses when writing for this Magazine. The advice is sound and practical, and there is a large amount of highly useful and reliable information.

The colour photographs show 49 species and are of a good standard. Approximately half of them are included in a popular handbook from the same publisher and will be familiar to many members. Twenty-three of the photographs were taken by the author and show his own birds.

BEIJA-FLORES DO ESTADO DO ESPIRITO SANTO
HUMMINGBIRDS OF THE STATE OF ESPIRITO SANTO

By Augusto Ruschi, illustrations by Etienne Demonte.

Approx. £72. Available from Wheldon & Wesley Ltd., Hitchin, Herts.

So few books are devoted solely to hummingbirds that any new publication is eagerly awaited by enthusiasts such as I. Although the book reviewed was published in 1982, it has only recently (October 1983) become available in the U.K.

The book is large format (14½ in x 11 in) and comes in a somewhat flimsy cardboard slipcase, which is no doubt meant to be discarded. There are 263 pages including 29 full-page colour plates.

The text is in Portuguese and English: from pages 1-96 the text in Portuguese occupies the top half of the page, with the English text on the lower half. The remaining pages have the Portuguese and English text running parallel down the page.

The first section of the book (which proves excellent and informative reading) is taken up with an introduction, followed by a description of the physiographic characteristics of the State of Espirito Santo, the bird life of the area, also a detailed anatomy of a hummingbird.

The main section of the book describes the species and subspecies of hummingbirds found in the State of Espirito Santo, Brazil. Although this section is fairly detailed, giving scientific names, plus vernacular names, in both Portuguese and English; also characteristics, habitat, migration and behaviour such as nesting, bathing, song, courtship, etc., I feel that with some species certain aspects have been somewhat generalised and many details known and described by ornithologists and aviculturists have been omitted.

For example no mention is made of singing leks in *Phaethornis*; also, too often the author describes the sexes of certain species as "almost identical", when, from experience with captive birds, it is known that the sexes can be determined if not by plumage differences, then by length of beak and/or tail.

As only the males of four hummingbird species are known to have an eclipse plumage (two of which are found in the area covered by the book), it would have proved worthwhile to have given precise details of this phenomenon. However, the author gives only a brief and inaccurate description of this plumage phase in *Heliothraupis squamosus*. The male does not "become like the female in appearance" (p. 255), but retains the dark green of the underparts. Also, the crown becomes dull grey; in the female it is bronzy green. No mention is made of the eclipse plumage phase in the male *Calliphlox amethystina*.

It is well known that female hummingbirds, completely independent of the male, build the nest, incubate and rear the young. Ruschi mentions this for each species/subspecies. Surely to exclude such repetition, mention could have been made under the subheading Laying, incubation and sequences (p. 71)?

It is obvious that the original text was in Portuguese and it is unfortunate that the English translation is not entirely correct. Certain mistakes can lead to confusion; indeed, certain words proved meaningless to me until I studied the Portuguese text from which I was able to decipher the true meaning.

There are a number of printing errors (a particularly confusing one appearing on p. 141). However, these seem to appear only in the English text and if one studies the Portuguese, it is possible to make out what is really meant.

All the species/subspecies described are illustrated in full colour. The birds are depicted life size and in most cases, both male and female, also the nest and chicks are shown. The plates are superb, although, no doubt due to the printing, some species/subspecies appear a little darker in colour than in real life.

Due to the high price, the book will no doubt appeal only to those seriously interested in the Trochilidae (and maybe to book collectors?). Because of this, I feel that certain aspects could have been dealt with in a more thorough manner. However, the book is most attractive and well produced and will no doubt find its way into the libraries of all who are interested in these birds.

A.J.M.

* * *

PARROT PRODUCTION: Incorporating Incubation

By John and Pat Stoodley. Bezels Publications Ltd. 108 pages

42 coloured plates and numerous black and white sketches. Price:£15.95

Both authors are well-known for their achievements in Psittacine aviculture and pioneering ideas on parrot diets, and they have combined to produce a volume which is a must for all serious aviculturists specialising in parrots. It is based, for the most part, on the personal experiences of the authors, and the soundness of its contents is a reflection on their phenomenal success with members of the genera *Amazona* and *Pionus*.

This very readable book is divided into a number of short chapters covering: importation and quarantine, caged birds; aviary design; security; predators; nest-boxes; diet; pairing and breeding; hand-rearing, incubation; hatching; disinfecting, and it finishes with a section covering useful information - addresses of societies and material suppliers, also egg problems and possible causes are listed. Andrew Greenwood, MRCVS, contributes a section on medicine and diseases.

All the chapters contain a wealth of practical information for the breeder, especially the section covering diet, which is perhaps the most stimulating part of the book. The Stoodleys have abandoned the conventional sunflower diet, turning instead to fruit, vegetables and pulses. I found the information on pulses a little sparse; more details on sprouting and types of plants used would have been worthy of inclusion as these obviously constitute an important part of psittacine diets.

The forty or so coloured photographs are of a high standard as are the line drawings depicting selected subjects. All in all, a very worthy and useful addition to parrot literature and thoroughly recommended.

M.H.H.

Sexing the Siy Parrot

In your recent publication, Volume 89, No. 1, 1983, on page 27 there appeared an article on a nesting of the Siy Parrot *Pionus maximiliani siy*.

In describing the three youngsters, the author, Mr. Mats Tell of Sweden, wrote: "All three had brick red frontal bands, thus indicating their sex - females".

Only in the interest of saving other breeders the mistake of retaining one such as a definite female, I would like to point out that this statement is not infallible.

Just this spring, Mrs. Betty Byers of Lower California hatched three also. She has reared a number of clutches of this species. To quote Mrs Byers: "All three had red or red/orange frontal areas. I kept the dullest and the brightest, hoping for male and female. Both chicks were sexed at 12 weeks old and both proved to be males."

This clutch was obtained with a loaned bird from the San Diego Zoo, California, so rest assured that the sexing was competently done.

Your readers might also be interested to know that Sven Lennartsson of Rimforsa, Sweden, is producing the Siy with much success.

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Edited by
MARY HARVEY

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AVICULTURAL MAGAZINE



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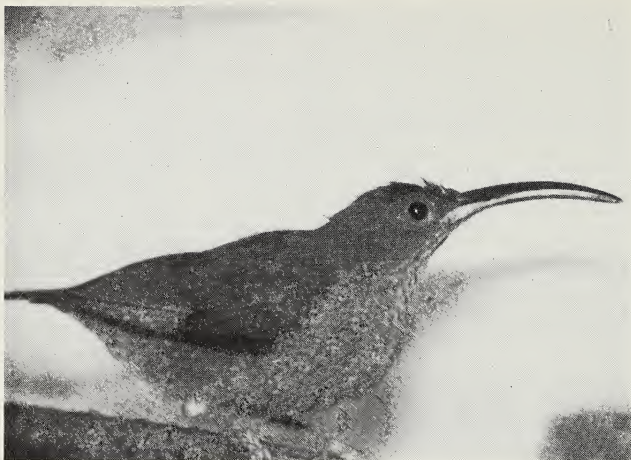
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THE AVICULTURAL MAGAZINE welcomes original articles that have not been published elsewhere and that essentially concern the aviculture of a particular bird or group of birds, or that describe their natural history. Articles should be preferably typewritten, with double spacing, and the scientific names as well as the vernacular names of birds should be given. References cited in the text should be listed at the end of the article. Line drawings should be in Indian ink on thick paper or card; photographs which illustrate a particular point in the article will be used where possible and should be clearly captioned.

ADDRESS OF EDITOR

Mary Harvey, Windsor Forest Stud, Mill Ride, Ascot, Berkshire, SL5 8LT, England.



Grey-breasted Spiderhunter

B. Peck



Naked-faced Spiderhunter

B. Peck

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SPIDERHUNTERS

By BRYAN and ANNE PECK (Cheltenham)

Very little has appeared to date in avicultural literature on the ten species of Spiderhunters which make up the genus *Arachnothera*. Generally grouped with the Sunbirds in the family Nectariniidae, they do, however, differ in several respects from the true Sunbirds by lacking metallic coloured areas of plumage in the male, having no noticeable dimorphism between the sexes (in most cases) and the different, often unique nest structure, characteristics which would make them strong candidates for family status in their own right. Their distribution is throughout South-east Asia and some of the Indonesian and Philippine islands.

Classification of species within the genus depends on the author. Gruson (1976) lists them in alphabetical order but for the purpose of this article, which concerns avicultural experiences, the order of sequence is based on diet, display and behaviour. It must be noted, however, that some species have yet to become available to the aviculturist. An asterisk (*) indicates the species with which we have experience.

The genus *Arachnothera*

*Little Spiderhunter	<i>A. longirostris</i>
*Thick-billed Spiderhunter	<i>A. crassirostris</i>
*Naked-faced Spiderhunter	<i>A. clarae (philippensis)</i>
*Grey-breasted Spiderhunter	<i>A. affinis</i>
Everett's (Kinabalu) Spiderhunter	<i>A. everetti</i>
*Yellow-eared Spiderhunter	<i>A. chrysogenys</i>
*Long-billed Spiderhunter	<i>A. robusta</i>
Whitehead's Spiderhunter	<i>A. juliae</i>
*Spectacled Spiderhunter	<i>A. flavigaster</i>
*Streaked Spiderhunter	<i>A. magna</i>

A. chrysogenys and *A. flavigaster* are commonly called the Lesser Yellow-eared and Greater Yellow-eared Spiderhunters respectively by aviculturists but as this tends to indicate a close relationship, we have used Yellow-eared and Spectacled as, apart from the visual, there are no close ties.

Importation

Before quarantine, Spiderhunters were imported into Britain in large numbers, most of which arrived in very bad condition. The main problems were two-fold - bad feet and *Candida* fungus in the mouth regions. These days, only one importer brings them into Britain with any regularity and those that have been released from quarantine have mostly been in superb condition, although a few have had poor feet, due mainly to the way in which they were trapped. Fungus is now a problem of the past as it can easily be treated with Nystan lightly dabbed on the infected areas twice a day. Diet, which is discussed next, and seclusion are the main priorities with newly imported birds. All but two species have been imported since quarantine restrictions were imposed, and of these the Grey-breasted and Spectacled are the most numerous.

Diet

In captivity the bulk of the diet must be made up of a good quality nectar mix. There are many such mixtures that can be used and the following has proved very successful with us over the last few years:-

50 gr. white sugar
5 mgr. activated dried yeast
5 mgr. plant pollen

These ingredients are made into a paste and diluted with 500 ml of boiling water and allowed to cool. The following are then added:

20 mgr. spoon of Minamino
2½ mgr. Becosym "B" group structure
2½ mgr. fresh minced beef

It has been found that Spiderhunters make better use of their nectar if fed from an open dish on the floor of the cage rather than fed from the more conventional type of water hopper. We use a 3 inch diameter earthenware dish as it is a good size for one bird's food and the fruit and cake, fed with the nectar, can easily be picked out. Fruit, which is added to the nectar, must be finely dried. A variety is accepted including

apple, grape, banana, tomato, and elderberries and red and black currants when in season. Carrot is also taken. It must be diced very small for the smaller members, but can be $\frac{1}{4}$ inch cubes for the larger species. We have experimented with an electric blender to combine fruit and nectar but this makes it into a paste which our Spiderhunters will not take. We also feed separately brown bread and milk sweetened with a little sugar.

A fine grade softfood can also be offered but with what is already provided, it should not be needed but does provide variety if taken. The addition of a mineral supplement such as SA37 or Stress will provide most of the extra minerals and Adexolin will do the same with the vitamins. Both are best added to the nectar rather than the bread and milk. Extra calcium can be provided in the form of cuttlefish "bone", scraped to a powder and sprinkled over the nectar. We also add Orlusc insectile mix and dried insects on alternate days with the fruit.

Insects are essential for longevity and must be as varied as possible and take the form of blowflies, fruit flies, spiders, crickets, first and second instar locusts, small moths and butterflies; in fact, any soft bodied insect that is available. Some types must be persevered with even though the birds may take some time before they become accustomed to them.

The first Spiderhunter I kept in the 1960's was *A. chrysogenys* and he was fed about 20 Wolf Spiders daily. He lived for five years, eventually dying from a form of stroke. Now, 15 years later, I rarely feed spiders, preferring crickets and first and second instar locusts. One or two a month are given per bird and then only as a tid-bit. We find this is ample and there is little doubt that they could do without spiders altogether - but we find that it has become a habit of ours while in the garden to catch any spiders seen.

Housing

With a group of birds that have not been bred in captivity, how to house them for optimum success is purely speculative. It is known that they can be kept for periods of five years or so in both cage and aviary. Cages are most important during the first year of captive life as they enable birds to be acclimatised and fully established. They should be of the box type, at least a metre long by half a metre high, with depth the same. Perching is most important as Spiderhunters are hygiene conscious wiping their beaks on the perch to remove food that has adhered to the beak after each feed. Therefore, two sets are kept and changed daily. Perches should be of soft wood or natural twigs. We prefer soft wood dowl, redwood, spruce, deal or birch. Soft wood holds its moisture for longer periods; natural twigs dry out very quickly. Apple, pear and elder can become hard in a matter of weeks, whereas soft wood can be

soaked when dry. It has been found that soft wood leads to fewer foot troubles.

A box type cage will decrease the initial stress period because the bird can find seclusion and should settle quickly if not disturbed more than necessary. Needless to say, only one bird per cage cuts out competition for food and roosting positions. This type of accommodation is also important if specimens need medication.

After the first moult, an aviary is more in line with today's thoughts and a small tropical house to one pair of Spiderhunters would be ideal. An outside flight could be utilised during summer months and readers are requested to refer to Mr. R. Elgar's notes on Humming Bird management in a previous issue of this Magazine (Volume 88, No. 4) as the suggestions put forward by him can be applied equally to Spiderhunters.

Spiderhunters, as stated previously, have not bred in captivity and for them to have a chance, the provision of large-leaved plants is essential. The nest structure of various species is divided into three types: open cup suspended from a leaf; two leaves stitched together; and a tunnel type nest stitched to the underside of a leaf. Material for construction must be as varied as possible but the availability of masses of cobwebs is important as without this a nest will doubtfully progress very far.

The species of plants able to support this type of nest that are available to the aviculturist are limited but three which are available and can be tried are the Cheese Plant, Rubber Plant and Banana. The latter plays host to nests of some species in the wild and the provision of several of the dwarf varieties would perhaps give the best chance of success. The related Sunbirds have been known to accept an artificial structure, usually a box, so the provision of an artificial nest, a long wicker tunnel supported beneath a large leaf, may coax them into nesting. Such a tunnel would probably have to be home made.

All the large Spiderhunters have parts of the day which are filled with high activity. This does not seem to be so with *A. longirostris* and *A. crassirostris*.

Little Spiderhunter *Arachnothera longirostris*

Range: India to South West China, south to the Philippines, west to Malaya and most of the islands within this rectangle. Twelve subspecies are recognised.

Habitat: Reputed to be a common species inhabiting secondary forest growth, cultivated gardens and areas where wild bananas grow, and is said to play an important part in their pollination.

Description: Size 6½ inches. Upper parts, from head to base of tail,

slate grey tinged with green; tail lighter tipped with off-white. Upper breast and throat grey-white, belly and undertail coverts yellow. Eyebrow stripe grey, white below. Bill dark blue grey (blackish), the lower mandible lighter. Eye dark brown. Feet blue grey. Both sexes have pectoral tufts which are only visible when roosting or in the male when displaying. Those of the male are orange-yellow and females are yellow. Adults lose all yellow and green in captivity, except for pectoral tufts which become lighter. Differs from *A. crassirostris* by feet, facial markings and thinner bill. Immatures have a paler eye stripe and throat tinged yellowish olive.

Comments: Having owned the nominate race and several of the subspecies, there is very little between them. Like the Thick-billed Spiderhunter, it is difficult to establish, mainly because both are very insectivorous, and not nearly so inquisitive as larger members of the genus. There is some difference in the size of birds imported from different areas, but most are heavier than *crassirostris*.

They travel badly, with very few living long in captivity and generally are not nearly as robust as the larger *Arachnothera*. Insects, especially fruit flies, are vital and in this respect they are like the Asiatic Sunbirds. With a great deal of patience they can be induced to take large spiders, crickets and first and second instar locusts.

The moult seems to take a greater toll on *A. longirostris* due mainly to the fact that they are reluctant to sample more diverse food. It is also a species of a nervous disposition- we have had a female for three years that is still quite flighty, which would indicate strong flight reflexes.

A. longirostris in general is an early rooster and also very selective about the roosting perch. They have the ability to hover in the manner of some sunbirds. They can be kept in small groups, the pair bond apparently being very strong in this species.

The Little Spiderhunter has a peculiar bathing routine: it enters the water backwards, washing its tail and vent first. I have heard of other birds bathing in this way but never witnessed it before. All individuals of this species that we have owned have bathed in an identical way.

Thick-billed Spiderhunter *Arachnothera crassirostris*

Range: Southern Thailand, Malaysia, Sumatra and Borneo. No subspecies.

Habitat: A rare species of lowland forests and secondary growth up to 4,000 feet.

Description: Size 6½ inches. One of the smallest species in overall length and certainly the lightest in body weight. Crown, nape, back, wings and tail dark grey; tail tipped as in *longirostris*. Upper tail and belly light yellow, upper breast and throat grey. Eyebrow light grey with the dark grey eye

stripe stretching to nape. Most field guides indicate that pectoral tufts are present only in the male, but we believe this to be incorrect as birds that we have owned have displayed to each other and on roosting both exhibited pectoral tufts which, when held in the hand, are difficult to find. Bill brown with dark flesh coloured feet.

Comments: One of the most delicate of the genus to establish and even then they require special foods and much attention. Establishing is made all the more difficult because of their shyness and very few learn to take food from the hand. Time is a strong factor as most die within 18 months of importation, usually from heart, liver or blood disorders. Post mortem examinations of dead birds reveal liver and heart discoloration, due we think to a greatly over-rich diet. Once tame they should be induced to a diet of more fruit and less of a sugar diet. We have had several but they seldom live more than two years.

This species is seldom imported because of its rare status in the whole of its range. It does not stand the inclement weather of Britain very well and if housed outside, quarters should be heated to around 55°F at night.

One egg laid on floor of cage was small in size - 10 mm - and was white, lightly speckled with mauve at the blunt end.

Naked-faced Spiderhunter *Arachnothera clarae*

Range: Philippines and its many islands.

Habitat: A bird of lowland jungle and ravines near water.

Description: Crown, nape and upperparts, including tail and secondaries, olive-brown; primaries old gold; feet flesh coloured with scales edged brown; toe nails dark; eye brown; bill black; naked skin on both sides of face below eye. Breast grey, but feathers give a two-tone effect as one side of breast feathers is a darker grey. No pectoral tufts, but distinct gold shoulder patches which could be a sex difference. These are a distinctive field character. Dupont describes the body colour as green, but the subspecies we own, *A.c. luzonensis*, is as above.

Comments: Hardy in cool temperatures but would not stand our winter conditions. Very tame even when first imported and mixes well with other birds although it will not tolerate other spiderhunters. Has a great liking for newly-hatched stick insects and spiders.

Yellow-eared Spiderhunter *Arachnothera chrysogenys*

Range: Greater Sunda Islands, Thailand and Malaya.

Habitat: Lowland forest but recorded up to 3,000 ft. Reported to be common in Malaya.

Description: Length 7-7½ in (18-19 cm). General body colour varies over the whole range from green through to grey. Yellow eye ring and ear



B. Peck

Head study of *Arachnothera chrysogenys*, showing eye ring and ear patch

patch (not connected). Yellowish on the throat; forehead streaked; bill brown, lighter below; eye light brown; feet flesh coloured. Immature are duller and lacking streaked forehead; some have reduced ear patch and eye ring or it is lacking completely.

Comments: This species is not over-aggressive when two or more are kept together, but must be watched as they can at times turn spiteful. When they do fight, they tend to strike for the eyes and head region. Insectivorous, especially spiders of all sizes, even very large garden spiders. Will tame very quickly if tempted with spiders; all those we have kept have done so.

Grey-breasted Spiderhunter *Arachnothera affinis*

Range: Thailand, Malaya through to the Greater Sunda Islands.

Habitat: Forest secondary growth near flowering banana. Locally common over most of its range up to 3,500 ft.

Description: Upperparts olive-green with darker streaks on throat and forehead. Olive-grey beneath becoming much paler at vent and underside of tail. Primaries and tail dark grey with tail bands occasionally present. Pectoral tufts are light in colour although some carry more yellow than others. Bill brown but tip and underside a lighter shade; feet pink tinged and eye colour varies from light to dark brown. Length 7 in (18 cm) but the Malay race *A.a. modesta* is smaller.

Comments: Not aggressive and can be kept in small groups. Although two males will occasionally “sham up” to each other, it rarely develops

beyond this. General habits are more like the larger sunbirds. Not as inquisitive as other members of this group, it is more insectivorous than the larger species, taking flies, spiders, crickets and first instar locusts but it has trouble with larger insects. Nest not described, but in captivity has built in a finch nest-box. Often misnamed by dealers as it can be mistaken for *A. robusta* and *A. everetti*.

Long-billed Spiderhunter *Arachnothera robusta*

Range: Sumatra, Borneo, Malaya and Thailand.

Habitat: Forest secondary growth up to 4,500 ft.

Description: Olive green on back, wings and tail; breast and belly lighter, lightly streaked and tinged yellow on centre of breast and belly. Very small area of naked skin around eye; beak dark brown, horn-coloured underneath, about 10 mm thick at base and 50 mm in length. Wing shoulders bright yellow. Each tail feather is tipped with a white spot giving the impression of a band. Pectoral tufts are yellow in the hen and orange in the male. Length approximately $8\frac{1}{2}$ in (21.5 cm).

Comments: Very aggressive and difficult to keep two together. Both sexes show pectoral tufts when displaying and when roosting. Once established, quite easy to keep, accepting the diet offered to the larger species but probably the least insectivorous of the genus imported. Very vocal, a short note often repeated for long periods. Bathes regularly and tames quickly.

Streaked Spiderhunter *Arachnothera magna*

Range: Himalayas, China, India, Burma, Malaya, Thailand and Laos. Breeds between 1800 and 4500 ft in India.

Habitat: Forest, secondary growth and clearings, especially near wild banana.

Description: Length $6\frac{1}{2}$ - $7\frac{1}{2}$ in (16.5-19 cm). Yellow olive, streaked black, finely on throat but getting larger on breast, back and head. Tail and wings brownish green. Bill black; feet vary from orange to yellow and eyes from black to brown.

Comments: When birds were imported from India they were quite numerous but few have been imported recently. Suffers badly with its feet when first imported. The birds we have owned of this species that were of Indian origin seemed to mix quite well together but those from Malaya were quite aggressive.

Very easy to feed, even when first imported and will take most insects plus most forms of conventional food, i.e. sponge cake and nectar, bread and milk, fruit and soft food. Very tame. It is reputed to be the largest of the spiderhunters but from personal experience this is not so; the largest

birds we have owned are *A. clarae* and *A. flavigaster*.

Spectacled Spiderhunter *Arachnothera flavigaster*

Range: Sumatra, Borneo, Malaya and Thailand.

Habitat: Locally common in secondary growth.

Description: Body, head, wings and tail olive green; breast and under-tail greyish yellow. Covered edge of flight and tail feathers brownish green. Bold eye ring and ear patch yellow. Beak dark brown; eye brown and feet horn-coloured.

Comments: One of the easiest to feed. A large bird, probably the largest if measured by body weight. Very tame and can be kept in pairs or groups, but again must be watched. Able to take large insects such as adult crickets and third instar locusts.

Whitehead's Spiderhunter *Arachnothera juliae*

Everett's Spiderhunter *Arachnothera everetti*

Both of the two remaining species of spiderhunter occur only on Borneo and it is unlikely that either has been imported. Information about their natural history can be found in *The Birds of Borneo* by B.E. Smythies. We have seen a skin of *everetti* and have grouped it, along with *juliae* in Group 2 where we think they belong.

The groupings below are based on observations and experience of the various species in captivity and what we have been able to find out about their natural history.

Group 1: *A. crassirostris*, *A. longirostris*

This group consists of the two smallest species which are similar in plumage although this is not the major similarity, the important common characteristics being diet and display.

The display of both is a series of stretch-posing by the male and wing fluttering by the female. *A. longirostris* will show its pectoral tufts most times it displays, but *crassirostris* only shows them when posing with its wings open. Both have tail feathers tipped or barred and the feet of both are very similar to those of the large sunbirds, in that the toes are formed with the nails being short but curved.

We experienced great difficulty in getting these two species to take any substitute for live food which was difficult to supply as they would only take small spiders and fruit flies. It was some time before house flies and bluebottles were taken, and even then the birds showed little interest. They would probably have taken small stick insects but at the time we had not started to use these.

A friend had a *longirostris* that laid an egg on the floor of a cage. Ours

have never shown any nest-building behaviour, although they did mate.

Group 2: *A. clarae*, *A. chrysogenys*, (*A. everetti*), *A. affinis*, *A. robusta*, (*A. juliae*)

This group contains the true spiderhunters. In appearance they are very similar. *A. clarae* has the shortest beak but this is not an indication of how insectivorous it is as the most insectivorous species in the group is *chrysogenys* but none is very dependent on live food in its diet.

The songs of *A. clarae*, *affinis* and *robusta* are so similar that we are unable to tell them apart; *chrysogenys* has a higher pitched song.

The dietary requirements are basically half insectivorous and half nectar and fruit. Notes from wild observations indicate that fruit juice, rather than the actual fruit, is eaten.

Group 3: *A. magna* and *A. flavigaster*

This group contains the largest species of the genus. Both are robust birds and able to take quite large insects. The display of *A. magna* is mainly wing flutterings and neck stretching; its whistle is a sharp note.

ACKNOWLEDGEMENT

I extend my thanks to John Chandler for notes on *A. clarae* in the wild and to Colin Vince for notes on establishing spiderhunters in captivity.

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Previous notes from the Avicultural Magazine:

- HOPPE, R. (1969). Short notes on some of my birds (Streaked Spiderhunter *A. magna*). P. 164.

BREEDING THE HYACINTHINE MACAW

Anodorhynchus hyacinthinus

By DAPHNE and WALTER GRUNEBAUM

(Gloucestershire)

Six years ago we acquired a pair of Hyacinthine Macaws and as we were unfamiliar with these beautiful birds, we sought information wherever possible. We discovered from reference books that they inhabit the forests, swamps and palm groves of the interior of southern Brazil and the westernmost parts of Bolivia; also that a great deal of their habitat is now being lost, owing to the opening up of Brazil, and that numbers of the birds are used by the natives for food.

Their diet consists of fruit, seeds and nuts of various kinds. They are mostly seen in pairs and, if disturbed, will circle round, screeching, and then settle in the tops of tall trees. The staff at Kew Gardens told us that the trees have a very quick leaf fall, and are almost immediately re-established.

These macaws are the largest of all parrots, their length overall being 35 inches (89 cm); the tail of the immature bird is a little shorter.

All this was interesting but did not make us much the wiser at keeping Hyacinthine Macaws in captivity in the English climate and with the limited variety of food available here.

When our birds arrived, they were seen feeding each other and gave every indication of being a true pair. The cock bird had a long white tail feather and several white flecks on his shoulders so it was easy to distinguish him from the hen. We put them in our largest aviary, which was not at all suitable as it was made of wood but it did have a flight 10 ft (3 m) high and nearly 40 ft (12 m) long. Their "house" measured about 8 ft (2.5 m) x 12 ft (3.65 m) at the apex, with a large, sturdy box 2 ft (61 cm) square, with a tin base, placed as high as possible on one wall. The birds obviously liked the height but it proved disastrous from our point of view, when trying either to inspect or photograph. A barrel was provided on the ground, together with two others in the flight outside, placed at various heights. All these barrels were ignored. Several natural branches of various thickness were fixed inside for them to roost on and, again, were placed as high as possible. Their house was well lit and heating was also available, used mainly at night. Their house opened on to a covered "verandah" where they had their food and drink, and where they could see all that was going on. From there they had their long flight to a small perspex-covered shelter at the far end, where they could get out of the

wind, which they cannot tolerate. Several branches of fresh willow, ash or fruitwood were placed in the aviary, along one side only to allow the birds' flight to be uninterrupted.

When they first came to us, their diet consisted solely of coconut, Brazil nuts and an occasional apple. Nothing else was taken, and sunflower seed was totally rejected so their diet was the first problem we had to overcome. We put another pair of macaws in an adjacent aviary, and the sight of these birds obviously enjoying banana and various foods eventually persuaded the Hyacinthines to add other fruits and vegetables to their diet.

After two years, in late March, the hen became interested in her box and laid two eggs. The incubation period is 28 days but at the end of this time the eggs vanished, presumably infertile. After another two months she laid two more eggs, but regrettably the chicks were dead in shell. The following year the hen died in May, quite suddenly and without any signs of previous illness. The post mortem examination disclosed that she had no eggs inside her, that she had emphysema and a fatty heart. Perhaps her previous unsatisfactory diet had some bearing on this.

The cock bird appeared distraught at her death, so we put a young Blue and Yellow Macaw into the aviary to keep him company. She taught him to eat sunflower seed, albeit reluctantly. During this time we searched for another bird, without any success. The cock bird went into moult and lost his white feathers.

After three months of indefatigable search, we eventually found another bird. It was not surgically sexed so we had to take a chance. Its feathers were dull and the yellow skin around the lower mandible was a pale cream colour, which, compared to the colour of our cock, which was dark orange, looked almost anaemic and on arrival she ate only Brazil nuts and white sunflower seed.

We put the two together in September 1982 and after three months we noticed that her diet had changed and they were both eating a good variety of food, which consisted mainly of coconuts, Brazil nuts and sweetcorn (fresh or defrosted frozen), augmented by bananas, grapes, apples, peas, broad beans and carrots, in season, and a few peanuts and walnuts. These last were not much favoured. Gradually the sunflower seed was abandoned. We no longer worried about their diet as their feathers were shining and the yellow skin on the new bird was becoming darker by the week.

The first indication that they might be courting came when we opened the trap for the cock to fly at liberty to which he had been accustomed before his first hen died though since then we had kept him shut in. To our astonishment he would not go out! He became very excited and flew backwards and forwards into his house, refusing to go near the trap.

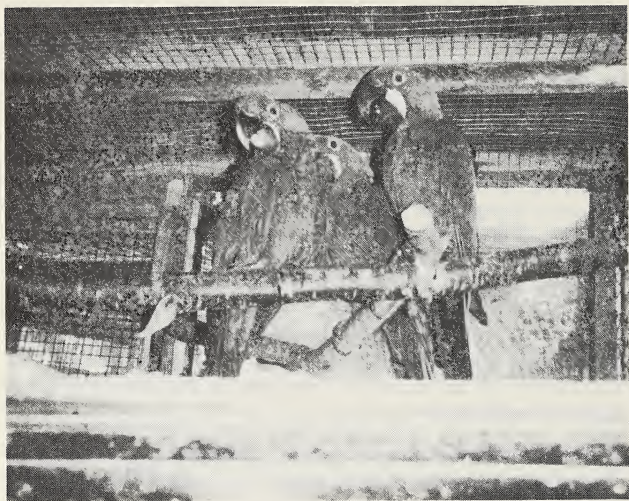
Shortly after this we saw, and heard them mating and on 26th March 1983 to our great relief, she laid two eggs. Three days before the 28-day incubation period ended the cock opened up the roof of his flight and both birds were found playing about the garden. As it was her first time at liberty, with eggs in the box, it was a nasty moment. However, by leaving them quietly to their own devices, they put themselves back in with no trouble at all but they lost interest in the eggs which disappeared, presumably infertile. It was then the 25th April.

However, in May 1983 the hen was back in the box again, sitting tight. The first egg must have been laid between 14th and 16th May. We increased the heat at this point, and with the aid of an old boiler and a piece of pipe, we were able to get a thin plume of steam into the house, thereby increasing the level of humidity. We would do this once or twice a day for an hour or two. It was interesting to see that from this moment, whenever we approached the aviary, the parents would assume a defensive position with backs together and tails crossed, accompanied by loud cries. They would stay like this until we moved away.

It was on 15th June that we heard the unmistakeable sound of macaw-chick noises coming from the box. It was an unforgettable moment, for although we have bred so many Blue and Yellow Macaws, somehow this was very different. The next day we were able to see the chick, which was tiny and appeared to be black skinned. There was also a second egg which had been abandoned. On 19th June we looked in again and saw that the chick was now definitely pink and already much larger. The parents now started to search for grit early in the morning and we put a pile of limestones in their flight, which they would pick up and grind in their beaks. We have never seen them eat commercial grit. On 17th June yet another egg appeared but by the following night it had vanished. The chick then made steady progress, dark quills being visible by 7th July.

The parents' diet at this time consisted of the usual coconuts and sweetcorn but they now enjoyed broad beans which were in season, and the first early peas. However, they could not be persuaded to eat any kind of soft rearing foot, which was eaten in quantity by the Blue and Yellow Macaws. A lot of cuttlefish "bone" was taken and daily vitamins were given in the drinking water.

At six weeks the yellow skin around the black beak and eyes could be seen and the chick started to look like a real Hyacinthine. The tail was about 5 in (12.5 cm) long and, apart from a few bare patches on its back, the chick appeared to be fully feathered and had become very aware of its surroundings. The parents now started to consume large quantities of cob and hazel nuts, even when they were still green and unripe.



D. Grunebaum

Hyacinthine Macaw family group: chick at 3½ months with cock (left), hen (right)

After another five weeks of steady progress, on 7th September the chick came out of the box and was found on the floor of the house. The parents would not go to it but sat on the side of the box calling to it. We waited, agonising over what best to do, but as it made no attempt to move, we eventually picked it up and put it back inside the box. After another day or two, it came out on to the verandah without further mishap.

However, our satisfaction over its progress was short lived. It appeared listless and rather nervous of climbing about; we thought this might be due to its fall at the start. It did not make any serious attempt to eat and would pick up a piece of sweetcorn and let it drop again, without taking anything from it. We began to worry when it failed to go back in to roost with its parents at night, in spite of their desperate efforts to get it to do so. The cock was obviously aware that something was amiss, and tried to make the chick eat. He stayed pathetically over the food tin, bobbing his head and making encouraging little noises but the chick did not respond and on the day we had decided that it would have to be taken away, it was found once more on the floor. Although we had not been too happy

about its general behaviour, it had nevertheless appeared to be in good physical shape up to the moment that it failed to go in to roost at night. It had undoubtedly caught a chill and quick action was called for. We took it into our house, boosted the room temperature to 80-85°F and laid the chick on a hot water bottle. Our veterinary surgeon visited and gave it a tube feed of Complan and Farex, and a B12 injection. The next day it was still obviously very ill but it was fed every two hours and we felt that it was holding its own. Someone then suggested that we should wrap it in foil under the infra-red lamp. This we did and the result was extraordinary in that, that very same evening, it was up and sitting on the edge of its box! Feeding was still very difficult as the syringes which we had seemed inadequate for a bird with such a large beak. However, when some friends who were experienced in these matters brought us a much larger plastic syringe, which was, in fact, for basting roast meat, feeding became very much easier and the chick started to make a rapid recovery. However, if the temperature in the room dropped below 75°F, the chick deteriorated again, so a close watch had to be kept. The weight of the chick had dropped to around 2 lbs at this time, but after five days of regular feeding, it was once more on its feet and taking an interest in life. We removed it from the small room, gradually lowering the heat, and installed it in a sunroom, where it could see other birds. After a short time it was able to hold food for itself, and was able to cope with peanuts and half-shelled Brazil nuts, banana, apple and it would try to scrape coconut. For about 10 days we continued to give it three daily feeds of soft food, but all milk-based food such as Milupa had to be stopped as the chick started to scour. By adding a teaspoon of live yoghurt to some apple puree and Farex, this condition was cured in five days. At the end of three weeks, the chick started to refuse soft food altogether and now (October 1983) it spends most of the day wrestling with half-shelled nuts, small pieces of sweetcorn, apple and soaked raisins. It has become very affectionate. The cock parent has spotted him through the glass and has been down to investigate, regurgitating as hard as he can. The hen is still not at all interested. We think that they would still accept the chick, as long as it can feed itself, but now unfortunately the weather is too cold to put it outside, even though it now weighs over 4 lbs.

Conclusions

In spite of their size, Hyacinthine Macaws do not seem to be very robust, and for this reason we have never contemplated surgical sexing, nor have we ever wanted, or indeed needed (until now!) to hand-rear as we felt that if it *could* be a natural process, then so much the better for both mother and chick. Our Blue and Yellow Macaws have reared a brood of

three this season perfectly adequately.

Hyacinthines seem to be very loveable and extremely intelligent birds but, with their enormously strong beaks, special attention should be paid to their housing, as we have learned to our cost, a stone and metal construction being the most satisfactory. They also need a never-ending supply of branches to strip and chew, and they consume a prodigious amount of food, especially during the breeding season. They are also capable of making an appalling noise if they are disturbed by strangers, or suffering from boredom or frustration. Some form of heating to maintain the overnight temperature at around 70°F, together with some means of increasing the level of humidity, proved successful in this instance, and the nest-box was one-third filled with dampened bark and peat to make an atmosphere of humid warmth for the eggs.

Breeding the little Hyacinthine has been a wonderful and worthwhile experience, but we have one regret - the cock bird seems to have lost his white feathers. It is now well over a year and there is still no sign of them!

Previous notes from the Avicultural Magazine:

DELACOUR, J. (1960). The Birds at Clères. (Hyacinthine Macaws laid but did not hatch) p. 221.

SMALL, Ralph C. (1975). Nesting and hand-raising of the Hyacinthine Macaw (Brookfield, Illinois, USA). P. 90-93.

As described above, the Hyacinthine Macaw *Anodorhynchus hyacinthinus* has been bred by Mr. and Mrs. Walter Grunebaum and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or any other reason that would disqualify the claim, is asked to inform the Hon. Secretary.

* * *

Shortly before going to press, an article was received from Mr. Gerd Volkemer, also on breeding the Hyacinthine Macaw. As so little has been published on this subject, and as Mr. Volkemer's account included some additional details, a precis of his article is given below. We would like to extend our congratulations to Mr. and Mrs. Grunebaum and to Mr. Volkemer for breeding such a difficult species which we hope will now become a regular event, and that their experience will enable captive breeding stocks to be established eventually.

NOTES ON BREEDING THE HYACINTHINE MACAW

By GERD VOLKEMER (Hubermühle, Germany)

A pair of these beautiful macaws was obtained in 1977 but unfortunately one died shortly afterwards. It was not until four years later that I obtained a further bird to make up the pair.

This pair was placed in an aviary measuring 4 m x 2 m x 1.5 m wide with inside quarters of 1.75 m x 2 m x 1.5 m wide. The temperature was kept slightly above freezing point during winter although these birds seem not to be sensitive to cold weather. A matchwood nest-box 1 m high x 50 cm x 50 cm was installed; the entrance hole was 20 cm square. Metal plating was placed around all corners of the box to prevent it from being destroyed and oak branches were placed around the entrance for the birds to chew if they wished.

Their diet consisted of various fruits, dried beef bones, a mixture of corn, oats, wheat, hemp and some smaller seeds, sunflower and peanuts. Calcium and minerals were mixed with the food and small pieces of mussel shell were also given. Every four weeks, the birds received a five-day course of multi-vitamins in their water. They also showed a fondness for small stones (1-4 mm).

At the end of May both birds adopted a defensive attitude towards their nest-box whenever the aviary was approached. The female would disappear inside before peering out and biting the oak branches surrounding the entrance, while the male stood nearby adopting an aggressive posture. Occasionally both birds would sit close, nodding their heads while holding beaks and uttering a loud "rolling" noise.

Copulation took place with both birds sitting next to each other, tails crossed with the male placing a foot on the female's back.

The first two eggs laid disappeared after a fortnight but on 2nd June a further two were found. These measured 50 mm x 35 mm, were pure white and the weight of one was 20 grams. The female incubated for approximately 30 days (exact duration was difficult to determine because of their aggressiveness). Only one hatched. This chick produced soft noises for several weeks before going through a period of silence until it started to become very vocal.

Its eyes opened at about two weeks of age and it left the nest at three months. At this point the plumage was duller than in adults and a paler yellow around the eye.

In addition to their normal diet, sprouted oats, wheat, sunflower and corn and unripe corn-on-the-cob (maize) were also given.

In 1983 this pair reared another two young and an additional pair produced one.



R.H. Grantham

Duivenbode's Lory has a colour scheme which is unique within the parrot family - chocolate brown with contrasts of yellow and violet

BREEDING DUIVENBODE'S LORY

Chalcopsitta duivenbodei

By ROSEMARY LOW

(New Barnet, Hertfordshire)

One hundred years ago, in 1884, Maarten Dirk van Renesse van Duivenbode presented a magnificent collection of birds and animals from New Guinea to the Royal Natural History Museum in Belgium. Among them was a new lory which was dedicated to the donor (Prestwich, 1963).

In the following century, little has been learned about this very beautiful bird. It was first seen alive in Britain in 1929 when at least four birds were imported. At the time not much more was known about it other than that it was found in northern New Guinea. This is a lowland species, found up to about 200 m (660 ft). Rand and Gilliard (1967) found it to be "only fairly common" and recorded that it was usually seen in small parties of up to six or eight birds in the tops of forest trees. Forshaw (1978) records that it is irregularly distributed, being common in some areas but uncommon to rare in others. Near Maprik, in north-western Papua New Guinea, Pearson (1975) carried out a six weeks' survey from September to November on a 15 hectare plot of lowland primary forest. He found the species to be an uncommon resident of the mid-storey. In the same year Greensmith observed five Duivenbode's Lories in a mixed flock with Rainbow Lorikeets feeding at the top of a high tree in second-growth forest.

During the period 1973 to 1978 several New Guinea parrots, primarily lories and Fig Parrots, made their reappearance in aviculture, having previously been known only from the era of small private importations in the first 30 years of this century. They included Duivenbode's Lories, which appeared in small numbers; despite every care, many proved difficult to establish. By the early 1980s no one in Britain had bred the species (which had been reared in the USA and Germany) and I doubt whether there were 20 birds in the UK.

This is a lory which could be confused with no other: indeed, few parrots have such distinctive and unusual plumage and no other parrot has a colour scheme of rich brown, yellow and violet. The predominant colour is dark brown. The head is strikingly marked in adult birds with a band of yellow from the lores, encircling the beak and throat; the forehead is also bright yellow. The entire under wing coverts are bright yellow, also the thighs and a patch on the sides. The underside of the tail is bronze-yellow. The narrow, elongated feathers of the nape and the sides of the neck are yellow (dull, not bright) in adults. Lower back, rump and

under tail coverts are violet or deep blue. Breast feathers have the concealed part yellow; primaries are black with a large yellow patch on the inner web. Beak, cere and legs, also the skin surrounding the eye, are black. The iris is dark brown, with an inner circle of pale yellow.

Length: 31 cm (12 in).

In the first and second editions of *Parrots of the World* the word "undescribed" appears after immature plumage. After comparing moulted and unmoulted birds of the year, I can provide the following description of immature Duivenbode's Lories:

The yellow area on the face (but not under the wings) is duller and less extensive than in adults. The elongated nape feathers are brown, not yellow. The naked skin surrounding the eye and lower mandible is white, not black as in adults; the bill and cere are black. The size is noticeably smaller.

Adult males are generally larger and of bolder appearance than females, although not to the pronounced degree of the Black Lory *C. atra*.

The genus *Chalcopsitta* contains four long-tailed lories, of perhaps more contrasting coloration than is found in any other parrot genera. The Cardinal *C. cardinalis* is red, the Black *C. atra* is black and the Yellow-streaked *C. sintillata* has possibly the gaudiest array of colours seen on a parrot, but is green above. *C. duvenbodei* has already been described. The Cardinal is extremely rare in captivity; the other three I have kept and have bred the Black (Low, 1978). The *Chalcopsitta* lories are fascinating birds, beautiful, extremely responsive to man and highly intelligent. They nearly all become tame in time, even imported adults. Young birds quickly start to mimic, without any conscious effort to teach them on the part of their owner: some adults kept in an aviary will mimic the sounds of human conversation without actually producing words.

Unfortunately, however, they are extremely noisy and frequently emit harsh, ear-splitting shrieks of a power which is perhaps equalled only by the largest cockatoos. When in breeding condition their calls are persistent and even more excruciatingly unpleasant.

Our *Chalcopsitta* lories have, as their basic diet, nectar which consists of malt extract (1 heaped tablespoonful), Milupa baby cereal (a variety of fruit flavours) (two or three heaped tablespoonsful), glucose (two heaped tablespoonsful) and a little condensed milk, dissolved in hot water and then made up to 1 litre (35 fluid oz) with cold water. This is changed twice daily or more frequently in very hot or very cold weather. I am not entirely convinced that this is a good rearing diet for Duivenbode's Lories, although it has proved satisfactory for other species (plus various fruits and vegetables and, in some cases, seed) and in future will attempt to

supplement this. The problem with the Duivenbode's is that they are most conservative feeders and usually decline to accept foods other than sweet corn and a little apple and pear. This is in complete contrast to the Yellow-streaked Lorries which will consume almost any food offered.

Prior to being introduced to the male in November 1978 the female of our pair of Duivenbode's had been kept with another female for about three years. Her initial reaction to the male was one of fear; she crouched in the corner of the aviary on the floor, although at no time has the male behaved aggressively towards her. After several months they were totally compatible. I neglected to note when copulation first occurred but believe that this was in 1981. The first breeding attempt was in 1982. Two eggs were laid; one chick hatched and died the same day.

Because of the extreme aggressiveness of the male in breeding condition (he would attack anyone who entered the aviary - a total transformation from the timid adult when first acquired) the pair was moved to a new aviary in February 1983. A few feet from their former enclosure, it was designed to allow nest-box inspection from outside the aviary. The measurements were 7 ft x 3 ft x 6 ft (2.1 m x 91 cm x 1.8 m high). In a secluded position, protected by a wall, shrubs and conifers (and covered in polythene in the winter), it has no shelter. The nest-box is permanently in position for roosting purposes. It measures 9 in (23 cm) square and 21 in (54 cm) high. Several inches of pet litter (obtained in compressed packs from pet shops) line the base.

Mating and courtship feeding had been observed for several weeks prior to their removal. Removal did not interrupt the breeding cycle. They soon entered the new nest-box and by 12th April the female was incubating one egg. The completed clutch, as in most lorries, was two eggs.

I inspected the nest on the evening of 5th May, when the female made a brief sojourn into the flight and, to my surprise, saw a wriggling chick. I had a split second before the female's return to decide what to do - and removed it just as she came in through the nest entrance. The chick was fluffy, indicating that it was not newly-hatched; it had either hatched on the previous day or early that morning. There was no food in its crop but it seemed strong and healthy. After it had been in the brooder a little while, it fed eagerly on our usual lory chick food. This consists of approximately equal parts of Boots bone and beef broth with vegetables (baby weaning food) and Heinz tinned fruit dessert. This is simply mixed with water and heated until it starts to boil. It is quick and easy to make and will rear any lory species. At first the chick could take only small amounts and needed to be fed every hour or hour and a half.

Next evening I inspected the nest again and was surprised and delighted to find a second chick. Again, I just managed to remove it before the



Duivenbode's Lory chicks, aged four days

R.H. Grantham



Duivenbode's Lory chicks, aged three weeks

R.H. Grantham

female returned. I greatly dislike removing chicks in these circumstances - before the parents have been given an opportunity to rear - and silently vowed that next time they should have a chance to rear their own. On removal the second chick was more obviously newly-hatched than the first. It weighed 8 g, as against 9 g of the first chick. The chicks had the bill very dark brown, with a contrasting white egg tooth. The long white down was not densely distributed over the body.

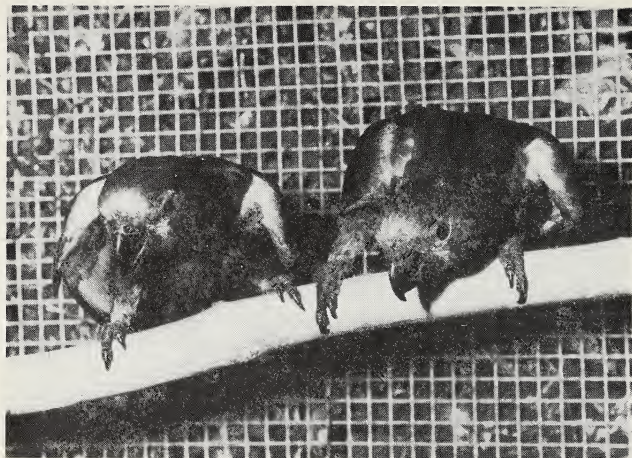
By the time they were seven days old, the chicks' feet had assumed a brown tinge. Between 10 and 19 days their bodies took on a darker appearance as the feather tracts of the second down became apparent. Being dark in colour, they were most conspicuous. By about 20 days the second down was erupting. This was dark grey in colour. The eyes started to slit at about 12 days but were not fully open until about three weeks. The toes of one chick were in the correct position, while all those of the other were still pointing forward; this is quite common at this age.

On 29th May, at about 24 days, the first contour feathers were erupting, shortly to be followed by the head feathers. At this stage they had a somewhat untidy appearance, retaining wisps of the first down on the head and back. By the time they were five weeks old the body feathers had just broken through the sheaths. These were dull brown above and yellow-tipped brown below. There was a tinge of yellow on the opening feathers of the forehead, cheeks and ear coverts. The white area of skin surrounding the eye was very prominent. The large, sturdy feet were black. The chicks weighed 130 and 140 g.

By then the temperature in the brooder had been reduced from about 92°F to 82°F (27.7 °C). Their feathering was well developed by six weeks - nearly covering the mantle, underparts and crown. The younger chick had deeper coloured and more extensive yellow feathering on the forehead and ear coverts and at the sides of the beak. However, by the time they were weaned and after the first moult, they were indistinguishable. Their tails were, at six weeks, ½ in (12 mm) long.

By this stage they were very vocal, their food soliciting call sounding like that of a *Trichoglossus* lorikeet chick amplified. They were quite active and their nails were painfully sharp. At seven weeks they were transferred from the brooder, in which the heat had been gradually lowered to about 79°F (21°C), to an unheated weaning cage. This is simply a box 12 in x 16 in x 12 in high (31 x 41 x 31 cm), with a hinged lid and a wire front. The young birds stand on a false floor of welded mesh under which there is a thick layer of wood chippings. These weaning cages are utilised in preference to larger, open parrot cages, as a convenient transition from the brooder.

By now the young Duivenbode's were almost fully feathered, except



R.H. Grantham

The young Duivenbode's Lories on the point of taking off to land on the photographer's head. They were very difficult to photograph!

under the wings (the final area to feather in lory chicks); the tails were very short, less than 2 in (about 4 cm). They were becoming vocal and adventurous, and their personalities were emerging. The older chick was perching and could climb to the top of the weaning cage. A week later they had outgrown this and were transferred to a metal cage 24 in (61 cm) long with a wire front.

When offered nectar on 30th June the older chick soon started to feed. Within two days both were drinking substantial amounts, filling their crops between spoon-feeds. The older chick quickly learned to drink in the same manner as an adult, while the younger at first lapped, keeping its lower mandible outside the nectar container. A week previously their food had been augmented with CeDe Canary rearing food, as provided to larger parrot chicks, as they had seemed a little on the thin side.

Within a few days it became impracticable to keep them in the metal cage and they were transferred to a 6 ft (1.8 m) indoor flight. On 30th and 31st July they were placed outdoors for most of the day but brought indoors at night because thunderstorms were imminent. They settled down quickly in their outdoor aviary, finding the nectar within minutes.

At this stage they were still receiving a late night spoon-feed, partly because they enjoyed the attention and because I believe that weaning should be as protracted as possible.

Meanwhile, the parents had nested again; the female laid on 28th and 30th June. I was able to ascertain the incubation period as 24 days, as the eggs hatched on 21st and 23rd July. Fortunately it was easy to inspect the nest as the female would leave whenever fresh nectar was provided. For the first two days of the first chick's life I inspected the nest two or three times daily and never found it with any food in its crop. On the third morning I fed the chick and returned it to the nest. That evening there were two chicks and I removed both for a quick feed. I fed the younger and found to my relief that the other had a full crop.

Thenceforth the female became much more protective of the nest; while she allowed me a quick look when she left, she would return before I could ascertain how much food was in the chicks' crops. I continued to check the nest two or three times daily - as it is up to the eight-day stage that losses of lory chicks are most likely to occur - and all seemed to be progressing well.

The only food taken during this period was nectar and a little corn and apple; other fruits and greenfoods were ignored. The female was very attentive to the chicks which usually had bulging crops. However, as often happens with lory chicks, the older was appreciably heavier and probably receiving a greater share of the food. On 21st July I was quite concerned about the younger and removed it quickly to find it weighed only 41 g. At the same age the hand-reared chicks had weighed 83 g and 74 g. Some extra litter (wood shavings) was added to the nest, which remained dry. While this was being carried out, the parents showed extreme anxiety, screaming and biting at the nest-box from which they had been prevented access. Because of their concern I decided to leave the chicks with them, although neither was as well developed as their hand-reared counterparts. By 23rd July they had some wispy down remaining, but no signs of feather tracts. A week later both were totally devoid of down - and I suspected that they were being plucked by the female. Feather tracts were evident, especially on the wings.

By 21st August the younger chick was totally devoid of down and no feathers were emerging. As it was a source of worry, it was removed for hand-feeding. Its weight was 89 g. It then progressed well and had greatly increased its weight to 140 g by 30th August. By the middle of September it was fully feathered but remained in a heated brooder because it had a much younger Dusky Lory *Pseudeos fuscata* as a companion. Doubtless it would have consumed nectar at an earlier age but this was not offered until 25th September when both young lorries were moved to a weaning

cage. The five and a half week old Dusky consumed nectar equally as enthusiastically as the Duivenbode's.

Also on 25th September the Duivenbode's reared by its parents emerged from the nest-box - after 11 weeks. It sat quite calmly in the aviary. The night promised to be fine and mild; nevertheless, I took the precaution of returning it to the nest-box. It was roosting out after its parents had retired to the nest. On the following night the procedure was repeated but the young lory emerged immediately from the nest to roost alone on top of it. After several weeks it roosted inside with its parents.

Unfortunately, I cannot record this as a total success story. On the morning of 2nd December, following a very cold night with several degrees of frost, one of the May-hatched youngsters was found dead in the nest-box. My veterinarian provided the following post mortem report: "The main finding - and the cause of death in my opinion - was a large cyst of ureate-like material ventral to the cloaca but not affecting the cloacal bursa. This contained about 15 ml of fluid and bulged out as soon as the abdomen was opened. The material had no smell and there was no sign of infection or inflammation. The bird was a female and the areas affected seem to be the distal oviduct/uterus (shell gland). I feel that this is probably a congenital abnormality in this bird and that the cyst had gradually been filling throughout its life."

On a brighter note, I am pleased to report that several months after our initial success, Duivenbode's Lory was bred in two other collections in the UK - by Mrs. Patricia King and at Birdland, Bourton-on-the-Water, one youngster being reared in each case.

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 SAYERS, B.C. (1975). The subfamily Loriinae - Duivenbode's Lory. P. 26-28.

As described above, Duivenbode's Lory *Chalcopsitta duivenbodei* has been bred by Rosemary Low and her husband, Bob Grantham. This is believed to be the first success in this country, but anyone knowing of a previous breeding in Great Britain or Northern Ireland, or any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

BREEDING THE COLLARED WARBLING FINCH

Poospiza hispaniolensis

By JEFFREY TROLLOPE

(Hounslow, Middlesex)

Introduction

The genus *Poospiza* consists of some 16 species of Neotropical buntings; they are small, active and acrobatic birds which are not well known in aviculture. Importations into the UK have always been small in number and erratic and because of their quietly coloured plumage, they have lacked the popularity of more colourful and available genera, such as *Paroaria*, *Sicalis* and *Corysphospingus*. There have been very few successful breedings, the most recent is probably for *P. ornata* in Sweden (Zackrisson, 1972).

The limited information available indicates that they are, like other Neotropical *Emberizidae*, opportunistic breeders, with a rapid reproduction rate when triggered by "optimum" environmental conditions. They are very insectivorous when breeding and if a good quality insectivorous diet is provided, reproduction in outside aviaries is not inhibited by declining photo period and temperature.

P. hispaniolensis has also been known as Bonaparte's Warbling Finch; the species is sexually dimorphic.

Description

Cock: Bill blackish and glossy, rather long and slender, irides brownish, lower eyelid white, long white eyebrow stripe surmounted by narrow dark line, side of head black, upperparts grey, wing coverts with a greenish buff wash, tail black with the inner webs of outer feathers whitish. Underparts white, side of breast and body grey, centre of breast black, sides of vent chestnut, legs and feet light brown.

Hen: Bill greyish brown, eyebrow stripe greyish white, upperparts brown streaked with dusky, tail greyish brown, underparts greyish; the hen lacks the black on the sides of head and centre of breast.

Distribution and habitat

South-west Ecuador and coastal Peru; cactus, scrub and cultivation.

Birds and housing

A pair of *P. hispaniolensis* was purchased in October 1980 and housed in an outside heated bird room during the winter. During 1981 and 1982

they were housed outside in my No. 3 aviary (3.25 x 1.5 x 2.25 m) from April to November.

Food and feeding

The birds are fed on a millet mixture with the addition of canary seed, niger, hemp and maw; a commercial insectivorous softfood is also given, but seldom eaten. Seeding grasses are given throughout the year. Livefood consisting of mealworms, maggots and small house crickets are also given throughout the year and when the birds are breeding, collected livefood from nettle beds and bushes is provided.

Breeding

Although both birds were fit and active, the cock also singing frequently throughout the seasons, no breeding activity occurred during 1981 and 1982. They were released into No. 3 aviary on 25th May 1983 and both birds were very active, the cock singing continuously. On 5th August, the hen began to build a nest in a clump of coniferous branches fixed to the aviary side. The nest was completed by 8th August and copulation was observed. Both birds chased away other species from the site (*Uraeginthus*, *Amandava* Waxbills and a pair of Tambourine Doves *Turtur tympanistria*). The first clutch was infertile. One chick was hatched and reared from each of the second and third clutches (Table 1).

TABLE 1
BREEDING SYNOPSIS 1983

Clutch No.	1st Egg Laid	Clutch size	Incubation Period (days)	No. of chicks hatched	Young left Nest (days)	No. of young reared
1	12 August	*3	-	-	-	-
2	6 Sept.	3	13	1	10	1
3	5 October	3	13	1	9	1

*infertile clutch

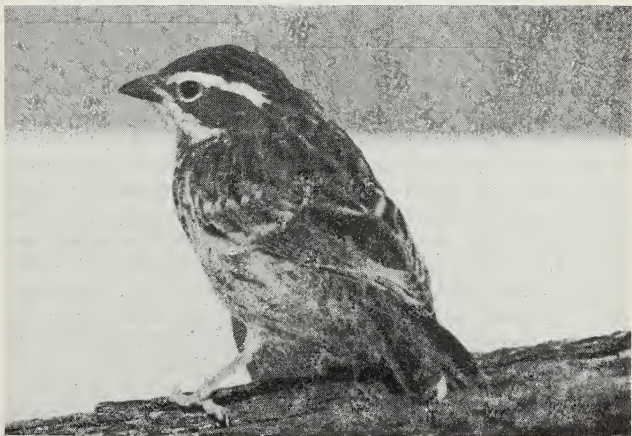
Nest

The same nest was used for the three clutches, a deep cup of dried grasses and straw, lined with finer grass stems (Plate 1) built in a fork of cut conifer branches. The hen alone built the nest and during this period the cock was continually chasing other birds from the site.



1. Adult female *Poospiza hispaniolensis* on nest

M. Trollope



2. Young *Poospiza hispaniolensis* at 76 days

M. Trollope

Eggs

Very pale blue ovates, marked at the larger end with small blackish and dark ash spots, three to a clutch.

Incubation

Like other Neotropical buntings, the hen was a close sitter and tolerant of nest inspection. The incubation period was 13 days, carried out entirely by the hen. The cock occasionally fed her while she was incubating, although she came off the nest to feed herself and exercise.

Chicks

The nestling has dark greyish skin, with greyish brown down; the gape is pinkish with whitish gape flanges, darker near bill tip. Both parents fed the chick, the cock brooding when the hen came off to feed. This pattern was repeated for the chick of the third clutch. In common with other Neotropical bunting species, the chicks left the nest at an early age (10 and 9 days respectively); neither the primaries nor tail feathers were fully developed and they could not fly effectively for another four to five days.

At 26 days (plate 2) the young have the bill dark horn, the irides are light brown, the forehead, crown and nape are greyish brown with a pronounced greyish white eyebrow stripe. The area from the bill across the upper face to the nape is brownish grey, the throat and lower cheeks are greyish white. Breast and abdomen are light grey, heavily streaked with dark brown, the upper surface is greyish brown, streaked with darker brown, wings and tail brown, with a few feathers tipped with light grey, legs and feet light flesh colour.

The parents fed the chicks almost entirely on live food, collected from nettle beds and bushes, supplemented with mealworms and small maggots. House crickets and insectivorous softbill mixture was provided but was not fed to the chick. However, the young birds, when independent of their parents, took both crickets and soft food. When the hen was incubating the third clutch, the cock fed and guarded the first chick that had hatched. The young became independent of the parents at 24 and 25 days respectively, eating hard seed and all other foods provided. At the time of writing (30th November 1983) the first hatched chick is darker on the side of the head, wings and breast, and appears to be a young cock.

Behaviour

P. hispaniolensis is an active, fast flying species, constantly flirting the wings and tail and perching on the sides of the aviary and plant growth, and acrobatic and effective at catching flying insects. Pair bonding and pre-

copulatory display consists of bill touching, the birds flying towards each other then briefly touching bills while hovering. When perched, they move rapidly towards each other along the perch and touch bills. Bill touching is often followed by copulatory chasing, the cock chasing the hen until she perches. The soliciting posture consists of the hen raising her head, flirting the wings and tail, and then the tail is moved to one side and raised. The cock then mounts with rapid wing beats. There is often an element of aggression in this display, usually from the hen who will jab at the cock after bill touching. During copulatory chasing, the cock will make a circling movement of the head in line with the body; the head is raised, moved back and then lowered and thrust forward in one rapid movement. Zackrisson (1972) reported that breeding Pretty Warbling Finches *P. ornata* were very aggressive to other species, killing a waxbill. In view of this, I was apprehensive. However, although the cock, and occasionally the hen, chased other birds from the nest site, no serious aggression occurred. Both parents were bold when I entered the aviary, flying at my head and sometimes lightly brushing me with their wings.

Voice

The call notes are a *che it cheoo*. The cock's song is loud and cheerful, rather complex for an *Emberizinae* species. I have noted it as *choo whit cheoo*, *choo chit wit cheoo cheoo*, *cheoo whit chee cheoo*, *choo chit wit*, *chit chee cheoo cheoo chit*, *chi cheoo wit*. When I entered the aviary or a cat was sighted they gave a low *chut chut*.

Summary

The breeding of captive *P. hispaniolensis* is described with notes on behaviour and voice. In common with other Neotropical buntings, they lay small clutches and are multi-brooded. The young have a rapid rate of growth and development.

In a temperate climate, reproduction is not inhibited by declining photo-period and temperature.

ACKNOWLEDGEMENT

I would like to thank my son Martin for taking the photographs.

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As described above, the Collared Warbling Finch *Poospiza hispaniolensis* has been bred by Mr. J. Trollope and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or any other reason that would disqualify the claim, is asked to inform the Hon. Secretary.

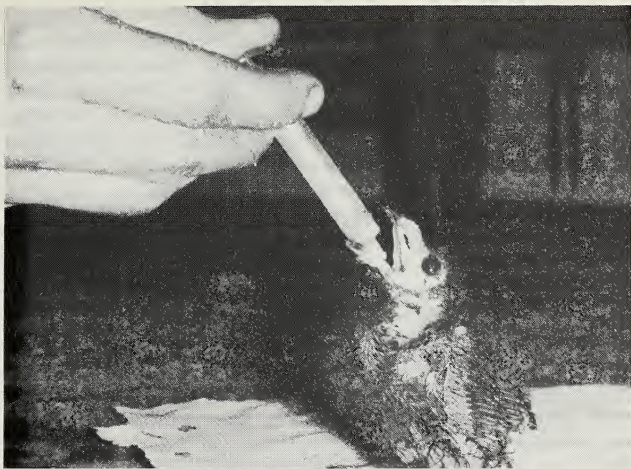
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HAND-REARING THE WHITE-CHEEKED TOURACO *Tauraco leucotis* AT THE PADSTOW BIRD GARDENS (Cornwall)

BY KEVIN EVANS

A White-cheeked Touraco has been successfully hand-reared at Padstow Bird Gardens from an egg deserted by the parents, for no apparent reason, after ten days' incubation.

A clutch of two eggs was placed in the incubator at a temperature of 99°F. The incubation period for the White-cheeked Touraco is 21-22 days, the eggs being laid at two-day intervals, with two being the normal clutch size. We were surprised when chipping was heard from the eggs on the 23rd day as we had just begun to think that the chicks were dead in shell. The first chick to hatch was very small and had obvious difficulty in breathing which got steadily worse and it died later that same day. The second chick hatched within minutes of the first, on the 24th day of incubation. This chick was much stronger than the first and it struggled for a few seconds to free itself from the shell, then, exhausted by its efforts, it slept for several minutes; upon waking it started to preen itself by throwing its head over its back and pulling at its thick, black down. At this stage, it was still quite weak and could only support its head for a second or two.

*Steven J. Matchett*

White-cheeked Touraco being fed at 14 days old

Once dry, it showed signs of being hungry and a Chinese Painted Quail egg, which was also about to hatch in the incubator, almost became its first meal!

The Touraco was reared on a low fat, natural yogurt and first stage baby food "Fruit Delight" mixture, to which was added small quantities of calcium lactate, Vionate and Farlene baby cereal. The ingredients were mixed well and slightly warmed by adding a little hot water.

The Touraco, whose eyes opened on the second day, would gape at the slightest vibration but it was a further five days before it responded by sight alone. It was fed by a 5 ml syringe to which a small length of soft rubber tubing had been attached. At first, it was fed about $3\frac{1}{2}$ ml of food every hour through the day, then once last thing at night and again in the small hours of the morning.

To cool it down, as when a brooding adult gets off the chick to feed it, the young Touraco was removed from the incubator at each feed.

To make the chick feel more secure, I placed it in a small cardboard box measuring 6 x 6 x 4 in. It was lined with limpet shells to give its feet a good grip and to stop its legs from splaying. The shells were covered with absorbant kitchen paper, which had to be changed every time it defecated, which was usually three times an hour.

The temperature in the incubator was gradually reduced by a couple of degrees each day until the chick seemed most comfortable at 85°F.

At eight days old, small black pin feathers had begun to show through on its tail, wings and down its spine. It would preen these feathers constantly, removing the protective sheaths as the feathers began to emerge. At feeding times it would now become very agitated if its food was not delivered quickly enough and its ration steadily increased to 5 ml an hour.

By 20 days, the young Touraco had nearly replaced its baby down with black feathers, which, although preened regularly, always looked scruffy. The chick was now moved into a large, unheated cage so that it could get plenty of exercise. When let out to be fed, it would immediately try to sample the numerous plants around the room.

Its mischievous antics were a delight to watch as it would always try to scale the highest furniture in the room, and as it could only fly very poorly this always resulted in it falling back and damaging its newly-developed tail feathers.

At three weeks, it had begun to pick up small pieces of fruit and so it was gradually weaned from the syringed food on to solid fruit. By five weeks, it was fully independent and was, therefore, moved into an outdoor aviary during the day and brought back in at night.

Now at five months old, it has moulted into a handsome bird with perfectly formed legs, toes and feet.

* * *

BREEDING THE GOLDEN-BREASTED STARLING

Cosmopsarus regius

AT THE LINCOLN PARK ZOO, CHICAGO, USA

BY KEVIN BELL (Curator of Birds)

The Golden-breasted or Regal Starling has long been regarded as the most striking, if not the most beautiful of the African starlings. The metallic blue, green and violet upperparts contrasting with the bright golden-yellow underparts and long tapering tail, make this bird a treasured avicultural species. Native to the arid acacia regions of Somalia and Kenya, this magnificent bird can be seen in many U.S. zoos, but unfortunately it is still breeding in only a few.

Lincoln Park Zoo received its Golden-breasted Starlings from Kenya during July 1977. The birds are kept in a heavily planted free flight exhibit approximately 31 metres long, 9 metres wide and 9 metres high, with approximately 30 other species including Violet-backed Starlings *Cinnyricinclus leucogaster*, Superb Starlings *Spreo superbus*, and White-headed Buffalo Weavers *Dinemellia dinemelli*. In general, the birds coexist quite well, the only skirmishes occurring when the Spreos had young at which time they would aggressively chase other Starlings away from any mealworms or crickets put into the exhibit. In addition to live food, all of our starlings are fed an insectivorous mix, consisting of ground fruit, egg, and meat with a multivitamin additive.

Our first encouraging sign with this species began in the spring of 1979 when they began displacing the Spreos at the food plates and at areas where live food is provided. Soon nesting material, leaves, grass and feathers, were being carried to a wooden nest-box about 5 metres off the ground. The box measured 25 cm x 25 cm x 37 cm high with a circular opening 9.1 cm in diameter.

When the eggs were laid, approximately 21 cm of nesting material was in the nest-box. The eggs, usually three or four, are greenish blue with reddish brown speckling. Since we could not determine precisely when the eggs were laid without disturbing the birds, an exact incubation period cannot be determined. Although eggshell is rarely found, a successful hatch is usually determined by both adults carrying mealworms in their bill to the nest-box. To counteract nestling mortality, the young starlings (including Superbs) are generally removed from the nest at 10 days to two weeks old for hand-rearing. This may also induce the adults to lay a replacement clutch. The average weight of five chicks at 12 days old was 45.8 gm. Hand-rearing is difficult at first as the young are reluctant to beg for food, however keeping them in a dark box and tapping lightly on the side of the nest-cup prior to feeding will work, with patience. Nestlings are hand-fed soft, white mealworms and a commercially prepared bird of prey mix. Young Golden-breasted Starlings begin to eat on their own at between three to four weeks old.

From 1979 to 1981 inclusive, twelve young were produced from our breeding pair and sent on loan to other zoos. Unfortunately, our breeding female died in 1981. At the time of writing, a second female, received on loan from the Denver Zoo, has hatched her first clutch of three eggs.

BREEDING THE YELLOW-BILLED HORNBILL

Tockus flavirostris

By B. MARSHALL (Kineton, Warwickshire)

I obtained a pair of Yellow-billed Hornbills in October 1982 and, as they had come from an outside aviary, I had no hesitation in putting them outside. Initially they were housed in a cage 4 ft x 2 ft (1 m 22 cm x 61 cm) to enable me to settle them down and get their aviary ready.

Their permanent aviary had to be modified before the Hornbills could be put into it. It was originally an L-shaped construction in the top corner of the garden and consisted of two 10 ft x 4 ft (3.05 x 1.22 m) aviaries to which was attached a shed 6 ft x 4 ft (1.83 x 1.22 m) providing inside quarters of 4 ft x 2 ft (1.22 m x 0.61 m) for each aviary. The conversion was simple enough as all it entailed was moving the dividing partition to give one aviary 14 ft x 4 ft (4.27 m x 1.22 m) for the Hornbills and one aviary 6 ft x 4 ft (1.83 x 1.22 m) for the original occupants - three pairs of White-bellied Manikins. The foliage and perches were stripped from the intended Hornbill aviary, except for small evergreens, and the whole floor dug over. Large perches were then placed at either end of the aviary. Two nest-boxes were fitted; one approximately 18 in x 18 in x 18 in (46 x 46 x 46 cm), filled to a depth of 6 in (15 cm) with a mixture of peat and rotten wood and with a 4½ in (11.5 cm) diameter hole, was placed at the end of the aviary nearest the shelter with the hole facing down the length of the aviary. The other box, measuring 12 in x 12 in x 24 in (30.5 x 30.5 x 60.1 cm), filled in the same way, and with the same 4½ in diameter hole, was fitted to the back panel of the aviary with the hole facing the front of the aviary and the house.

Although not surgically sexed, I thought the birds were a pair. Whilst the plumage was identical, one bird was noticeably smaller than the other, having a smaller head and beak, and this I took to be the hen. From subsequent behaviour, I was proved correct.

The birds were placed in the shelter part of their aviary and shut in for about two weeks. On allowing them access to the aviary itself, the cock bird was first to emerge, uttering what was later discovered to be an alarm call. This alarm call was used frequently at times when he was unsure of strangers or unusual happenings around the aviary. Having satisfied himself that all was well, he then fetched the hen out and together they continued to inspect every part of the aviary, including a cursory check of the nest-boxes.

The pair over-wintered outside with no problems at all. Although we

did not have too bad a winter, they still had access to the shed which was kept above freezing by two 12 in tubular heaters which were thermostatically controlled.

In the early part of the spring, the birds showed a lot of interest in the nest-boxes, though most of this interest seemed to be in the larger one and consisted mainly of removing, and subsequently replacing, bits of the filling material.

On 3rd June 1983, the birds were seen mating and for the next month the aviary was a hive of activity during which time many alterations had to be made. The birds were very tolerant of my continual interference, albeit, in my opinion, for their benefit.

Despite all their attempts at shoring up the 4½ in diameter hole in the nest-box, they were having no luck at all. Obviously the average garden mud was not suitable, and so a trip was made to the local hills with two buckets. This resulted in some beautifully soft, very adhesive mud which seemed ideal for the job but, unfortunately, this was not the case and they were still having trouble getting it to adhere. At this point we decided to remove the perch from the nest-box and nail bark to it, thus giving the front at least the appearance of a tree and at the same time giving the birds a much thicker area around the hole. The results of this modification were immediately apparent as, within 24 hours, the entrance hole was getting smaller. My own conclusions from this were that they were quite willing to accept this artificial tree but the wood needed to be at least 1 in (2.5 cm) thick to allow mud, etc. to be plastered on. The Hornbills preferred to cling below the entrance hole, as opposed to perching.

On 15th July 1983, the hen entered the nest-box and, with the aid of the cock, sealed herself in, leaving only a slit about 3 in (7.5 cm) high by ½ in (1.5 cm) wide through which the cock bird fed the hen religiously. He seemed a lot more agitated at this time and whenever strangers approached the aviary, he would fly continuously backwards and forwards, uttering his alarm cry.

On 19th August, five weeks after the hen had entered the nest-box for the final time, chicks were heard in the nest-box. They seemed to understand the sounds of their parents immediately, calling when the hen had accepted food from the cock and going silent, no matter what, on hearing the alarm call of the cock.

All went very well until about 24th or 25th September, when the food intake began to drop. The cock bird was still as attentive as ever and, as it was approximately 70 days since the start, I concluded that they would probably be coming out very soon.

On the morning of 4th October, some 82 days after the hen had been walled into the box, a hole no more than 2 in (5 cm) diameter was

*B. Marshall*

Yellow-billed Hornbill at 51 days

knocked in the seal and she emerged, very well feathered, having moulted during her enforced confinement, but she was very thin.

The pair promptly set about re-sealing the hole, but not before it had been noted that at least one well-grown chick was in residence. It took them about two hours to restore the seal to its former state, then the waiting game continued.

On my arrival home from work at about 5.30 p.m. on 4th October, 1983, I checked the Hornbills. The adults were sitting on a perch looking decidedly bored, and close examination of the nest-box showed the hole to be completely sealed.

Something was seriously wrong! Having read all that I could on the breedings of *Tockus*, I knew there were no

records of this before. I decided to feed the birds and see if some fresh food would stimulate them into opening up the hole and feeding the chicks. Unfortunately this did not work. Although they did feed and perched near the box, no attempt was made to open up the box. At 6.30 p.m. it was decided to bring any chicks that were still alive into the house and hand-rear them.

The entrance hole was carefully broken open and a solitary chick was found alive and well inside. It was also evident that other chicks had died at some time during the rearing.

The chick weighed in at 150 grams and was almost fully feathered. The beak was very much smaller than those of the parents, being only about 2 in (5 cm) long. It had a grey beak and its legs were grey black as in the parents. The plumage was the same as the parents in colour although the tail was a lot shorter. The actual boxy size was about that of a hen bird. However, the pink wattles and bald facial skin were grey coloured

in the chick.

The chick, though very strong and extremely well fed, did not look at all well and its eyes were glazed. It was placed in a hospital cage and left for two hours during which time it huddled in the corner of the cage. When the time came to feed the chick, it seemed to have perked up quite a lot and most certainly had a will of its own. The biggest problem with hand-feeding was probably the size of the chick's tongue as it was only about one-third the length of the beak which meant that all the food had to be placed well back.

Within 24 hours of being brought indoors, the chick was a changed bird, refusing to stay still whilst being fed, preferring to perch on the spar of a chair or on someone's shoe or arm. It showed all the signs of its parents' curiosity and intelligence. It had the ability to pick food up almost immediately but had some difficulty in tossing it from the end of its beak and catching it at the back to allow it to be swallowed; its success rate will obviously improve with age.

After three days, the chick was transferred from its hospital cage to a 4 ft (1.22 m) show cage where it spends most of its time preening and cursing anyone who gets too close. It seems to be settling down well.

On 8th October 1983 I removed the nest-box for inspection and found inside a dead but well-formed chick of about five weeks, which could possibly explain the lower intake of food in late September. Throughout the rearing the cock had been passing large amounts of newspaper to the hen and this was neatly layered inside the box, possibly being used to absorb the very liquid droppings. The hen, as was mentioned earlier, had moulted in the box. By the layering of newspaper in the box, it is possible to see that the hen did, in fact, moult prior to the hatching of the chicks.

At all times, diced fruit was available to the birds, together with meat, mealworms and crickets, and soaked sponge cake. Although the parents fed on all of these foods, the chick was reared entirely on meat and live food. Whilst the hen was sitting, I changed the meat content of their diet from mince to what our butcher sells as dog mince. It consists of a variety of meat bits and pieces which are apparently passed through a mincer with larger holes. The Hornbills prefer this mince to the ordinary mince. It was interesting to note that whenever the meat from a chicken wing was offered, this was taken in preference to all other foods.

Why the chick was sealed in completely, I do not know and probably never will. Next year, however, there are going to be some alterations to the nest-box in that it will be positioned so that the hole faces north and it will have a removable back partition with an inner glass cover to allow me to check on the progress of things. I will also be able to remove any

dead chicks as the smell of the decaying chick may have been what triggered the sealing of the box.

The filling in the box will be deeper for two reasons: firstly, because the inmates are apparently supposed to eject droppings from the box through the slit - with only 6 in (15 cm) of filling, they could not possibly reach the slit which was some 14 in (35.5 cm) higher. This distance between the chick and the hole, despite the wooden struts inside the box, may have made it impossible for the chick to climb out of the box with the hen, had it wished to.

The chick, now some 10 days out of the nest, is feeding well, mostly on dog meat with the occasional mealworm, but it is showing no signs of eating any fruit or sponge cake. Despite being very tame and friendly when out of its cage, the chick still insists on hissing and uttering alarm calls when its food is placed in the cage, if it is in there.

It is not known at what age these birds achieve maturity but we hope that a mate will be acquired in the not too distant future and another generation can then be reared.

Previous notes from the Avicultural Magazine:

News and Views. (1964). (Bred at Bloemfontein Zoo in 1961). Vol. 70: 116.

As described above, the Yellow-billed Hornbill *Tockus flavirostris* has been bred by Mr. B. Marshall and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or any other reason that would disqualify the claim, is asked to inform the Hon. Secretary.

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BROADHALFPENNY DOWN CONSERVATION SANCTUARY - 1983

By PATRICIA STOODLEY (Portsmouth, Hampshire)

At Broadhalfpenny Down Conservation Sanctuary we try not to carry too many 'lame ducks'. It has been our policy for a number of years to weed out parrots that are non-producers, or at least rear too few chicks. The cost of labour, housing and food make it essential to utilise the aviary space available to the best advantage.

Birds kept at the Sanctuary are mainly Amazon parrots, macaws and *Pionus* parrots, and by retaining only the most prolific breeding birds in the collection there is every possibility that the progeny will be equally prolific as the parent stock.

Our strict programme to improve breeding in our stock would not be looked on favourably by those who become attached to their birds and cannot find it in their hearts to part with those that do not produce young. Regrettably, no matter how engaging these parrots are, we cannot afford the luxury of keeping them, and usually an understanding home is found where they will be appreciated as pets.

Even with the best of care, breeding failures cannot be totally eliminated. Occasionally a pair that has reared chicks successfully many times before will fail to nest. Perhaps one or both birds will not be in good enough condition to breed, or they may have infertile eggs or chicks dead in shell.

We give particular attention to these pairs, first eliminating the possibility of outside disturbance being the cause of the breeding problem - cat, fox, hawk, rats, etc., can all prove devastating. The nest-box is also inspected for dampness, mice, ants, etc., and also for structural damage such as the bottom being chewed away.

If there are no obvious external reasons why a particular pair have failed to breed, then attention is turned to the birds themselves.

We start, if necessary, with a worming programme. Then, although our diet is not considered to be a contributory factor to poor fertility, since it is used in general throughout the Sanctuary and the breeding results here are way above average, any breeding pair failing to go to nest is given higher concentrations of the vitamins and minerals essential to high fertility. We find that the most effective method of providing these additions in a palatable form is to increase the amount of kelp powder and vitamin B12, also known as cobalamin, or cyanocobalamin, in the diet.



Adrian Lack

Young hand-reared macaws at the Broadhalfpenny Down Conservation Sanctuary

The rations we feed generally contain a wide variety of beans and peas: butter beans, black-eyed beans, chick peas, flageolet beans, green garden peas, green whole lentils, haricot beans, kidney beans, lima beans, soya beans, etc. They are soaked in water overnight and then heated to boiling point. When cool, they are added to wheat, maize, pearl barley and buck wheat. The latter is a grass seed and is not usually considered to be a wheat. These cereals are also soaked in water overnight but are not heated.

Fruit and vegetables are added. We use apple, carrot, celery, orange, beetroot, garden greens, winter radish, boiled sweet potatoes, lucerne and live twigs. Most of our parrots prefer bitter-tasting foods, and they also relish dandelion plants including the roots. The mixture can be put through a food processor and fed as a mash with a little meat, milk, fish or broth, or it can be fed in its whole state.

We add a liberal sprinkling of kelp powder daily to each pair's dish of food. The vitamin B12 is given in a little milk. We could feed it poured over cake, rusk or bread, but our parrots willingly drink this pleasant tasting liquid as a treat. Although soluble in water, B12 needs to be combined with calcium for best results, and milk therefore makes an excellent mixer.

Birds that are housed inside are given vitamin D3 in their food since they are deprived of natural sunlight and therefore their bodies are unable to effect the conversion of the precursor, 7 dehydro-cholesterol, into D3.

Before the breeding season gets under way, the incubation room and the brooder, or rearing room, are thoroughly cleaned. All accessible surfaces are washed down with Aquasan. This is a liquid sanitising agent for livestock drinking water, and is effective as a disinfectant, fungicide, algicide and deodorant. It is odourless, non-irritating and non-toxic. More commonly used in poultry and pig units to keep the drinking water clear of slime and bacteria, it helps to prevent transmission of disease through water.

To make doubly sure, the rooms are also fumigated with Microgen, which is a pill source of formaldehyde gas and contains 90% formaldehyde.

During the breeding season, we anticipate having some 100 Amazon, macaw and *Pionus* parrot chicks hatch in the incubators, this being only a part of the total number reared. To achieve this success it is necessary to acquire technique in the use of an incubator. Eggs of the larger parrots are too valuable to adopt the 'happy Jack' approach of 'having a go and hoping for the best'!

There are several commercial incubators on the market, but our units

have been purpose-built to suit our particular requirements. Eggs are moved from incubator to incubator as they progress, and once hatched the chicks are taken to the brooder room.

The 1983 breeding season started early for us at the Sanctuary with the Scarlet Macaws *A. macao*, Blue and Yellow Macaws *A. ararauna ararauna* and Green-winged Macaws *A. chloroptera* all laying eggs in January. It was a good year for our macaws: the Green-winged and the Scarlet produced three clutches each pair, the first two clutches from each pair being hatched in the incubators. We have only one mature pair of Blue and Yellow Macaws and they produced five clutches, a total of 17 eggs. These were hatched in the incubators, and because the birds looked like nesting again, the nest-box was closed up. So many chicks from a single pair of macaws in one season is exceptionally high. The other macaws averaged eight chicks per pair.

In early March, the first of the Amazon parrots produced eggs. These were from the White-fronted Amazons *Amazona albifrons albifrons*. They have been nesting here since 1979 and are always the first Amazons to lay. Their eggs, if taken newly laid for artificial incubation, hatch within 24 days. Both the nominate race and the smaller subspecies *A.a. nana* produce double clutches.

Within a few days of the *albifrons* making a start, the *Pionus* come into lay. Eggs from the Plum-crowned Parrot *P. tumultuosus*, the Bronze-winged Parrot *P. chalcopterus* and the Coral-billed Parrot *P. sordidus corallinus* are collected for artificial incubation. Their second clutches are also taken, but the third clutches are left in the natural nest for the parents to rear. The more common *Pionus* eggs are not collected for artificial incubation because we cannot give time or space to these in the rearing room.

The poorest nest was from a young pair of Buffon Macaws *Ara militaris ambigua*. They hatched only two chicks, and since it was their first year of parenthood, they were not permitted to have a second clutch.

During the season some 19 species of Amazon parrots were bred here. These included:

Yellow-billed	<i>A. collaria</i>
White-fronted	<i>A. albifrons albifrons</i>
Nana	<i>A. albifrons nana</i>
Blue-fronted	<i>A. aestiva aestiva</i>
Yellow-winged	<i>A. aestiva xanthopteryx</i>
Yellow-fronted	<i>A. ochrocephala ochrocephala</i>
Parvipe	<i>A. ochrocephala parvipes</i>
Double Yellow-headed	<i>A. ochrocephala subsp.</i>

Orange-winged	<i>A. amazonica</i>
Green-cheeked	<i>A. viridigenalis</i>
Vinaceous	<i>A. vinacea</i>
Tucuman	<i>A. pretrei tucumana</i>
Finsch's	<i>A. finschi</i>
Cayman Islands	<i>A. leucocephala caymanensis</i>
Primrose-cheeked	<i>A. autumnalis autumnalis</i>
Salvin's	<i>A. autumnalis salvini</i>
Lilacine	<i>A. autumnalis lilacina</i>
Mealy	<i>A. farinosa farinosa</i>
Salle's	<i>A. ventralis</i>

The male Yellow-shouldered Amazon *A. barbadensis barbadensis* again reared chicks, his hen being a Yellow-fronted *A. ochrocephala ochrocephala*. It is such a pity that we are unable to find a mate for him from his own species.

The Finsch's and Parvipe are early nesting Amazons, dropping eggs soon after the White-fronted. The Finsch's chicks at hatching have a small beak unlike most other parrot chicks. The Parvipe chicks, although closely related to the Double Yellow-headed, have a totally different call. It is a delightful deep rich *cluck-cluck* which suits these rather large, heavy Amazons.

The Salle's are fairly early nesting birds also, and their chicks each year are just as spiteful as the adults. I do not know why we continue to work with this species. In my opinion, they have little to commend them as aviary birds. Once in good condition they become quite dangerous both to their keeper and to each other.

It is interesting to watch a large mixed group of Amazon fledglings feeding. Several food dishes are placed about the pen, and a truly mixed bunch descend on the food, but all keeping well out of the way of the Salle's Amazons who feed together. Any bird coming near their food dish is soon sent away with a sharp peck.

Where large numbers of chicks are reared there is always a higher risk of infection, and some zoos find it necessary to inject chicks at hatching against pseudomonas.

The sanitant Aquasan that we use at the Sanctuary will kill pseudomonas, and not only is it used to wash down in the brooder room and incubation rooms, but it is also used to wash hands and clothing before handling chicks. Many of the household disinfectants do not kill pseudomonas, including the well-known brand of disinfectant used in the nursery for washing and sterilising.

Outbreaks are usually airborne, and thrive in the warm humid condi-

tions of the brooder room. Unfeathered chicks appear to succumb more easily than older ones. It is an airborne gram negative bacillus, and if not treated the chicks die of septicaemia in a surprisingly short time.

There are many forms of pseudomonas, and our veterinary surgeon, Mr. Andrew Greenwood, a member of this Society, has found the drug Gentamicin highly successful in treating infected birds. Gentamicin is nephrotoxic, and the patient must be kept fully hydrated using water and electrolytes replacement therapy. Chicks at only a few days old make a rapid recovery almost immediately after receiving the drug by injection.

Some breeders who contacted us during 1983 were also troubled by outbreaks of candida. This yeast fungal condition is usually first noticed inside the mouth parts of affected hand-reared chicks and caged birds. Candida in aviary birds is not as quickly detected, and all too often the bird dies.

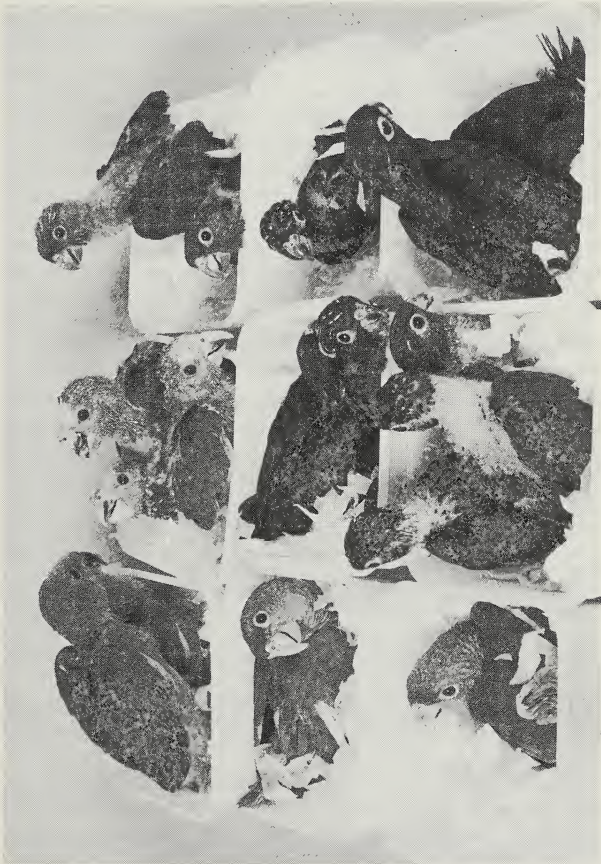
In the sanctuary the feeding of hand-reared chicks is as hygienic as we can make it, and each chick is examined every day for candida. The mouth parts of the macaw chicks in particular, with their deep side pouches, are wiped clean after every feed with a cotton wool bud dipped in Miconazole which is supplied by our veterinary surgeon. It clears up the most persistent 'deep in the crop' cases within a day or two.

This year we had some 60 young Amazon parrots and some *Pionus* parrots surgically sexed, many before they were weaned. It is customary to have this small operation carried out after the birds are a year old, which necessitates carrying them over the year taking up aviary space that could be put to other use.

Having our chicks sexed so young this season enabled us to keep back unrelated birds required for breeding, and to place others where wanted as tame young birds as soon as they were independent and before they grew away from close human contact.

Isolated cases of misfortune and the resultant bad publicity have made some people unsure about having their birds surgically sexed. When approached on this subject I always give the same reply. It is said that veterinary surgeons, like doctors, practice. Find one who has his first 1000 successful cases under his belt, and he will not be gaining his practice on your birds!

During the year we had several visitors from overseas. I would like to mention just one - Professor S.W.J. Seagar, Associate Professor of Texas A. and M. University, USA. He is engaged in major work with parrots, and visited the Sanctuary to learn from our project. We learnt so much from him during his visit, and were particularly interested in his work on artificial insemination of parrots.



A group of hand-reared *Amazona* and *Pionus* chicks
at the Broadhalfpenny Down Conservation Sanctuary

Adrian Lack

We feel this procedure could be used to our advantage in the Sanctuary and hope to work towards it some time in the near future. It was indeed most satisfying to meet such an eminent veterinary surgeon, and exchange experiences.

Micro-Bio Aquasan and Micro-Bio Microgen are supplied by Micro Biologicals Ltd., Fordingbridge, Hampshire, England.

* * *

SOME ASPECTS AND PROBLEMS OF SEXUAL DIMORPHISM IN BIRDS

By DEREK GOODWIN (Petts Wood, Kent)

As most readers will know, birds (and other creatures) are said to be sexually dimorphic when the male and female differ markedly from each other in size, shape or coloration. Strictly speaking, if the only marked difference is one of colour, as, for example, in the Bullfinch *Pyrrhula pyrrhula* or the Indigo Bunting *Passerina cyanea* it is more correct to say that they are sexually dichromatic. In this article, however, I shall use the terms "sexual dimorphism" and "sexually dimorphic" to cover *marked and immediately obvious* differences between the sexes, whether these involve only colour; colour, size and shape as in the Pheasant *Phasianus colchicus* and Peacock *Pavo cristatus*; or size alone (apart from small colour differences) as in the Watercock *Gallicrex cinerea* and Great Bustard *Otis tarda*.

I propose to discuss some generalities and examples and indicate some problems. Hopefully, some readers might be able to give information leading towards answers.

In some birds the sexes are identical in coloration, if allowances for plumage state and minor individual or geographical variations are made. Usually cocks average a little larger than hens, have proportionately slightly larger bills and their heads will tend to have a "bolder" or "coarser" profile but not usually sufficiently so for a single cock or hen to be sexed on its appearance alone. The Herring Gull *Larus argentatus*, Speckled Pigeon *Columba guinea* and Java Sparrow *Lonchura oryzivora* are examples.

In many species, in which the sexes are often said to be alike, cocks are in fact usually or always a little brighter than hens and/or have more brightly coloured or differently coloured irides, orbital skin or bills, or else have some of their feathers quite differently marked but not so as to markedly alter their general appearance. The Common Partridge *Perdix perdix*, Rock Pigeon *Columba livia*, Pink Cockatoo *Cacatua leadbeateri*, Great and Blue Tits *Parus major* and *P. caeruleus* each come into one of these categories.

Naturally, for Nature has no consideration for Man or Man's concepts, there are species showing sexual differences in brightness of plumage really too great to be classed as "a little brighter" and yet hardly warranting inclusion among those with "marked and immediately obvious differences", the Mourning Dove *Zenaida macroura* and the Greenfinch *Carduelis chloris* for example. As, however, such of these species whose behaviour and ecology are known do not show any differences from relatives in which the cocks are only "a little brighter" than the hens and which can be attributable to their greater degree of sexual dimorphism, they will, for present purposes, be "lumped" with the latter.

That justly renowned and perhaps most readable of all Victorian naturalists, Alfred Russel Wallace, discussed at length the correlations between sexual dimorphism (or its absence) and breeding behaviour in birds in one of his many most interesting books (*Natural Selection and Tropical Nature*). Inevitably I, or anyone else who now writes on the subject must repeat, probably in less felicitous words, some information already given by him. I apologise to both his shade and my readers for this and to make amends urge the latter to read this and all Wallace's other books at their earliest opportunity.

In general we find the following correlations between differences or similarities between the sexes and the role of cock and hen in reproductive behaviour:

(1) Where the sexes are alike or very similar in appearance, whether they are cryptic or conspicuous, both sexes usually help to care for the young and in many cases both sexes incubate the eggs and brood the young.

There are, however, a number of species that are exceptions to this general rule.

(2) Where both sexes are conspicuously coloured, *even on the upper parts*, the nest is either roofed over or in some hole or other place where the incubating bird cannot be seen from above except in the case of species, usually large, which have few nest predators which the adults cannot

drive off and/or which nest in places where nest predators are not normally a significant danger to the brood or the brooding or incubating parent. The White Stork *Ciconia ciconia*, swans *Cygnus* spp., and the pied imperial pigeons *Ducula bicolor* and *D. spilorrhoa* are examples.

Of course, these evolutionary correlations of appearance and breeding behaviour came about long before Man reached his present numbers, world-wide range and destructiveness. He is often a very serious predator on birds that come into this category.

I should perhaps add that building roofed nests and nesting in cavities may have other functions beside concealment of the incubating parent(s) and that it is not *only* brightly coloured species, like bee-eaters *Merops* spp. and kingfishers *Alcedo*, *Halcyon*, etc. that do so but also many sombrely coloured species.

(3) Where the male is very much more conspicuous than the female and the nest is open-topped (whether cup-shaped, saucer-shaped or nearly flat) and not concealed in a hole or cave, only the female incubates and broods the young. The male may or may not help to feed and protect the young. On the whole the greater the difference between the sexes, the greater the likelihood that the male will pay little or no attention to the young. The Golden Pheasant *Chrysolophus pictus* is an example of the latter and the Bullfinch *Pyrrhula pyrrhula* of those in which the cock helps to feed the young.



Masked or Namaqua Dove *Oena capensis*. Cock (front) and hen (back). Bills as well as plumage differ in colour, the cock's being red and yellow, the hen's duller.

There are some true exceptions to this general rule but a still greater number of *apparent* exceptions. In these latter the male's conspicuous markings may be on his face, breast or underparts, where they are hidden from view when he crouches low in alarm on the nest when he has seen, or the alarm calls of other birds have warned him, that a bird of prey is about. The Masked or Namaqua Dove *Oena capensis* is an example. Or the male's plumage, though much brighter and more conspicuous on an open perch may be just as cryptic as (or no more obvious than) that of the hen, when he is sitting on a nest among vegetation. This is almost certainly the case with many (though not all as we shall presently see) of the fruit doves of the genus *Ptilinopus*. Probably also with those brightly coloured tanagers of the genus *Tangara* in which the sexes are alike or nearly so, and which, so far as is known, all build open nests.

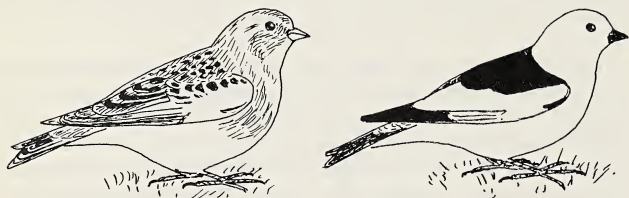
(4) "Lek" birds, that is those species in which, during the breeding season, the males spend much of their time displaying, in association with others of their sex, at particular (and usually traditional) display grounds, which are visited by the hens for mating purposes only, commonly show extreme sexual dimorphism in size, shape or colour, often all three. The Capercaillie *Tetrao urogallus*, Sage Grouse *Centrocercus urophasianus*, Ruff *Philomachus pugnax* and Blue Manakin *Chiroxiphia caudata* are examples.

There are, however, some interesting exceptions to this rule - the Calf-bird *Perissocephalus tricolor*, the Screaming Piha *Lipaugus vociferans* (Snow, 1982), probably also the Great Snipe *Gallinago* (formerly *Capella media*) and some of the small, dull-coloured hummingbirds of the genus *Phaethornis*. In all these species the cock advertise themselves by loud calling and are much more vociferous than the hens but, of course, the same is true of many "everyday" birds that form "typical" pair bonds.

(5) In all species in which the hens are markedly brighter (and usually also larger) than the cocks, the hens take a very active role in courtship and the cocks alone incubate the eggs and care for the young. The bustard-quails *Turnix*, phalaropes *Phalaropus* and Pheasant-tailed Jacana *Hydrophasianus chirurgus* are examples.

It might be mentioned that although in most cases the more conspicuously coloured sex is as big as or larger than the other, this is not invariably so. In many birds of prey, especially some falcons *Falco* and sparrowhawks and goshawks *Accipiter* the male is much smaller but also more brightly coloured than the female, and in some birds of paradise the brighter male is marginally smaller.

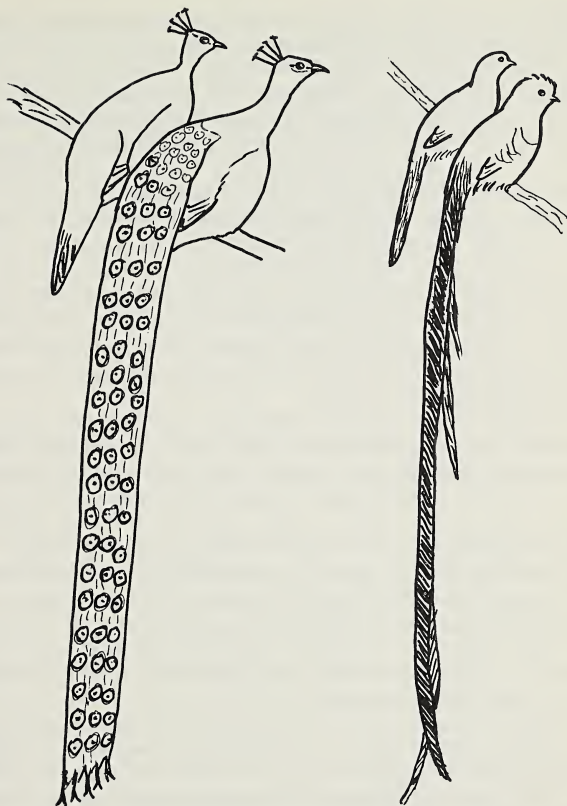
The above generalisations apply equally to birds in which the sexual differences are constant throughout adult life and those in which they depend in part or whole on a breeding plumage that is worn for only part of the year. Included among those latter species are the Snow Bunting *Plectrophenax nivalis* and Chaffinch *Fringilla coelebs* in which the colour changes are brought about by a presumably genetically programmed shedding of the ends of many of the head and body feathers.



Cock Snow Bunting *Plectrophenax nivalis*

Left, in autumn. Right, in the breeding season. The shedding of the feather ends, the so-called "abrasive moult" changes the bird's appearance (when not in flight) from predominantly buffish to vivid black and white. The bill also turns from yellowish to black.

In many cases it is very easy to deduce probable reasons for the generalisations listed above. A more conspicuous cock incubating or brooding would be in greater danger of both his own life and that of his offspring; tendencies to greater conspicuousness will soon be checked in the hens of species in which the female incubates on an open nest and is vulnerable to many feathered enemies. The lek system, in which the dominant cocks who have the most central display positions copulate with most or all of the hens, will clearly encourage or permit a degree of conspicuousness and increase of size that is useful in competition with other cocks but would have too many drawbacks in a species that practiced one-to-one pair bonds.



Peafowl *Pavo cristatus* (left) and Quetzal *Pharomachrus mocinno* (right)

In these two very different birds, the striking sexual dimorphism is primarily due to the male's enormously elongated and ornamental upper tail-coverts which normally conceal the true tail.

In the Blue or Common Peafowl (shown here) the hen is much less colourful than the cock but the same is not true of the related Green Peafowl *Pavo muticus*.

Only peahens incubate and care for the chicks but the brilliant cock Quetzal shares incubation "duties", but in the concealment of a tree hole nest. The ends of his long tail coverts may protrude from the hole and give away his presence to the human hunter but it is likely that to any non-human predator it would be mistaken for just one more bit of greenery in the mountain forest.

Often we find within the same family of birds some species in which there is marked sexual dimorphism and others in which it is, respectively, less marked, slight and virtually absent. In some of these, for example the pheasants, partridges, etc., Phasianidae, such differences are often or usually correlated with significant differences in breeding behaviour. But this is not always so, or at least in our present state of knowledge appears not to be. In describing some of these cases, I hope that readers will be alerted to note any behavioural or ecological differences that they observe and which might throw light on why some species have evolved a strong degree of sexual dimorphism and others not.

Among the family Estrildidae, the waxbills, grassfinches, avadavats, munias and their allies, we find almost every degree of sexual dimorphism, at least as regards to coloration or lack of it. Yet, so far as we know, the roles of the sexes in parental care are similar in all species and all build covered nests or else nest in holes so that the incubating parent is invisible to a passing hawk or other predator.

Presumably in this family the advantages or disadvantages of sexual dimorphism are not linked with the sexual roles in parental care. Sexual differences in which the cock is largely red or brightly coloured tend to be commonest in relatively unsocial species which live in pairs and many in which the sexes are alike are highly gregarious. There are, however, several exceptions. The Zebra Finch *Peophila guttata*, for example, is highly social and strongly sexually dimorphic. I have elsewhere (Goodwin, 1982) suggested that there might be a premium on sexual dimorphism in some social species if it permits quicker and more efficient pair formation than might otherwise be the case but this is mere speculation and I hope some of my readers will be able to offer at best definite information and at worst fresh ideas on the subject.

It might be mentioned that the cordon-bleus show three different types of sexual dimorphism or lack of it. In the Cordon-bleu or Blue-breasted Waxbill *Uraeginthus angolensis* the sexes are almost or nearly quite alike in colour in some populations; in others the female has less blue on her underparts than the male. In the very closely related Red-cheeked Cordon-bleu *U. bengalus*, the cock differs strikingly from the hen in having two crimson cheek patches of which she shows not a vestige. He also has more and usually brighter blue on his plumage, although there is a great amount of geographic (racial) variation in the amount, brilliance and distribution of the blue on face, breast and flanks in hens of this species. In the Blue-headed Cordon-bleu *U. cyanocephala* the cock is much brighter and more extensively blue than the hen but does not, unlike his red-cheeked relative, possess any colour or markings, no hint of which is present in the hen.

Observations on a few individuals (anecdotal evidence of no statistical significance, my critics tell me) suggest that the hen Red-cheeked Cordon-blue may have an innate sexual recognition of the cocks of her species not possessed by hens of the other two species (Goodwin, 1971). There is, however, nothing in what little is *so far* known of the ecology of the three species to indicate why they should have *evolved* such differences as above described.

The parrot family, Psittacidae, also show a wide range of sexual dimorphism or lack of it. In many the sexes are alike or differ only in the colour of the iris, as in the Pink Cockatoo *Cacatua leadbeateri*, cere and feet as in the Budgerigar *Melopsittacus undulatus*, or relatively small areas of plumage as in the Rose-ringed Parrakeet *Psittacula krameri*. In others there is marked sexual dimorphism and in a few of these, notably the Mulga Parrot or Many-coloured Parrakeet *Psephotus varius*, the cock not only looks much more conspicuous than the hen when in an aviary, but is very much more easily seen in his natural habitat. Yet all parrots nest in holes (No, I have not forgotten the Quaker Parrakeet, it nests in holes within the great communal nest of bitten sticks) so it is difficult to see why the hens should need to be more cryptically coloured than the cocks, as the hens of the Mulga Parrot and several other species most certainly are.

Mention must be made here of the remarkable sexual dimorphism of the Eclectus Parrot *Eclectus roratus* in which the cock is brilliant green with scarlet flank patches and (predominantly) orange bill and the hen is mainly darkish red and purplish blue. This is often instanced as a species in which the hen is brighter than the cock, but I fully agree with the late Duke of Bedford (the avicultural one) who once wrote in our magazine that he did not consider a brilliant green, scarlet and orange bird less bright than a dull red and blue one. Observations on captive birds indicate that in this species, as in other parrots in which the point is known, the cockatoos and the Cockatiel excepted, only the hen sits and is fed by the cock. In the wild observations have suggested (Forshaw, 1978) that several birds of both sexes are sometimes or usually involved with one nest but, even if so, such sexual dimorphism is certainly not a usual feature of species in which more than one pair attend a single nest or its resultant young.

As with the estrildids, there is an open field for any observations that might help us to understand why certain parrots are sexually dimorphic and others not. I will add that although most predominantly green parrots are very well camouflaged when among foliage, this is not always the case. When in Australia I was surprised to find that the Budgerigar's predominantly bright green and yellow plumage was highly conspicuous among

the dull greyish foliage of some of the trees of the Australian outback. The same was true for the largely bright green Port Lincoln Parrot *Barnadius zonarius*.

Within the pigeon family, Columbidae, we also find a complete range of sexual differences and similarities of plumage. These birds differ from estrildids and parrots in that most of them build shallow, open nests in trees, bushes or other vegetation. Of the relatively few species that usually nest in holes or on ledges in caves, none are (markedly) sexually dimorphic.

The males of some of the sexually dimorphic pigeons are probably little if any more conspicuous than the females to a passing raptor when they are crouched "freezing" on the nest. This is hardly likely, however, to be (or have been) the case with the Blue Ground Dove *Claravis pretiosa* and the extinct Passenger Pigeon *Ectopistes migratorius* in which the cock has bluish grey and the hen brown or greyish brown upper parts. Both share, or shared, incubation in the most usual pigeon manner, the hen sitting at night, early morning and evening and the cock during the middle hours of the day. But the most marked sexual dimorphism seen in the pigeons is that of the Orange Dove *Ptilinopus (Chrysoena) victor* in which the male is bright orange with a greenish yellow head and the female dark green but, strangely, with the head almost the same colour as her mate's. Recent observations on a wild nest (W.N. Beckon, pers. comm.), on which the cock was never seen incubating, suggest the possibility that this pigeon may prove an exception to the general rule in that only the less conspicuous hen may incubate and brood. If so, it will be intriguing to discover the parental behaviour of its close relative, the Yellow-headed Dove or Green Dove *P.(C) layardi* in which both sexes are green.

A lot yet remains to be discovered about some pigeons and any aviculturists who breed a species whose nesting behaviour is not well known should try to make observations on the roles of the sexes and times of change-overs on the nest.

Unlike estrildids, parrots and pigeons, the woodpeckers, Picidae, are seldom kept in captivity and certainly cannot be recommended as aviary birds under any usual avicultural circumstances. They are, nevertheless, of great interest in connection with questions of sexual dimorphism as I have pointed out at more length elsewhere (Goodwin, 1968). For our purposes they can be divided into wrynecks, which stand far apart from other woodpeckers and consist of only two closely related species in both of which the sexes are similarly coloured; the piculets, which are tiny tropical woodpeckers with soft tails; and the typical woodpeckers which comprise a great number of species, ranging from about the size of a Carrion Crow *Corvus corone* to about that of a Tree Sparrow *Passer montanus*, spread over the temperate and tropical parts of all continents except Australia,

and many islands adjacent to these continents. Most of them feed entirely or partly by “woodpecking” in trees but some feed on the ground, like our Green Woodpecker *Picus viridis* and a few even nest there, in earth or clay banks. It is this largest group that I shall refer to as “woodpeckers” here.

The vast majority of woodpeckers show sexual dimorphism that involves the cock having more red, or (less often) yellow, on his head than does the hen. In some species the cock may only have a few red feathers and the hen none at all, in others both sexes may have their heads largely red but the hen with some small area brown, black-and-white, or black that is red in the cock. In only a very few species are the sexes alike but these few include species in which both cock and hen have an approximately equal amount of red on the head, as in the Red-headed Woodpecker *Melanerpes erythrocephalus* and the Middle Spotted Woodpecker *Picoides*, (formerly *Dendrocopos*) *medius* and Lewis’ Woodpecker *Asyndesmus lewis* in which neither sex has any red (or yellow) on the head. In only three species of woodpeckers are the sexes different without this dimorphism involving red or yellow plumage. Only one of these, the Golden-shafted Flicker *Colaptes auratus*, has any red on the head.

So far as I know, there are no observations to suggest that those woodpeckers in which the sexes are alike, or nearly so for in some of them the males are very slightly brighter than the females, differ significantly in behaviour or ecology from their strongly sexually dimorphic relatives.

Juvenile woodpeckers usually show red or yellow on their heads in their first plumage and very commonly are also sexually dimorphic. Often,



(a)



(b)



(c)



(d)

Greater Spotted or Pied Woodpecker

Distribution of red plumage (shown shaded black) on heads of:

(a) adult male; (b) juvenile male; (c) adult female; (d) juvenile female

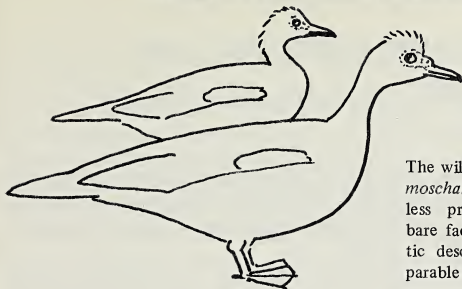
however, the red is differently placed to that of the adult. British readers who have watched our commonest woodpecker, the Greater Spotted Woodpecker *Picoides* (formerly *Dendrocopos*) *major* will, no doubt, be aware of a common error in books on British birds. These often state that juveniles of both sexes have the entire top of the head red, and accompanying pictures often show the juvenile thus, with the red extending down over the area on the nape where the adult cock has a red patch, which is absent (black) in the hen. In fact the juvenile cock Greater Spotted Woodpecker has no red at all on his nape where the adult male is red. Only his forehead and forecrown (entirely black in the adults of both sexes) are red. His sister although generally similar to him usually has the red confined to her forehead, hardly extending on to the crown at all.

The question of juvenile plumages in the woodpeckers presents many points of interest but I must not dilate on them here. Suffice to say that in a few species the juveniles are without bright colours at all and that, in general, as regards the amount of red or yellow on the head, juvenile woodpeckers tend to come nearer to the family average than do adults. That is in many species in which the adults have a lot of red on the head (whether in one or both sexes) the juveniles have less and vice versa.

The typical sparrows of the genus *Passer* present a somewhat analogous case to the woodpeckers, at least as far as the adults are concerned. In the Yellow Sparrow *Passer luteus* and the Arabian Yellow Sparrow *P. euchlorus*, the cocks are largely yellow in colour and the hens mainly brown and grey. They are sometimes placed in a separate genus *Auripasser*. Most other species have a different form of dimorphism, the cocks having a black bib, more or less (according to species) like that of our House Sparrow *P. domesticus* which is lacking, or only slightly indicated, in the hen. Usually they have other less obvious plumage differences involving chestnut, rufous or golden-brown on the head and/or mantle of the cock which is replaced by paler and/or duller shades in the hen.

The main exceptions involve both "hen-feathered cocks" and "cock-feathered hens". The former are represented by the Grey-headed Sparrow *P. griseus* of Africa and some of its close relatives, the latter by our familiar Tree Sparrow (and it alone) in which the sexes are alike, both having a black bib, black cheek patches and the top of the head a purplish chocolate colour, which fades to pale chestnut in worn plumage. The behaviour of both House and Tree Sparrows has been well studied but nothing that I have read of their behaviour or ecology makes it clear why the sexes should be alike, and similar to the males of related species, in one but not in the other. Perhaps some reader will be able to throw light on the matter?

Waterfowl, ducks, geese and swans, show within the family most possible kinds of sexual dimorphism or, respectively, lack of it. They must be



The wild Muscovy Duck *Cairina moschata*, although smaller and less profusely endowed with bare facial skin than its domestic descendents, shows a comparable sexual difference in size.

among the most intensively studied birds in the world so I will confine myself here to just one, possibly a little neglected aspect of sexual dimorphism among them. This is the difference in size between the sexes, which is slight or absent in most, rather marked in some, and striking in others, notably in the well-known Muscovy Duck *Cairina moschata* and some (though not all) of its relatives.

In Muscovies (both wild and domestic) and in the Comb Duck *Sarkidiornis melanotos* the male is about twice the size of the female. Recent studies on the Comb Duck (to which I regret I cannot find the reference) suggested that large size in drakes had been selected for because successful males were able to mate with more than one female.

Most (though not all) of the waterfowl that show such extreme sexual dimorphism are hole nesters and I have always thought that difficulties in finding tree holes that were large enough and safe enough may have been a factor that, in an evolutionary sense, had prevented the ducks from keeping up with their husbands in the matter of size.

Perhaps some of our waterfowl-keeping readers will give us their views on this?

Note: the diagrammatic sketches, illustrating some of the points described in the text, have no pretention to art or a completely detailed accuracy.

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NEWS FROM LONDON ZOO - 1983

By PETER J. OLNEY (Curator of Birds)

How far the weather affects breeding results is not really known and any correlation would be difficult to quantify accurately. Most aviculturists, however, are usually more than willing to blame bad weather, be it too wet, too cold, or too hot, for poor results.

Climatically 1983 was unusually interesting. A rather mild winter, with an exceptionally mild January was followed in London by record rainfall in April. England and Wales had the fourth wettest spring this century and then a very hot summer, with London having its hottest weather since reliable records were first kept in 1840. How far all this influenced the breeding of the birds in London Zoo is impossible to judge with any certainty. There were, as always, many other factors which must have had an influence. My general impressions were that the mild winter encouraged early display and nest building, but the wet spring caused low hatchability and a number of prefledging deaths. Later layers and second clutches fared better with higher fertility, relatively more successful hatchings and more successful rearings. A number of birds laid early, but lost or abandoned their eggs (e.g. Stone Curlew) or subsequently their young (e.g. African Thrush, Lemon-rumped Tanager). Of the eggs laid by the Chilean Flamingos in the spring, only one hatched, but of the six eggs laid in the summer, four hatched and four were successfully reared. A similar pattern of events occurred in the Abdim Stork colony, where, of the four first nests in the spring, only one egg hatched, but in a later second clutch, both eggs hatched and two young were reared.

Other parent-reared birds of note included: a Blue-crowned Motmot from the same parents who, in 1982, reared two young; three Tropic Hornbills from a new breeding pair of which the male was reared here in 1979; Rock Peplar and Barraband Parrakeets in an outdoor colony of these two species; an Oystercatcher from a pair in which the male was reared here in 1978; Snowy Owls from a pair in which the male is at least 33 years old, having come to this collection in 1950, and fathered 48 chicks (this must be a record?) - he was rescued from the HMS Eros (!) off the Azores, having flown on board. Other owls reared included Boobooks, African Spotted, Abyssinian Spotted and Little Owls.

Artificial incubation and hand-rearing increases each year, even though we have now got to the stage where we deliberately do not breed some species because they are common enough not to be in demand. One of the most satisfying successes in 1983 was the hand-rearing of seven South

African Crowned Cranes *Balearica regulorum* from three clutches incubated artificially. This success is an important development for although cranes have been reared before in the collection, either at Regent's Park or at Whipsnade, they have been the result of different management techniques. Either the eggs and young have been left with the parents, or they have been placed with domestic chickens who act as foster parents. It has been part of our policy to concentrate efforts on crane breeding, and this has included the building of aviaries off-public viewing at Whipsnade. This policy, which has been immensely helped by laparoscope sexing, appears to be succeeding. Four species - Red-crowned, Wattled, White-naped and South African Crowned Cranes were bred at Whipsnade in 1983.

A male Andean Condor was hatched and reared using the same procedures as in 1982 when, for the first time in this country, a Condor was reared. In 1983 the single egg was laid on 5th April, and after a few days was removed to an incubator, where all went well until just before hatching. The egg had pipped, but because of the positioning of the beak, the chick could not break out of the shell. On 2nd June, by carefully and slowly removing parts of the shell with forceps, the chick was released and emerged, healthy but rather tired-looking. He proved to be strong and fast-growing, and somewhat larger than his sister of the previous year.

Other artificial rearings of particular note included: two Ruffs, from parents of which the female had been hand-reared here in 1980; five Black-footed Penguins, which have now joined the colony of 19 birds of which at least 12 have been bred here; an Oystercatcher; Chilean Tinamous, ducks, geese and many pheasants including Koklass, Swinhoe's, Nepal Kalij, Siamese Fireback, Hume's Bar-tailed, Mikado, Scintillating Copper, Cheer and Grey Peacock.

More and more cooperative schemes for the management and breeding of various species are being put into effect, and as part of these schemes a number of birds were sent to other collections, or were taken in on loan. Examples of such movements included the despatch of 13 Lesser Flamingos to the Wildfowl Trust, our male African Fish Eagle to Cricket St. Thomas, and the receipt of two pairs of Rothschild's Grackles and a Red-crested Turaco from Jersey.

REVIEW

THE BIRDS OF AFRICA. Volume 1. By Leslie H. Brown, Emil K. Urban and Kenneth Newman. Academic Press, London, 1982. 521 pages; 28 colour plates; 4 black-and-white plates; many line-drawings and maps. £53.40. ISBN 0.12.137301.0.

There are six volumes planned for this series (there may be a seventh on the Malagasy region) and the aim of the authors has been to compile all the available information about African birds, which they have found scattered through a large, expensive, often unobtainable and now largely out-of-date quantity of books; through the ornithological journals of societies of many different countries, and in unpublished material such as record card systems, collections of migration data and postgraduate theses, as well as personal notes by the authors and many others. The result must certainly be *the* definitive handbook of African birds which will include every species occurring in this continent, migrants and vagrants as well as residents. This first volume covers the orders from ostriches to falcons.

This series was Leslie Brown's special goal and it is very sad indeed that he did not live to see the first volume in its final form for it is a magnificent book, attractively designed and indispensable to anyone interested in African birds.

Each resident bird has a distribution map and is described in full detail with sections on its range and status, description, field characters, voice, general behaviour, food and breeding biology. Visitors are also given extensive coverage.

The task of illustrating every bird has been achieved by Martin Woodcock and Peter Hayman in 28 colour plates. Whilst this method has its artistic limitations (up to 40 species have been painted on some pages), the paintings are useful and workmanlike. There are also four monochrome plates and numerous line drawings. As one would expect, there is a superb bibliography listing general and regional references as well as those for each family of birds. In all, well worth saving up for.

M.H.H.

CORRESPONDENCE

Red and Yellow Diamond Doves

I would like to reply to Derek Goodwin's letter (Vol. 89, 1983, No. 2, p. 121), since it was I who mentioned that red and yellow Diamond Doves are common over here.

I just presumed that, since these two very attractive colour mutations fetch only R20-30 a pair over here, they were common everywhere in Europe. However, I cannot agree with Neville Brickell's description of those he saw at Mitchell Park (a mixture of both colours and all ages).

The colours red and yellow can be likened to those same colours in the domestic pigeon. The body colour is a little lighter grey than found in the normal Diamond Dove, with the mantle and wings a pale yellow. Yellow males seem to have a darker grey body colour than the females. Whereas the red, to my mind the prettier of the two, has a light silver grey body colour with the darker red mantle and wings. The red is a clear red, not a brown red.

So the lighter bodied bird has the darker wings and the darker bodied bird has the lighter wings - an attractive contrast. I can recommend them to anyone who likes mutations.

We have other mutations here at Mitchell Park, including four colour varieties of the Laughing Dove *Streptopelia senegalensis* including Pieds, Black-eyed Whites, Cinnamons and Albinos - and there are quite a few of these in aviaries in South Africa, also a few Pied, red and grizzle Rock Pigeons.

Mitchell Park Aviaries
Durban
Republic of South Africa.

W.D. Cummings

* * *

AVICULTURAL MAGAZINES - MASTER SETS

Strange though it may seem, the Avicultural Society does not possess a complete set of all the Magazines published although we have been able to acquire many of the missing issues in recent years. Listed below are issues that we still require to complete the two reference sets held by the Society, one of which is kept at the Society's offices for use mainly by the Editor, and the other in the joint Linnean Society/Avicultural Society avicultural library at Burlington House-

1894	October, November, December
1895	January, February, March, April, May, June, July
1897	February, March
1898	January, February
1902	March, November
1903	January, February, March
1917	November
1918	April, May, June, October
1919	June, July, October
1921	February, April, May, June, July, August
1922	January, February, March, October
1923	January, February, March
1924	The whole year
1926	January, February, July, August, October, November
1927	January, February, March, April, May, June, July, August, December
1930	January, February
1931	November
1961	January/February, March/April

I will be delighted to hear from members who can fill any of these gaps. I would also be very interested to hear from any member who wishes to dispose of bound volumes of the Magazine as very few of the volumes of either of our reference sets are bound. I hope that members will not take it amiss if I suggest that they might like to bear this need in mind when making their wills?

Hon. Secretary

FIRST BREEDING AWARDS

At its meeting on 22nd February, 1984, the Council approved the following awards for the first breeding of the species mentioned. Accounts of all these breedings have been published in the *Avicultural Magazine* and no report has been received as to any prior breeding in Great Britain or Northern Ireland or any other information that would disqualify any of the claims.

THE AVICULTURAL SOCIETY MEDAL

Cape Parrot <i>Poicephalus robustus</i>	Mr & Mrs R. Grantham	1981
Yellow-shouldered Amazon Parrot <i>Amazona barbadensis</i>	Mr and Mrs R. Grantham	1982
Jamaican Yellow-billed Amazon Parrot <i>Amazona collaria</i>	Mr. and Mrs J. Arman	1982
Indian White-backed Vulture <i>Gyps bengalensis</i>	Anon	1982
Splendid Starling <i>Lamprocolius s. splendidus</i>	Mr. R.C.J. Sawyer	1976

CERTIFICATE OF MERIT

Pied Butcherbird <i>Cracticus nigrogularis</i>	Paignton Zoo	1979
Pied Imperial Fruit Pigeon <i>Ducula bicolor</i>	National Trust, Waddesdon Manor	1982
Crimson-rumped Toucanet <i>Aulacorynchus haematopypus</i>	Padstow Bird Gardens	1982
Spectacled (White-fronted) Amazon Parrot <i>Amazona albifrons nana</i> (first published account)	P. Clarke	1981

ILLUSTRATIONS FROM THE *AVICULTURAL MAGAZINE*

A quantity of photographs from the *Avicultural Magazine*, going back some years, has been returned by the printers.

These originals will be kept in my office for six months during which time I will be glad to hear from any authors wishing to claim their photographs and, if I have them, I will return them.

The printers have agreed that from now on they will return the originals of drawings and photographs promptly with each issue, so if authors want to have their illustrations back eventually, would they please say so when submitting them and print their name on the reverse of each, please? Slides should also be named on the cardboard mount and if possible put in some sort of protective casing as they do get so easily damaged.

Editor

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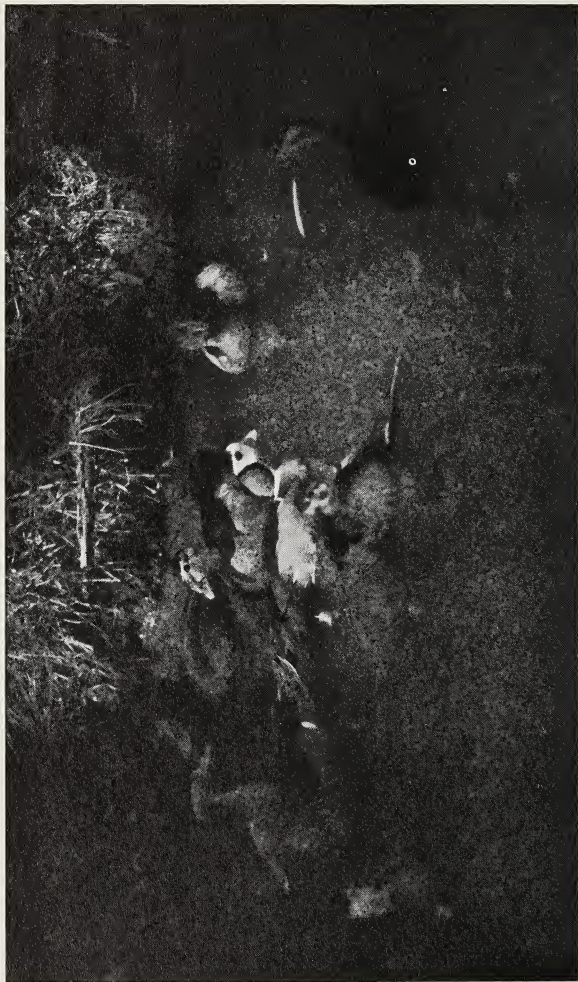
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THE AVICULTURAL MAGAZINE welcomes original articles that have not been published elsewhere and that essentially concern the aviculture of a particular bird or group of birds, or that describe their natural history. Articles should be preferably typewritten, with double spacing, and the scientific names as well as the vernacular names of birds should be given. References cited in the text should be listed at the end of the article. Line drawings should be in Indian ink on thick paper or card; photographs which illustrate a particular point in the article will be used where possible and should be clearly captioned.

ADDRESS OF EDITOR

Mary Harvey, Windsor Forest Stud, Mill Ride, Ascot, Berkshire, SL5 8LT, England.



Young African Pygmy Geese in exhibit

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BREEDING PYGMY GEESE OF THE GENUS *NETTAPUS* AT THE NEW YORK ZOOLOGICAL PARK

By DONALD BRUNING & CHRISTINE SHEPPARD

The genus *Nettapus* has been kept only rarely in captive collections. Smallest of the waterfowl, they are generally weak competitors in a mixed species flock. Highly aquatic, they do poorly on land and are very vulnerable to predators. They prefer high tree hole nest sites and perches and cannot function well if pinioned. They do not tolerate extreme cold temperatures. This combination of factors makes pygmy geese difficult to import and greatly limits the facilities where they can be successfully housed and bred.

The New York Zoological Park has kept and bred two species of pygmy geese: *N. coromandelius*, the Cotton Teal, and *N. auritus*, the African Pygmy Goose.

Indian Pygmy Goose or Cotton Teal *Nettapus coromandelianus coromandelianus*

This is one of the smallest members of the Anseriformes. These birds are found throughout Southeast Asia ranging from Ceylon, India and China across Malaysia and Indonesia to New Guinea. Some populations are quite sedentary but others, especially those in China, migrate several hundred miles. Their flight seems awkward at times but they can manoeuvre around trees as easily as Mandarin Ducks and their flight is quite fast. They normally nest in tree hollows.

Cotton Teal feed preferably among floating vegetation, with small leaves and seeds being the major part of their diet. They roost in trees at night but spend most of the day on the water feeding much like coots.

Although large numbers are caught each year in India these birds seldom survive transportation and the dietary changes of captivity. Once

acclimatised they do live quite well in captivity if they can be kept away from predators. One full-winged female at Cleres lived six years and even laid two eggs in 1932 in an aviary. Another bird lived nine years in an outdoor aviary in England. Pinioned birds generally succumb sooner or later to rats or other vermin. The New York Zoological Park felt quite fortunate when a group of six were purchased from George Searles, a private collector from Patchogue, New York, on 18th March 1971. These birds were placed in a large heavily planted exhibit in our new World of Birds building which was still under construction during 1971.

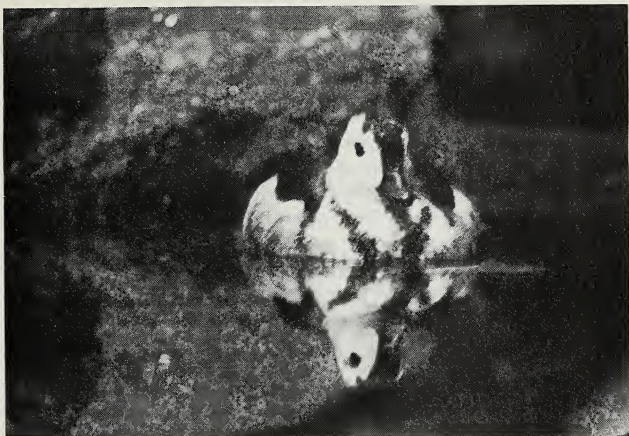
The birds were being fed a diet of soaked rice and millet as is generally true of any waterfowl coming into the United States from Asia. Prior experience had shown that this diet is inadequate for any hope of keeping these birds for a long period of time. We weighed all six birds immediately. The average weight was 189 grams, but the birds varied from 168 to 238 grams.

We then set about altering the diet. Since the birds were eating only soaked rice and millet we mixed a small amount of turkey pellets and Gaines dog meal into the mixture, with a few mealworms and bits of chopped kale added on top of each food pan. Since everything was soaked the birds could not avoid eating some of the other items as they ate the rice and millet. Gradually over a period of two months we increased the amount of turkey pellets and Gaines dog meal while decreasing the amounts of rice and millet. One of the smallest birds died after a short period at the Zoo, but the other birds thrived on their new diet and in their new home.

The exhibit itself is over 10 m in diameter and height. It is heavily planted with *Ficus* trees and lower ground plants such as *Diffenbachia*, ginger and *Spathaphylum*. A pool covers nearly 30 percent of the floor area and is where the pygmy geese spend much of their time.

The young birds thrived and moulted into adult plumage early in 1972. At this point it became apparent that we had four females and only one male. The male was not in good condition and had a displaced wing. This male lived for four years but was never able to mate with any of the females. When the male died in February 1976, we began the search for a new mate and in April 1977 we acquired two males from the Wildfowl Trust in England. The new males immediately started courting the females. Within a couple of months the first egg was found in the pool. A female was regularly seen perched in the trees during the following two months.

On 28th August 1977, a clutch of two eggs was found in a beautiful down-filled nest in a hollow tree cavity, approximately six feet (two meters) above ground level. The female incubated until 10th September when she was observed off the nest. When the female did not return to the



New York Zoological Society
Indian Pygmy Geese at the New York Zoological Park:
male above, female below

eggs within two hours, the eggs were removed and candled. Both eggs had been fertile but apparently the female had abandoned the nest the previous day as both embryos were dead. No further nesting activity occurred in 1977.

The female began to spend a lot of time perching in the trees during late spring and summer of 1978 and she was observed carefully as she nested during July. On 1st August she emerged with three ducklings. One duckling caught its leg on the edge of the pool and was removed for overnight observation. When the chick seemed well the following day, it was returned to the exhibit with the female and the other two ducklings. The third chick was unable to keep up and feed with the other chicks and it died two days later. Quantities of live crickets and mealworms were supplied during the month of August to supplement the adult diet. The chicks appeared to start eating duckweed (*Lemna*) in a shallow pool and it seemed to be the major item of their diet for the first few weeks. Duckweed was mixed with the adult diet and the chicks quickly acquired a taste for turkey pellets and Gaines dog meal.

The two chicks grew rapidly and within six weeks were indistinguishable from the adult female. On 7th September, the chicks were banded and weighed. They weighed 236 and 220 grams and seemed in good condition.

As far as we can determine, this is the first successful breeding of this species in captivity.

In 1979 a clutch of six eggs was laid. Six hatched and six were reared in the original exhibit.

In 1980 a female was noted missing during the breeding season. On a Friday, the day the female was not observed, we felt she might be nesting but we did not want to cause a major disruption. After the female had not been seen over the weekend we carefully searched the exhibit but found no sign of her. We still hoped that she was carefully hidden on a nest.

Two days later the male bird was also gone. We have never found out what happened to the pair but have assumed that they were stolen. We immediately instituted additional security measures, and moved the remaining birds to a glass-fronted exhibit.

In 1981 a young pair produced two clutches of infertile eggs.

In 1982 the young pair produced two clutches of eggs from which six chicks hatched. None were successfully reared in their new exhibit with a deep pool and plenty of duckweed.

In 1983 we traded birds with Doug Goode and Mike Lubbock to pair up our young birds. The young birds have produced a clutch of infertile eggs.

Now we shall prepare for 1984.

African Pygmy Goose
Nettapus auritus

The first captive propagation of African Pygmy Geese was at the private collection of Winston Guest, on Long Island, New York. Mr. Guest imported his birds in 1973 and two of the imported birds were donated to the Zoo. The birds were kept in a heavily planted indoor exhibit, about 35 x 25 x 20 ft (10.68 x 7.63 x 6.10 m). The cage floor is about 8 ft (2.44 m) below the visitors' viewing area. The viewing area is an open front, with plantings between it and a pool, approximately 10 ft (3 m) in diameter and 18 in deep. There is a 10 ft planted area behind the pool. Other exhibit inhabitants include a pair of Malayan peacock pheasants and about 20 small passerines. The exhibit gets natural light through a skylight. This is supplemented in winter with flood lights to provide a minimum of 12 hours of daylight.

The African Pygmy Geese laid their first clutch in September 1979. The parents incubated and hatched one duckling from a clutch of eight. This bird lived only one day. No eggs were laid in 1980. In 1981, 7 eggs were laid in mid-August. Six hatched, but the parents failed to rear them. The exhibit had been heavily supplied with duckweed. In July 1982, six eggs were laid and all hatched on 12th August. The female was removed and placed in a water brooder with three ducklings; the other three were placed in a separate brooder. Because the female was too nervous, she was placed back in the exhibit the next day, with the ducklings that had been with her. Large amounts of duckweed were provided. Both members of the pair then attended the young which swam and appeared to feed. All died within the next day, however, and were found to have no food in the gastro-intestinal tract. We had had similar problems with a clutch of Cotton Teal which had appeared to be feeding well on duckweed, yet apparently died of starvation. All but one remaining duckling failed to respond to intensive efforts to induce feeding and died. The last bird fed readily and was reared to adulthood. The pair re-nested in late September 1982 and laid six eggs. It was decided to pull these before hatching for hand-rearing. The ducklings began to hatch at 6.00 p.m. on 18th October, and immediately were exposed to a human hand and vocalisation to induce a following response. A total of four ducklings hatched. They were placed in a duck brooder measuring 8 x 4 x 2 ft (2.44 x 1.22 x 0.61 m) with a removeable pool and adjustable heat lamp, and maintained at 85-88°F. A heating pad was placed under the chicks after the first two days. Ducklings were marked with food colouring for identification and could also be distinguished by size differences. The birds were weighed at the start of every morning.

Early observations seemed to show that ducklings dabbling in water with floating duckweed ingested water but that duckweed itself was of too large a size to be ingested. Eventually, using a very shallow pan filled with a tepid slurry of two parts powdered turkey pellets, one part powdered Gaines dog meal and eight parts water, it was possible to induce feeding by churning the mixture up near the chicks, simulating the action of the parent's feet. The ducklings themselves would churn with their feet while feeding. Initially the birds would feed only in water. Particles sifted on the water surface in front of the ducklings could be seen to flow into the mouth. It was necessary to add water occasionally as the food particles absorbed moisture. New food was prepared three times a day. Approximately every two hours, nine times a day, food was presented. By vibrating fingers through the water (about seven oscillations per second) the ducklings could be attracted to feed. This noise perhaps imitates the sound of an adult dabbling. After seven to ten days it was possible to induce feeding from the edge of the pan by generating currents of particles. The birds still required a splashing noise or feeding would terminate prematurely.

During the first four days, while techniques were being developed, the chicks did not eat enough to produce good weight gains. They were supported during days 5-10 by supplemental tube feeding. A mixture of one tablespoonful of dry Gerber Hi Pro baby cereal, 1.5 gm Nutrical (a high calorie veterinary supplement) and 17 cc water, heated to 100°F was administered, 0.4 ml per bird, up to five times a day. Each bird was treated differently, depending on its speed in developing self-feeding.

By the time the chicks were three weeks old, the large feeding pan had been replaced by petrie dishes of wet feed and water and the ducklings were swimming. None of the birds would feed itself until at least 21 days and the last bird was about 30 days before it was feeding independently. The feed at this time was still powdered pellets but with only so much water as would be absorbed in half an hour.

The techniques described here represent a learning experience. Pygmy Goose ducklings evidently are small particle strainers and most individuals do not adapt readily to our standard rearing techniques which use dry, crumbled pellets. It is worth noting that parent rearing (of Cotton Teal) has been successful only in an exhibit with a shallow back pool. Failures have taken place in exhibits with deep, well-scrubbed pools, where no particulate matter would be available for parents to churn up for their brood. Supplemental tube feeding was very useful in a case where difficult chicks were feeding, but not sufficiently. We hope to improve and standardise these techniques in 1984.

Previous notes from the Avicultural Magazine:

- FINN, Frank (1901).. Some out of the way ducks (Cotton Teal). p. 129.
ASTLEY, Hubert. (1914) My birds at Brinsop Court. p. 278-279.
..... (1915) Cotton Teal in captivity. p. 269-270
"News and Views" (1975). African Pygmy Goose bred in Rhodesia. p. 114.

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ATTEMPTED BREEDING OF THE TOCO TOUCAN*Ramphastos toco***AT PENSCHYNOR WILDLIFE PARK, CILFREW, NEATH, WALES**

By S.E. DYE (Curator of Birds) and A. MORRIS (Keeper)

In our winter programme of 1982 it was decided to rebuild a large run of aviaries. The first to be completed was the toucan flight which was some 20 ft by 10 ft wide with a height of 7 ft 6 in (6.10 x 3.05 x 2.29 m). A feeding area measuring 5 ft x 4 ft x 7 ft 6 in ((1.53 x 1.22 x 2.29 m) was built at one end, next to the service door. Perches were placed so that the occupants had to fly the whole distance of the flight to be able to feed from the feeding perch.

Several plants were bedded and the ground area grassed over, excluding two small areas in which shallow water baths were placed.

A grandfather-type nest-box, the height of the aviary by 1 ft 4 in (0.40 m), was built of $\frac{3}{4}$ in marine ply and placed in the right hand corner as far away as possible from the public. The entrance hole of 4 in diameter faced the length of the aviary. An inspection door 2 ft from the base was included and, to help conceal the box from the public, bamboo was planted around it.

While the aviaries were being completed, a hen Toco Toucan which had laid in previous years was being housed in an aviary alongside our tropical house, where she could easily be shut in at night if the weather turned bad. This bird had always been in excellent condition throughout our time working at the park.

As the new aviaries were nearing completion, we took the opportunity of buying a newly-imported male that had been surgically sexed. The bird, a fine specimen, was heavily clipped on its left wing by trappers after being caught, which slowed him down considerably.

He arrived at the park on 28th February 1983 and was kept on his own for two weeks so that we could observe his behaviour and feeding habits. All proved satisfactory so, on 15th March, he was moved to an aviary adjacent to the hen's. This went well but a period of very wet weather forced us to lock them inside for a couple of days. When the weather did break, the birds were let out in the early morning and at once the male displayed to the hen. After several mornings this became a routine with the hen responding at times by clapping her beak and calling to the male. The nest-box in the new aviary was being made ready by the placing of nesting material which consisted of 9 in of wood shavings and then 1 ft of peat, followed by another 9 in of rotten wood shavings. This was repeated, layer upon layer, until within 4 in of the hole.

On 13th April both birds were released into their new aviary, whereupon the visual differences between the sexes became apparent. Principally it is the larger bill size of the male but he also has a larger black spot at the tip of the bill and a bolder black marking at the base; it was also a darker shade of orange towards the tip. There was also a slight difference noted in the call of the male.

By midday all was going well and there was no signs of stress or fighting between the birds and both had found the feeding area with little trouble.

The diet offered consisted of a softfood which is made fresh every day in the park for all our softbilled birds. This consists of a basic mixture of brown bread, grated carrot, apple and turnip or swede when in season; a small amount of dried insect mix is added plus crushed Diet A pellets and SA 37 multi-vitamin powder.

The toucans receive one 9 in round dish and two 4 in hang-on type dishes, placed either side of the feeding perch. In the morning these are filled with our softfood mix plus chopped fruits such as apple, banana, pear, grapes and a small amount of orange, and other fruits when in season. Mealworms are given as is a small amount of minced meat or sausage meat, rolled into small balls. Chopped day-old chicks are fed twice weekly. Mice are also given. Dishes are topped up mid-afternoon with dried insect mixture.

By 15th April both birds were observed in and out of the nest-box and the hen was seen to drop nesting material some 16 ft from the nesting area. The box was checked on 20th May and it was found that about 2 ft 9 in of the nesting material had been removed. Both birds were seen to visit the nest over the next 10 days and mid-afternoon on the 30th

attempted mating took place. A display routine was performed which consisted of bill clapping and the moving of the head and bill simultaneously by both birds in the same direction. Calls were very aggressive.

The box was checked again on 5th May and found to have a small scrape about 3 in wide but there seemed to have been no more nesting material removed. By the 19th the hen looked very swollen around the vent and a close watch was kept on both her and the box. Both birds were seen to leave the nest very early on the morning of the 22nd and inspection revealed one egg. The hen was observed to enter the nest for short spells only for the remainder of the day.

Next day, the hen stayed in the box for most of the morning, only vacating to feed. Another inspection revealed a second egg and at this stage the cock became very aggressive. Each time the hen left to feed, the male would take up a position in front of the entrance hole as if he was on guard until she returned.

She stayed in the box all day on the 24th, apart from feeding in the early evening. An inspection next day revealed a third egg and this was taken to be a full clutch. The eggs are white in colour. From 25th May to 8th June very little was seen of the hen other than the 20 minutes or so when she left to feed. Food intake increased on 8th June and over the next four days the male spent short spells in the nest-box and, as the hen was seen very little over this period, it was thought that he was feeding her.

The hen was away from the nest for long periods on 12th June and the male was taking little interest so it was decided to investigate. To our disappointment no eggs were found but shells picked up at the base of the box showed signs of having formed chicks in them. Incubation period was in the region of 21-22 days for the first egg laid.

It was a disappointment to all concerned with the breeding but the box has been reset and we are hopeful of success in the future.

Previous notes in the Avicultural Magazine:

FALKNER, Guy. (1944). A tame Toco Toucan, p. 40-41.

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BREEDING THE BLACK-HOODED RED SISKIN

Carduelis cucullatus

By DEREK GALLIANO

(Gibraltar)

The Hooded Siskin is a very active and colourful little bird (about 4 in/ 10 cm) and, according to the scant literature available, is long-lived; an eight- or nine-year old hen breeding successfully being not uncommon.

The cock is vermilion red on the breast and rump. The back is similarly coloured and marked with black pencilling. The head, upper parts of the neck, tail and wing feathers are all black and the flights bear the characteristic red colour flash.

The hen, although less brilliantly coloured, is, nonetheless, very attractive, being mainly grey throughout with flashes of red on the rump, the upper breast and the face. The wings display the characteristic red wing flash as in the cock.

Three years ago, I managed to acquire a pair of these delightful birds and after having had them for about five months, I put them together in early April as they were showing signs of wanting to go to nest. The cage used was the box-type version and its dimensions were approximately 4 x 2 x 2 ft (1.22 x 0.70 x 0.70 m). I fixed a canary nest-pan high up in one of the corners of the cage and provided the usual nesting materials given to canaries. The hen subsequently went on to lay two clutches; one of four and the other of six eggs. The eggs were laid on consecutive days and were smaller in size than a canary egg, being chalk white in colour and very similar to those of the Bengalese. Unfortunately, all ten eggs were clear and later on that year the cock died, followed by the hen two months later. Although I was extremely disappointed, this fleeting experience made me more determined than ever to be successful with the Black-Hooded Red Siskin. The opportunity would come my way much sooner than I thought.

In January 1983 I was extremely fortunate to acquire, through a local dealer, a cock and two hens. The two hens were kept together in the previously mentioned box-cage and the cock was housed in a smaller cage by himself. I installed a tubular heater in order that the temperature did not fall below 70°F. With the aid of artificial lighting, "daylight" was gradually extended to 15 hours.

On 13th February a nest was placed in each of the four corners of the box cage. Following the very welcomed advice of a local British bird breeder, the nests were "natural" and provided plenty of privacy for the

birds. The nest-pans were suspended from the cage roof by wire frames which were surrounded by plenty of foliage. Nesting material was also provided.

By this time the two hens were becoming increasingly aggressive towards each other and on 15th February I removed one of the hens and introduced the cock bird into the breeding cage. The pair soon settled down and the cock was seen feeding the hen. The following day the cock was seen entering one of the nests on repeated occasions and distinctly "calling" the hen from within the nest. When he emerged from the nest, the cock would have nesting material held firmly in his beak with his plumage all puffed out in display. He would then break into an arduous song and chase the hen who would invariably ask to be mated. Within two days the nest was ready and on 23rd February, exactly a week after they had been paired up, the first egg was laid. The following day, however, disaster struck. The hen was found lying on the cage floor and it was only too apparent that she was eggbound. Oil was applied liberally round her vent and then she was placed in a show cage situated near the heater. Thankfully, a few hours later the egg was passed. The hen, however, was in very poor condition after this ordeal and was placed on her own in a flight cage to recover. The eggs were placed under a canary hen and turned out to be addled.

Two days later, on 26th February, the second Siskin hen was introduced to the cock and they mated immediately. The same general behaviour was observed as with the first hen. In this instance, however, the cock was much more dominant and I believe this can be attributed to the fact that the second hen had been introduced into "his" territory whilst in the first pairing, it had been the reverse.

On 3rd March the first egg was laid and this was followed by four more on consecutive days. The eggs were removed as they were laid and replaced with plastic dummy eggs. The hen did not seem to mind this daily intrusion and would return to her nest a few moments after the exchange of eggs was effected. On 8th March the clutch was set and throughout the incubation period the hen was rarely seen out of her nest. The cock was always in attendance and on numerous occasions was seen feeding the hen in the nest.

On 20th March, one chick hatched and I decided to foster it out to a pair of canaries which were proven feeders. The following day a second Siskin chick hatched and was left with its parents. By 23rd March it was apparent that the fostered chick was not doing too well and, in fact, it required to be hand-fed at approximately hourly intervals. Two days later this chick's condition had deteriorated considerably and, more in hope than anything else, I returned it to the Siskin hen. The following day a

quick look at the nest revealed that the two chicks were alive and making progress. The change in condition of the chick which had been fostered was unbelievable! Everything continued to go well and on 29th March, when the chicks were eight and nine days old, I inspected the nest again. Both chicks were already nearly fully-feathered. Their plumage was rich yellowish brown on the chest with black flights and tails. The characteristic red wing flash was brown.

On 5th April both chicks left the nest and a week later were seen eating millet spray on their own. By this time the hen had started to build another nest and the cock was becoming increasingly aggressive towards the chicks. On 16th April, at the age of 25 and 26 days, the Siskin chicks were removed and placed in a stock cage, together with two canary chicks which had also been separated from their parents on the same day. The chicks were soon picking up food and were weaned without any problems.

On 20th April, the first egg of the second round was laid and this was again followed by a further four eggs. The same routine followed as in the first round and on 6th May three chicks hatched. All went very smoothly and on 12th May the three chicks were close-rung. As a matter of interest, one of the chicks (which subsequently turned out to be a hen) was smaller than its siblings and needed to be rung again two days later as the original ring had slipped off. On 22nd May, when they were 16 days old, the three chicks left the nest and on 1st June they were separated from their parents. The following day I noticed that the three chicks were not feeding themselves properly. I was tempted to return them to their parents but decided against this form of action as the cock bird had already become very aggressive towards the chicks. Instead, I removed the hen from the breeding cage and put her in the same stock cage with her chicks. Much to my relief, she started feeding them immediately.

The first Siskin hen, which had become eggbound, was now fully recovered and on 4th June I introduced her again into the breeding cage. The cock mated immediately and five days later the hen laid the first of three eggs. I had noticed that the hen was not sitting on the dummy eggs and consequently decided to place the three Siskin eggs under a canary hen which had previously reared four chicks when paired to an F_2 Siskin hybrid cock. Unfortunately no chicks hatched from the three eggs, one being addled and the other two dead in shell.

By early August it was obvious that I had bred four Siskin cocks and one hen. When they started to lose their juvenile plumage, black specks appeared around the head and neck of the young cock birds. When in juvenile plumage there is no difference between the sexes although the hen I bred was definitely smaller than her brothers.

As a general observation, I should say that not once did I see the Siskin cock feed the chicks, either at the nest or when they had fledged. He would, however, feed the hen tirelessly. The Siskin hen was an excellent feeder and on the few occasions she left the nest for more than a few minutes, the cock would make sure that she soon returned to her duties!

The basic diet of my Siskins consists of a combination of canary mixture and a British finch mixture. To this I add a teaspoonful per bird of niger and condition seed. Maw seed and small millet are sprinkled over the mixture. I also pass dog "Meat Munchies" through a coffee grinder and sprinkle some of the resulting "meat powder" over the seed mixture. A sprinkling of insectile food is also added. A millet spray is provided for each bird and this is really enjoyed. Lettuce leaves and apples are favourites and a bath is provided two or three times a week. When the chicks were being reared I offered the adult birds some soaked seed, grated cheese, hard-boiled egg and various proprietary canary-rearing foods. The birds did not show any interest in these foods and the practice was discontinued. When the young were in the nest four or five millet sprays were consumed every day, together with half an apple and a considerable amount of thoroughly washed lettuce leaves which the birds really relish. When the chicks hatched, livefood was offered in the form of ants' eggs, small mealworms and termites. The first two were not taken but, for the first five days after her chicks hatched, the Siskin hen consumed large numbers of termites. After the fifth day the rate of consumption dropped considerably and by the seventh or eighth day the hen would no longer be interested in this valuable source of protein. In order to increase fertility, a Vitamin E solution is added to the drinking water twice a week.

As a result of last year's success I now possess five cocks and three hens. At the time of writing, the three hens have already been paired up (a young cock with his mother, the young hen with her father and a young cock with the unrelated flighted hen). All three hens have now built their nests and should begin laying their first eggs within the next few days. As you can imagine, I am really looking forward to breeding more of these birds and the knowledge of the very real danger of their extinction has given an added impetus to my determination to achieve my ambition of building a free-breeding stud of Black-hooded Red Siskins.

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PLEASE NOTE: Following the response to the brief item by Mary Goodwin (1983, p. 120) and a similar appeal by David Coles in *Cage and Aviary Birds* (a weekly bird journal published in Britain), it has been decided to attempt an international census covering the captive population of the Hooded Siskin and to analyse management techniques. Details will appear in the next issue of the *Avicultural Magazine*. Ed.

CAGE-BREEDING THE CHESTNUT-BREASTED FINCH

Lonchura castaneothorax

By A.J. MOBBS

(Walsall, West Midlands)

There appears to be very little of detail written on the breeding in captivity of the Chestnut-breasted Finch. The few books which mention the species give only vague details and all emphasise that these finches will not breed under cage conditions.

It is obvious that the authors of certain titles which have been published over the past few years not only have not bred Chestnut-breasted Finches, but have not kept up to date with the avicultural literature. Otherwise they would surely have been aware that the species is frequently being bred under cage conditions.

Not all aviculturists have facilities for aviaries and one wonders how often such people have been deterred from keeping a species through reading misleading statements made in what they presume to be up-to-date books.

Nowadays I specialise in breeding Gouldian Finches *Chloebia gouldiae*, but to add a little more interest each season, I do keep and attempt to breed from one or two pairs of a different species. Last season I decided on Chestnut-breasted Finches.

First nest

A guaranteed pair was purchased in June (1983) and immediately housed in a box cage 91 x 41 x 41 cm. The birds proved rather shy, due no doubt to having previously been housed in an aviary. They never completely lost their shyness, although the young they produced, once in adult plumage, proved most confiding.

Before the birds were released into their cage, a nest-box was hung in the right hand rear corner of the cage. The birds roosted in this from the beginning. Soft hay had been placed in the nest-box, but within a matter of days the birds had removed most of it and appeared to be searching around the cage for nesting material.

As both birds took a keen interest in the nest-box, I collected some newly-mown grass from the verge of a country lane. This appeared more to the birds' liking and within a matter of days, the pair had built a globe-like structure inside the nest-box. Within five weeks of purchase, the Chestnut-breasted Finches had five eggs. They appeared to take little interest in them, however, and because of this I removed the eggs and

placed them under Bengalese, giving the latter's clutch to the Chestnut-breasted. It was most fortunate that I did this as, within three days, the Chestnut-breasted had begun to incubate the Bengalese eggs in earnest and I was able to return their own clutch to them, giving the Bengalese eggs back to their rightful owners.

As already mentioned, the Chestnut-breasted Finches were rather shy and because of this, whenever I entered the birdroom, whichever bird was incubating at the time would immediately leave the nest. Be this as it may, all five eggs duly started to hatch 12 days after incubation and within two days all five had hatched successfully.

As this was the first time that I had attempted to breed Chestnut-breasted Finches, I decided to make a photographic record of the growth of the chicks and when they were four days old, I removed the nest-box, opened the hinged lid and photographed the chicks for the first time.

When the chicks were seven days old, the parent birds ceased to brood. From experience with a further nest, I feel that this was a little early. However, we were experiencing extremely warm weather at the time and this no doubt had some influence on the parent birds.

As I always close-ring Gouldian Finches at 10 days old, I fully expected the Chestnut-breasted Finch chicks to be ready at the same age. However, upon inspecting them at nine days, I found they were a little large for close-ringing and experienced great difficulty in doing so. Indeed one of the chick's toes bled during the operation.

By the time the chicks were 19 days old, the cock was seen to court the hen continually and mating was seen to take place on numerous occasions.

The chicks left the nest-box at 22 days. This I felt was a little premature and believe it was due to my accidentally knocking the nest-box while feeding the birds, as the moment I touched the nest-box, the youngsters exploded from it. However, it appears that the Chestnut-breasted chicks do leave the nest at this age (see second nest). Due no doubt to the chicks leaving the nest-box through disturbance, they did not return to it for a couple of days, but spent most of the time sitting on top of it.

Newly fledged chicks are quite small, being nowhere near the size of an adult. Indeed they do not appear to attain full adult size until they have completed their first moult (from immature to adult plumage).

Not only are newly fledged chicks quite small, their plumage is far from complete, the tail feathers being very short and pin feathers abound, especially around the head and neck.

At five weeks of age, the chicks were removed from their parents and



A.J. Mobbs

Chestnut-breasted Finches: above, four days old; below, 18 days old

placed in a large box cage 1.8 m x 41 cm x 41 cm. They settled well and, due no doubt to being away from the rather shy parent birds, became quite steady. At eight weeks a youngster was seen to sing for the first time. It was immediately caught up and fitted with a split ring. Four weeks later, two more were observed singing and these too were fitted with split rings. All the first round chicks were in full adult plumage by the time they were 16 weeks old.

Second nest

After removing the first round chicks from their parents, the breeding cage was thoroughly cleaned. The nest-box was also cleaned, refilled with fresh hay and placed in position.

The pair were so eager to go to nest again that they accepted the hay placed in the nest-box, adding only a little extra from the small amount placed on the floor of the cage. Within a day of removing the first round chicks, the breeding pair had one egg. Three days later they began to incubate. Both birds sat more "tightly" than they had with their first round (due no doubt to becoming more used to me and to their surroundings). Upon checking the nest-box two days after incubation commenced, they were found to have a clutch of five.

Thirteen days after incubation commenced, a chick was found on the floor of the far corner of the cage. It had not been fed and appeared to be about 24 hours old. I placed it in the nest-box and the parent birds appeared to accept it. However, two days later, the cock was seen to push the now dead chick through the bars of the cage where it fell to the birdroom floor.

As it was obvious that the chick had never been fed, I decided to check the nest-box. Three chicks were in evidence; two with food in their crops and one obviously newly-hatched. The fifth egg proved infertile and was removed.

Two of the chicks were close-ringed eight days after hatching and the remaining chick two days later. The parent birds ceased to brood on the same day as the last chick was close-rung. At 22 days the chicks left the nest-box for the first time, but returned to roost during the night period. Two days later the hen had begun her third clutch. As the chicks roosted in the nest-box, I decided to leave it in position even though I did not want the parent birds to rear a third round. When the hen had completed her clutch (again of five), I removed the eggs, placed them under Bengalese and gave the Chestnut-breasted infertile Bengalese eggs to incubate.

When the chicks were 33 days old, the cock was seen to attack them rather severely and the following day I removed them, at the same time removing the nest-box to allow the adult pair to rest and moult.

Three of the five eggs hatched under Bengalese and the chicks were reared successfully.

Diet

The staple diet supplied to my Chestnut-breasted Finches consists of Pearl White Millet, Panicum Millet and Plain Canary, all supplied in separate dishes. Spray millet is available permanently as is oyster shell, limestone and mineral grit. A piece of cuttlefish "bone" is attached to the cage front permanently and flaked cuttlefish "bone" is supplied at least twice a week to non-breeding birds. For breeding birds, especially when chicks are in the nest, flaked cuttlefish bone is offered two or three times daily as at such times the birds appear to relish it. A dish of soaked seeds (consisting of one part Budgerigar mixture to one part Plain Canary seed) is given daily. Non-breeding birds take only small amounts, but pairs with chicks take the seeds avidly and are, therefore, offered as much as they will consume.

Non-breeding birds appear to take no interest whatsoever in live food, yet will take up to 40 mealworms each day when breeding. I find it preferable to kill the mealworms (by nipping off their heads) before offering them to the birds, otherwise the birds often drop them on the floor of the cage and the mealworms then crawl away before they can be eaten. Mealworm pupae are taken avidly and when I have plenty of these, I feed them exclusively.

Thoroughly washed lettuce is given to a breeding pair at least twice a day; non-breeding birds are supplied only every other day. The only addition to the above diet is Vitaflight C, which is added to the drinking water at all times and once or twice a week a teaspoonful of Kilpatrick's Iodised Minerals (for pigeons) is placed on the floor of the cage.

Song and display

Chestnut-breasted Finch cocks are extremely vocal and can be heard (and seen!) singing for hours at a time. Some cocks will even sing while incubating. Peering was observed in immature birds, but this activity is not nearly so pronounced as in the Gouldian Finch and once the Chestnut-breasted reach maturity, the activity ceases.

The display of the cock Chestnut-breasted Finch consists of the back and rump feathers being raised; the feathers of the lower breast and belly are also puffed out. The cock stands sideways on the perch, facing the hen, and bobs up and down, singing all the time. At no time do the feet leave the perch. After a few moments, the hen will crouch and solicit by quivering the tail. The cock then mounts immediately and copulation takes place.

Discussion

When wild-caught Australian finches were exported from their country of origin, no doubt many could not be induced to breed successfully in a cage. However, as there has been a total ban on the exportation of birds from Australia since 1960, the birds in our collections have obviously been bred under captive conditions for many generations. Many of the Australian finches are now almost fully domesticated (the Gouldian Finch especially) and it is obvious that many that were considered in the past to be unsuitable for cage-breeding, could no doubt be induced to nest and rear young if housed in a fairly roomy box cage.

From the experiences of other aviculturists as well as my own, it is obvious that the Chestnut-breasted Finch can be cage-bred. A good basic diet of clean seeds is essential, plus the additions already mentioned above. It is debatable whether or not live food is essential as the three chicks from the third round of my pair were successfully reared by Bengalese without live food being offered. However, the Chestnut-breasted pair was seen to hunt around their cage immediately the chicks hatched. This activity ceased the moment live food, in the form of mealworms (or mealworm pupae) was offered.

It is often stated that Chestnut-breasted Finches are almost impossible to sex visually. I do not agree with this, but will refrain from describing what I consider are plumage differences between the sexes as I feel it may not prove entirely infallible. The obvious way to sex the species is by the song of the cock. If this is done when young birds start to moult into adult plumage, the birds can easily be distinguished from each other as no two moult out in exactly the same way and if a split ring is fitted to all birds observed singing, these can be used for future reference.

Many breeders have mentioned that they find it difficult to dispose of surplus stock. I am certain that if they took the trouble to sex their young birds, then they would sell them much more readily.

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BREEDING THE BLACK SUNBIRD

Nectarinia (Chalcomitra) amethystina amethystina

By F.C. BARNICOAT

(Johannesburg, Republic of South Africa)

The South African National Cage Bird Association's medal for the breeding of the year has just been awarded to Mr. Jack Scheepers of the Natal coastal town of Amanzimtoti for his breeding of the Black Sunbird in January 1983. This is a well deserved achievement in a lifetime devoted to avicultural pursuits which has taken Jack Scheepers far afield in a number of different countries in Africa. The breeding took place in a large aviary, 17 x 10 x 3 m high, constructed of nylon shade cloth of 60% shade strength. One end consists of an artificially constructed rock cliff with waterfall and a stream winds through the aviary, which is attractively planted with a wide variety of plants including leonotis, tree-ferns, bromeliads, anthuriums and orchids which thrive in the subtropical climate of the coastal region of Natal.

One male and three female Black Sunbirds were housed in this aviary with a mixed collection of small seedeaters and softbills for about 18 months. The male suddenly turned aggressive and slaughtered all other birds in the aviary except the three females of his own species and the few quail. It was while this tragic occurrence was being investigated that the pear-shaped pendulous nest was first discovered attached to a length of a type of Brazilian air-plant known colloquially as "old man's beard", suspended from the roof of the aviary. No further nest inspection was carried out for fear of causing the birds to desert.

The nectar mixture is prepared approximately to the following recipe:

- 6 tablespoons brown sugar
- 4 tablespoons honey
- 4 tablespoons golden syrup
- ¼ teaspoon meat extract such as Bovril
- 1 teaspoon Haliborange
- 6 drops of Abidec (vitamin supplement)
- in 1½ litres hot water

The mixture is kept under refrigeration for up to two days and is successfully used for a collection of some 17 sunbirds in another very large aviary, including the Greater Double-collared, Lesser Double-collared, Grey, White-bellied and Marico. The Olive Sunbird is the best one of all as a character, but has proved too aggressive to keep with any other sunbird, even in a very large aviary.

The breeding of the Black Sunbird, however, was totally dependent for its success upon a large supply of live-food. Approximately 200 spiders a day, for which several persons searched diligently on Mr Scheepers' large property, were provided and these were supplemented by a supply of flying ants, which had been deep frozen and several fruit fly cultures in the aviary. The single nestling grew rapidly and was a grey-brown colour, very like its mother, when it left the nest. I viewed it in May, by which time a small patch of the iridescent black colour had appeared at its throat, proving it to be a male. It was doing well in the large aviary with the other sunbirds.

The parents were encouraged to repeat their success, and went down to nest twice more. On both these occasions there were two youngsters and the view is that possibly this was their undoing because it was not possible to keep pace with the enormous amount of livefood required to feed two babies simultaneously. Another disadvantage was that the supply of frozen flying ants had been exhausted by the first baby. Unfortunately the babies died when they were just beginning to feather. No doubt there will be renewed efforts to succeed again when the summer comes.

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BREEDING THE RED-WINGED LAUGHING THRUSH

Garrulax formosus

AT THE SAN DIEGO ZOO

By ALAN LIEBERMAN (Ornithology Department)

Babblers (family Timaliidae) are a large and diverse group of Old World passerines containing 230 species of 41 genera. The most diverse is the genus *Garrulax* with 47 species, of which the Red-winged Laughing Thrush is a member. Other members of this genus, generally known as Laughing Thrushes, which are often encountered in aviculture, are the Melodious Jay Thrush *G. canorum*, Chinese Jay Thrush *G. chinensis*, White-crested Laughing Thrush *G. leucolophus*, White-throated Laughing Thrush *G. albogularis*, and the Necklaced Laughing Thrush *G. monileger*. Although various species of laughing thrushes have been kept in captivity, relatively little is known of the breeding habits in the majority of the species. The Red-winged Laughing Thrush is one of those species for which little has been

described and, to this author's knowledge, has never before been bred in captivity.

The Red-winged Laughing Thrush (also known as the Crimson-winged Laughing Thrush) is found in pairs or small flocks in the mountainous areas of Szechwan and Yunnan Provinces in western China. It is a monomorphic, thrush-like bird measuring 10.5 in (26.5 cm) in length. Its distinguishing characters are blood-red primaries and upper tail, with a grey crown streaked with black. The body colour is a rufescent olive-brown. Favoured habitat is forest undergrowth up to timberline, above which it can be found in the low bushes which surround alpine meadows.

The San Diego Zoo acquired two flocks of wild-caught Red-winged Laughing Thrushes, numbering seven and ten birds, from the Chengdu Zoo, Szechwan Province, People's Republic of China, in August 1981 and January 1983. During the 30-day quarantine period in the San Diego Zoo hospital, the initial group of seven birds was treated with Pyrantel Pamoate for nematodes, and the subsequent shipment of ten birds was treated with Bithionol and Albendazole for flukes and sulphadimethoxine for coccidia. All birds survived quarantine and were released for exhibit without mishap. The flock was divided into four groups which were introduced to four aviaries of various dimensions: two birds in an exhibit measuring 18 ft x 15 ft x 7 ft (5.4 m x 4.5 m x 2.1 m); six birds in an exhibit measuring 40 ft x 15 ft x 15 ft (12 m x 4.5 m x 4.5 m); five birds in a walk-through aviary of 12,000 square feet (1,080 square metres); and four birds in a walk-through aviary of 8,000 square feet (712 square metres). All four exhibits also house other bird species indigenous to Southeast Asia and are variously planted with shrubs and trees found from that geographic region.

This species captive diet consists of a "standard soft-bill pan" which contains chopped fruits (apples, oranges, tomatoes, grapes, raisins, papayas), chopped greens (romaine lettuce or spinach), moistened protein-meal (trout chow, milled dog food, mockingbird meal, shrimp meal), blueberries, and Zu-preem Bird of Prey Diet. Vionate multi-vitamin is sprinkled on the chopped fruit. Also available, in a pan primarily for the gallinaceous birds sharing the aviary, are mixed grains and pheasant pellets, from which the Red-winged Laughing Thrushes are often seen feeding. There are daily offerings of live crickets or mealworms. In all four aviaries, but especially in the walk-throughs, naturally occurring live food is available in the form of earthworms, moths, crickets, caterpillars and subterranean larvae, all of which have been observed as prey items for the constantly foraging Laughing Thrushes. A common sight is three or four Red-winged Laughing Thrushes energetically turning over leaves in the litter in search of invertebrate prey.

During the latter part of 1981 and for the entire year of 1982, no nesting activity was observed, although in all four flocks it appeared that all the Red-winged Laughing Thrushes were compatible, often seen allopreening, and singing in duet. Their vocalisations are varied and musical, with the most common song being best described as sounding like a two-note police whistle.

In March 1983, a flurry of Red-winged Laughing Thrush nesting activity began in all four aviaries, involving what is thought to be, at most, six pairs of birds. In all, 11 nests were built, being begun or observed on the following dates: 3rd March, 15th March, 17th March, 18th April, 1st May, 3rd May, 26th June, 27th June, 29th June, 1st July, 21st July. Nests were built of dried grasses, bark fibres, pine needles, and bamboo leaves in varying quantities, according to availability, in each exhibit. Nest form was a bulky cup affair, measuring approximately $7\frac{1}{2}$ in (18 cm), in diameter, 5 in (12 cm) in height and 3 in ($7\frac{1}{2}$ cm) from nest lip to nest floor. The highest nest from the substrate was about 6 ft (1.8 m), while the lowest was about 3 ft (0.9m), with an average height of about 5 ft (1.5 m) for all 11 nests. Eight of the nests were built in Golden Bamboo *Phyllostachys aurea*, two were built in young Pomelo *Citrus grandis*, and one nest was built in a freely attached nest basket. It appears that when and where available, Golden Bamboo is the nest site of choice. Nest materials are woven around and between the $\frac{1}{2}$ in to 1 in (1.3 cm to 2.5 cm) stems of the bamboo, incorporating the bulk of the bamboo clump into the matrix of the nest itself. Wherever available, bamboo leaves were used as the finishing material to form the interior lining of the nest chamber.

Eggs were laid in eight of the eleven nests; two with one egg, five with two eggs, and one with three eggs. Fertility was confirmed in only three nests, three clutches disappeared without apparent cause (predation, autopredation?) and two clutches were incubated for 21+ days, abandoned and determined to be infertile. In one of the fertile clutches (of one egg), the embryo died in the egg prior to pipping. The eggs are typically oval-shaped, with a smooth semi-glossed blue surface. They are richly spotted with tear-shaped streaks the colour of dried blood, becoming more densely marked toward the broad end of the egg. The four eggs measured had average dimensions of 1.16 in x 0.86 in (2.97 x 2.20 mm).

In the two nests which produced young, the incubation period was estimated to be 16 to 17 days. In all cases in which eggs were involved, both parents shared in incubation duties. In the two cases in which young were hatched (one hatchling and two hatchlings), both parents proved to be diligent parents, sharing brooding time and foraging time, making innumerable forays in search of live food for the chicks. Mealworms and crickets were offered to the parents three to five times daily, along with

the daily "soft-bill" pan. Supplementary, naturally occurring live food was always available. Characteristically, the parent birds would line up the invertebrate prey in their beaks until full, before returning to the nest. Up to a dozen mealworms were counted on one occasion in the parent's beak, which were ultimately shoved into the nestling's waiting gape. The chicks feather rapidly and fledge from the nest after 15 to 16 days. They remain near the nest, clinging to surrounding twigs while being fed by the parents. Eight days after leaving the nest, the chicks begin turning leaves, actively searching for invertebrate prey, but remain dependent on the parent birds for the majority of their diet for two to three weeks after leaving the nest.

One chick was attacked ten days after fledging by a second pair of Red-winged Laughing Thrushes which was beginning to exhibit nest-building behaviour. This chick was removed from the exhibit, and was hand-fed for 14 days, but ultimately died from its injuries. It is recommended that in aviaries with limited resources (space, vegetative cover, nest sites and material) nesting pairs of Red-winged Laughing Thrushes should be kept to a minimum to prevent intra-specific aggression between nesting birds and fledglings. Both pairs that successfully fledged young returned to nest within one to two weeks after the chicks were self-sufficient. However, in one nest the eggs disappeared, and in the other nest the eggs were infertile and abandoned.

In view of the restrictions imposed on the exportation of nearly all of mainland China's avifauna, it is hoped by the staff of the San Diego Zoo that this recently established group of Red-winged Laughing Thrushes will serve as the nucleus of a breeding flock. Successful breeding in the forthcoming seasons will provide future generations of this handsome Laughing Thrush to other aviculturists and zoos that are interested in keeping such a charming songster.

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There have been no previous notes on this species in the Avicultural Magazine.

KEEPING AND BREEDING GREEN-CHEEKED CONURES

Pyrrhura molinae

By Dr. W. MERCK

(Hamburg, Germany)

I received a pair of these conures in October 1981. The dealer had offered to find a true pair from his stock by endoscopy, but the birds seemed to me to be too small and slight for such an operation. Then the dealer undertook to try to select a pair by his judgement, and he was later proved right.

As far as I know, up to that time this species was hardly ever imported into Germany but since then, they have been available occasionally.

The male and female are identical in colour but the behaviour of my male is rather livelier and less shy, though the hen is not all that timid. The cock feeds the hen from time to time out of the breeding season.

The colouring is as follows: crown and nape dark grey, the latter tinged with light blue, ear coverts greyish white, cheeks green, throat and sides of neck whitish grey with feathers edged grey, upper breast feathers edged with light brown, upper tail coverts tinged with light blue, under tail coverts blue-green, primaries blue, tail on both sides copper red, the remaining plumage green, bill and feet greyish-black. I presume that my birds are of the race *sordida* as they do not have any red on the abdomen, apart from a few hardly visible reddish feathers (Arndt, 1983).

As with most of the other *Pyrrhura* species, the plumage is not as strikingly brilliant as with so many other parrots, but in their discreet colour composition and elegant shape, the *molinae* make a charming picture, especially when the sun is shining on them - which, by the way, they like if it is not too intense. As their aviary is not shaded by trees, I put some foliage on the wire over their favourite perching places. When a group of these conures is flying, displaying their deep blue wings, it is an especially pretty sight.

Green-cheeked Conures are lively birds, on the wing much of the time and they are skilful climbers. In their ability to run fast up and down the wire they resemble the *Cyanorhampus* parakeets. Branches for chewing are essential and very much appreciated, whereas old wood, such as the aviary frames are made of, is hardly touched.

The aviary measures 4 x 1.5 x 2 m (13 ft 2in x 5 ft x 6ft 6 in). The attached shelter, measuring 1.5 x 1.5 x 2 m (5ft x 5ft x 6ft 6 in), can be only moderately heated and in times of severe frost, the temperature may drop to +3°C. Sometimes the parakeets go down on the ground, which is partly turfed.

These birds do not have a loud screech and only become a little noisier when they are upset by something unknown, such as a strange person or animal, so even sensitive neighbours cannot be irritated by them. Nor are my birds very shy, and the presence of people in the garden does not cause them to fly into the shelter. As they are out in the aviary nearly all day, one can observe them well unlike shy birds that rush into their shelter the moment anyone appears.

Strangely, the Green-cheeked Conures did not go into a nest-box at night, though two were provided, one in the flight and one in the shelter. As far as I know, this is quite unusual amongst birds of the *Pyrrhura* genus and they only changed at the beginning of the breeding season.

Though only recently imported in the winter of 1981/2, they proved to be resistant to cold weather. I let them out into the flight when the temperature was not below -2°C but I am sure that they would have gone out in even colder temperatures. They also bathed in very cold water.

Their diet consists of the usual seeds (sunflower and oats are also sprouted), of which sunflower and millet spray are preferred, corn-on-the-cob (maize), a little biscuit, shredded carrots and much fruit - apples, pears, grapes, figs and red currants. Wild berries such as hips, mountain ash, hawthorn or white thorn, and cotoneaster berries of various sorts are much relished as are chickweed and dandelion heads. Grit, cuttlefish "bone" and limestone are always provided. To date, they will not touch spinach.

The birds became interested in the nest-boxes for the first time in March 1983. Eventually they adopted a log in the shelter with a layer of wood shavings. Soon mating took place and between the 28th March and 5th April, five eggs were laid. Checking the log on 1st May, I found four young in the nest. The fifth egg did not hatch and later disappeared.

As the parents were apparently worried when I entered the shelter, I had few opportunities to observe the birds when feeding the young. As far as I could see, the cock was often in the nest (always at night). At first the young were naked, thereafter covered with thin down. They were apparently always well fed. The first chick left the nest on 11th June, the others followed during the next days, but they went back into the box quite frequently for some further days and during this time, were more inside than outside. The first time out their movements were quite awkward and hesitant, but soon they became used to the new surroundings

and learned to fly and to climb skilfully. They are now very lively, moving about together and there is much mutual preening and playful struggling.

The plumage of the young differs only slightly from that of their parents: the grey is paler, especially the ear coverts, the ceres are lighter and the bill more brownish-grey. The size is the same.

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DELEGORGUE'S PIGEON

Columba delegorguei delegorguei

By NEVILLE BRICKELL

(Natal Avicultural Society, Republic of South Africa)

This bird is also known as the Bronze-naped Pigeon and the Crimson-winged Pigeon. It was named after the French naturalist Adulphe Delegorgue during his African travels in 1847. Little is known about this rare secretive species which may be seen singly or in pairs with flocks, sometimes gathering to feed in the early morning and late afternoon.

The male has the head slate grey suffused with slight green iridescence; nape vivid iridescent mauve; band across hind neck white; mantle and wings dark reddish brown shading to slate-black on lower wing-coverts; rump blue-grey; tail blackish; underparts dark greyish pink shading to reddish brown on the belly; eye dark brown or reddish; orbital skin around eye dark pink to flesh pink; bill blackish with pale horn-coloured tip; legs and feet reddish pink. The female has the crown and nape brown and lacks the white collar. Young birds of the nominate race have not been described but a juvenile of *C.d. sharpei* lacked the white collar; underparts dark rufous; upperparts greyish brown, feathers edged with light rufous.

Delegorgue's Pigeon occurs in Pondoland (coastal), Transkei (highlands), eastern Griqualand to Natal (interior), western Zululand, eastern Zimbabwe and southern Mozambique.

It is locally migratory according to food supply. It inhabits evergreen forests and thick woodland and is also found on the coast and on occasions in mature pine plantations. It is rarely seen as it keeps mostly within the protective 'cover' of the forest canopy, but is recorded mainly on its call which is a distinctive, fairly loud *coo-co-coo*, followed by five or six quiet *coos*. If approached, it remains motionless at first but once flushed, flight is swift and direct.

This species appears to be mainly frugivorous, feeding in the upper branches of forest trees on wild figs, various kinds of berries and fruit. Recorded feeding on the large pinkish or red fleshy cones of Real Yellowwood *Podocarpus latifolius*, the small, single-lobed, yellow-green capsule of the wild Poplar *Macaranga capensis*, and the black (when ripe) berries of the Pigeonwood *Trema orientalis*. The stomach of one specimen contained the larvae of cicadas, while that of another contained some small quartz pebbles.

Delegorgue's Pigeon breeds from November to April. It constructs a flimsy platform of twigs in a tree or shrub, usually about 5-7 m above the



N. Brickell

Male Delegorgue's Pigeon

ground. It lays two glossy white eggs; both sexes incubate and feed the young (Kenya).

The species is in no danger of extinction as long as the relatively small areas where it occurs remain protected. There are populations elsewhere in Africa. I can find no record of its having been kept or bred in aviaries in South Africa but the northern race *C.d. sharpei* is reported to have been kept on rare occasions in British and American zoological gardens.

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NOTES ON THE TAMBOURINE DOVE

Turtur tympanistria

By NEVILLE BRICKELL

(Natal Avicultural Society, Republic of South Africa)

I have had a long association with the Tambourine Dove, or, to give it its alternative names, Wood Dove or White-breasted Dove. The association has been caused because their low, rapid flight has led them to fly into moving cars using a road which runs through the middle of an evergreen forest near my home on the coast. Many have come to grief, but those stunned spend about a month recuperating in my hospital aviary before being released back into the forest. The male has a snow white forehead, throat, breast and belly; nape, ear-coverts and back ashy brown; tail dark brown, the outer feathers with subterminal markings in black; iridescent wing spots blackish purple; eye brown; bill purplish, with black tip; legs and feet reddish purple. The female differs from the male in having the white parts suffused with grey. Juveniles have the sides of the chest and flanks barred, the feathers edged with greyish white.

This dove occurs from Sierra Leone and Fernando Poo in the west to Ethiopia in the east, then southwards to north-eastern Angola, Zimbabwe (except in the dry east), Mozambique, eastern Transvaal, Swaziland, Zululand, Natal to southern and eastern Cape Province, South Africa. They also occur on the islands of Comoro and Madagascar.

The diet includes weed seeds, grain, fruit and insects. They are particularly fond of the seeds of the Castor oil plant *Ricinus communis*. They have been recorded feeding on the seeds of Sorghum *Sorghum bicolor*, Land Grass *Eleusine africana*, Flat-crown *Albizia* sp., Stink-hout *Celtis* sp. and Fever Tree *Croton* sp., as well as the fruits of Waterbessie *Syzigium cordatum*, Mulberry *Morus mesozygia* and Pigeonwood *Trema orientalis* (Rowan, 1938). In captivity they accept a grain mixture consisting of crushed red maize, lentils, tares, millet and sunflower. To supplement the lack of castor oil in their diet, sponge cake was used. Lettuce, watercress, chickweed and spinach was their only supply of green food. The chickweed was eaten on every occasion, and only small portions of the lettuce and watercress, with no interest shown in the spinach. Various types of fruit were tried but only orange and dried currants were accepted. Insect life must play a large part in their natural food supply, as they never refused such items as small mealworms, flying termites, small brown ants, spiders, small slugs and dead flies.

During nesting two (occasionally one) creamy white eggs are laid on a



Neville Brickell



Tambourine Doves: adult male, left: adult female, right

platform of twigs and roots, placed at 1-10 m (3 ft 3 in to 33 ft) in a tree or in the tangled branches of a creeper. A pair was recorded utilising a nest originally built by Laughing Doves *Streptopelia senegalensis* (MorpheW, 1972). The nest construction is carried out by the female as the male carries twigs to the nest site. Both birds share in the incubation with the male sitting for long periods during the day and the female relieving for short intervals. The female would take the night sitting. The incubation period is between 17-20 days. The egg shells are usually removed by the male soon after hatching. The female closely broods the young for the first few days whereupon both brood constantly. On hatching the young have a brownish skin covered with pale creamy white down on the head, scapulars and rump. At seven days the quill feathers cover a large portion of the body. At nine to ten days the feathers start to appear from the quills. The young birds leave the nest at 19-22 days. Hybrids between this species and Green-spotted Wood Dove *Turtur chalcospilos*, Blue-spotted Wood Dove *Turtur afer* and Namaqua Dove *Oena capensis* have been recorded.

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THE BLUE-NAPED PARROT

Tanygnathus lucionensis

By GEORGE A. SMITH

(Peterborough, Northants.)

The Blue-naped Parrot weighs somewhere between 170 and 200 g. It has a resemblance to an immature Alexandrine Parrakeet *Psittacula eupatria* with a broader, shorter tail. Its glory is the wing-coverts which, to the bend of the wing, are black and towards the flights are gold bordered. Some coverts are blue. The nape is blue and more blue is on the rump. Contrary to published opinion (e.g. Delacour and Mayr, 1946, Dupont, 1971, and Forshaw, 1978) the sexes are of different appearance. Hens have the gold on the coverts muted to dull brass; they have less blue both to the wing and nape, and the black is reduced and duller. The bill is not so perfect and a brighter red.

The Blue-naped, as with the other Philippine parrots, was seldom imported. I obtained four adult hens from the late (and so much missed) Mrs. Stephanie Belford in the spring of 1977. The only one that had good plumage was picked up dead the next day, presumably it succumbed to the stress of capture and transport. The next best-feathered bird died, of visceral gout, in January 1981. She and another had laid annual clutches of two or three eggs every late May or early June. In February of 1983 I managed, through an advertisement, to obtain the loan of a male from Ken McKenzie. Neither of the remaining hens was ever able to fly. They had a tousled look, for some feathers never grew and the vanes to the biggest feathers had defective barbs, while the flight and tail feathers always grew in a curve. As diet made no difference to their feathering I assumed that this was the result of once having had "French-moult". The two hens had always been amicable. They roosted in separate boxes and the likelihood was that the borrowed male, like the Ring-necked Parrakeet *P. krameri* (Smith, 1972) and the Derbyan Parrakeet *P. derbiana* (Hayward, 1983) might have become a bigamist. I doubt that the hens would have fought. The separated hen was held two flights away, in an identical outside aviary, 2 x 1 x 2 m high. Regrettably, she was picked up dead two weeks later, with a ruptured liver from a hard fall as she could only flutter.

As with the Alexandrine Parrakeet, the pair are more at ease in close company than are the smaller-sized Ring-neckeds and will perch, often for long intervals, quite relaxed with their bodies almost touching. The courtship noticeably lacked the neurotic (because it is superfluous) wiping of

the bill of many *Psittacula* parakeets. In the early courtship days when the cock preened his partner's head he had less of the spite and fear so obvious in Ring-neckeds. He groomed her head. When approaching the hen the courting male (this is also noticeable in *Psittacula*) held himself, penguin-like, bolt upright with eyes blazing and a very slight drooping of the wings and flaring of the tail. He marched grandly forward (his legs stretched clear of the body) with long, gliding, deliberate steps. It was possible to compare this stately gait with that of a normal bird for, as he approached, the hen would sometimes walk off. As the upright, proudly advancing male moved towards the hen, he had his bill always directly facing her with the head held arrogantly high. No side-to-side swaying of the head was seen. Usually the female squatted low while he, intending to copulate, first looped his head over her back with his bill-tip against her opposite neck side, as if he were trying to stop her moving, then climbed on her back facing the wrong way round. Positioning himself in the correct direction, he began copulation by pressing his cheek next to hers for a second or two then, lifting his head over her nape, pressed the other cheek and, after a similar pause, back again. This pressing of alternate cheeks took place with a perfect rhythmical pattern. Although quite vociferous birds, no noise was heard during treading. A regular alternate pounding of the neck of the female by the copulating male's head, called "hammering" is seen in the Ring-necked and the Long-tailed Parakeet (Smith, 1979) and, incidentally, in fig parrots *Psittaculirostris*. If the hen was not willing to mate she would hold herself in an imperiously high-stretched body and head position, which usually set him doing stiff-legged jumps with eye-blazing to punctuate his marching. Then he would take short flights dropping vertically on to a perch, immediately followed by a short bounce, an action very reminiscent of lorries and fig parrots and surprisingly elegant for so stocky a bird. On walking away from the hen, or less commonly, when approaching, he would slide his lowered bill ahead of himself. The frequency of copulation fell throughout incubation and was never seen once the eggs hatched.

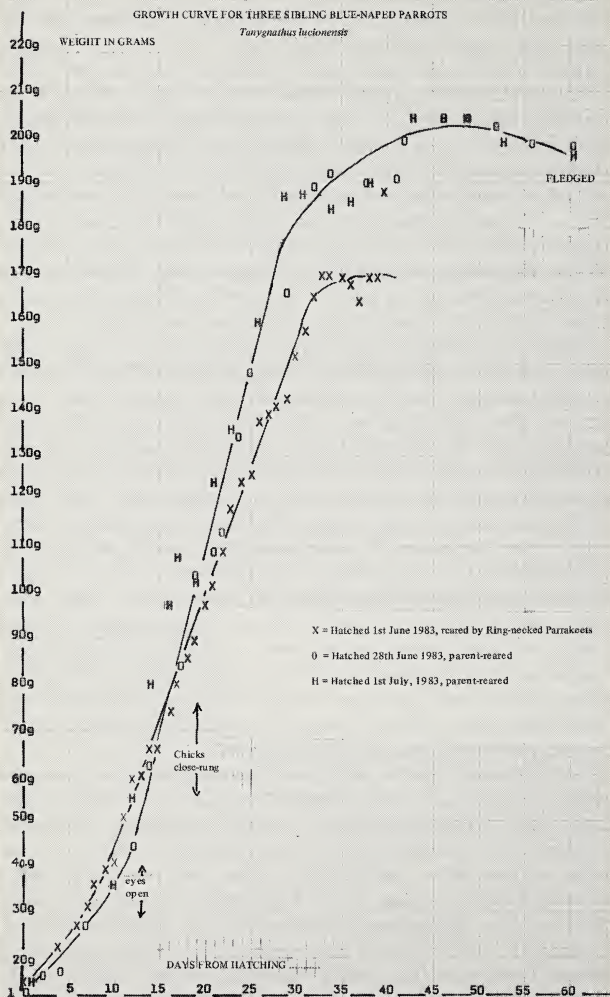
Nest excavation was done by the hen. This nest was used as a dormitory, by both, for many months before laying, and after. The nesting container was our usual dry (because of overhead protection) sloping, thick wooden rectangular box. As has been our invariable practice, for many years now, no nesting material was provided, except for generous lengths of softwood quartering screwed along the length of the inside corners of the box for the hen to chew at. From Mrs. Bonestall's account (1937) it appeared that her hen Blue-naped Parrot might have picked up odds and ends from the aviary floor to form a nest. However, the soft, warm material she describes as forming the nest does seem more likely to have been gathered by mice.

Certainly the several clutches my three birds laid were invariably deposited on a thick accumulation of woodparings torn by the hens from the interior of the boxes. Six clutches were of two and four of three eggs. All were laid in the period of late April, through May to the first week in June.

This hen laid her first egg on 3rd May, 1983. The second followed three days later. As expected, the male played no part in incubation. The first egg was infertile. After asking Mr. McKenzie's permission (the first chick had been promised to him) the eggs were put into a mechanical incubator. On 2nd June the first egg (of her second clutch) was laid sixteen days after removal of these. Another (three days later) completed this second, fertile clutch. The eggs were left with the parents. The first hatched on 29th June and the second two days later. This twenty-six day incubation matched the incubator-hatched egg and Mrs. Bonestall's pair. Pipping commenced three days before the chicks released themselves from the shell.

The incubator-hatched chick was immediately given to a pair of Ring-necked Parrakeets that had a single three-day-old chick. (The foster parents had, by removing their two previous clutches, been held back for this purpose). The only difference, other than size, between the Ringnecked Parrakeets and the Blue-naped Parrot chick was that the former was completely naked. Blue-naped chicks have a thin, extremely sparse scattering of quite short (3-4 mm) down. This vestigial down never rubbed off and was still there after three weeks. All the chicks were regularly weighed. The Ring-necked Parrakeet-reared chick was weighed at approximately eight in the morning, when it had an empty crop, and the two parent-reared chicks some time in the early afternoon when they usually had full crops. (This might explain much of the difference in weight). When four days old, two of the three were clearly yellow. Such a jaundiced look, which is often noticed in fresh-hatched parrot chicks is, I believe, not pathological. It may prove to be an accumulation of carotenes: the vegetable pigments that colour, amongst other things, egg-yolk. Perhaps it is the absorption of the yolk-sac that gives this effect.

As will be seen from the graph, growth was very rapid, the eyes opening when 12 days old and by three weeks the chicks were covered by a dark grey, secondary down, the follicles of which had appeared, and darkened the skin, at 11 days old. By 24 days the quills of the feathers were sprouting in the skin and at the 29th day the first green could be seen on the secondaries and larger wing-coverts. When 40 days old, the eldest, solitary chick was taken for (successful) hand-rearing by Mr. McKenzie. Because of the deeper red to the bill and the larger amount of blue to the wing, it is assumed to be male. The other two seem to be female. The second chick fledged after 56 days and the final one two days after that. Both are beautifully perfect in feather and extremely tame. In appearance they are



smaller than the parents. The bill is a muddier and duller red; there is no blue to the nape and only a little to the back; the wing markings are very dull and indistinct. The tail feathers are pointed, not rounded as in the adults, and the eyes are dark.

The surviving British population of the Blue-naped Parrot is between 14 and 20 birds. Included is the pair, and their two offspring (also bred in 1983) owned by David Alderton. This number would be well adequate provided that the necessary exchange of breeding birds takes place, to establish them as aviary birds without having to obtain more from the wild.

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Young Tropical Screech Owl on 5th October 1966

Y. Oniki

BEHAVIOUR AND MOULT OF A YOUNG CAPTIVE TROPICAL SCREECH OWL

Otus choliba

By YOSHIKA ONIKI

(Department of Zoology, University of Sao Paulo, Brazil)

Owls in general are thought by Brazilians to be animals that bring bad luck to people; they believe that where an owl sings at night, someone may die soon. However, Brazilians are also attracted by nests, eggs and young birds, if only to put them in captivity or destroy them.

A barred young Tropical Screech Owl was one such unfortunate bird (Plate 1), hatched in a large warehouse at the Agronomic Institute at Belem, Para, Brazil, and brought to me on 26th August 1966. I kept it in a large bathroom, perched on a branch. It tried to peck and clapped its beak when touched but soon became tame. On 4th October it closed its eyes when I touched its head. It was in better health, clapped the bill less and often flew around the room.

Feeding

While a head wound healed, the bird was fed raw beef and boiled eggs. Water was provided by opening its bill and dropping in water with an eye-dropper. On 16th October, when I discovered the first expelled pellet containing dark material, I started feeding it one to two mice, three to four geckoes, and several beetles every night. Feeding was not a problem, except that when it arrived I had to open its beak and force the food in; soon it was feeding by itself. These owls are often insectivorous; a bird from Icapara (Sao Paulo) in the Museu de Zoologia of the University of Sao Paulo had remains of insects in its stomach.

On 14th October I had provided a container full of water for it to drink and bathe in. The bird got in the container and drank and then stamped its feet in the water, sitting and lowering the head several times so that belly and head would get wet. It stopped bathing when I watched but resumed as soon as I left. The next day, when the container was presented, the owl entered the water and drank but did not bathe. Spicknall and Pickett(1983) did not see drinking in captive *Rhinoptynx clamator*.

Plumage

When I received the young bird, it was covered with soft downy grey

feathers barred with a darker grey, almost black; its feet were ivory, the bill light olivaceous grey, and the iris tan or orangeish brown. Forty days later, on 4th October, the first body feather dropped. Every day thereafter two to five more feathers dropped. Its legs had gained feathers with grey bases and light brown tips, each with a dark brown subterminal bar. Its bristles were longer.

On 20th October I noticed different new feathers on its neck. The new feathers were streaked instead of barred, and there was a dark feather on the superciliary line. Whenever it preened, a few body feathers dropped and some remained next to its bill. On 26th October the young owl had a series of white feathers along its superciliary line. Breast feathers with dark stripes were increasing in number, forming a necklace and two rows down the sides of the breast. On 7th November there was a line of short, white ear feathers which were erected at the presence of strangers. On top of the head, black feathers had increased in number, forming stripes. By 24th November the owl had a different plumage (Plates 2 and 3) than when it arrived in August, and emitted at least three different types of calls.

From observation of two young in a nest found on 17th October, 1972, on top of an old nest of the Great Kiskadee *Pitangus sulphuratus* in a rubber tree at the Agronomic Institute (Oniki and Willis, 1983), we can conclude that at hatching, young Tropical Screech Owls are covered with fluffy white down and eleven days later their chests are covered with dark-barred feathers. More than 40 days later the barred feathers drop gradually and are replaced by the streaked plumage described above. Wetmore (1968) describes a similar sequence of plumages from Panama.

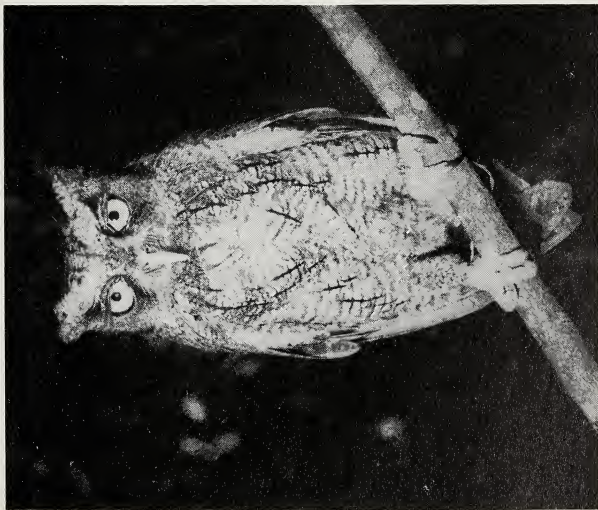
Vocalisations

On 13th October at 18:00 the young owl had given, for the first time, a couple of sounds similar to the call of an adult owl. It had heard these calls from a bird outside - ever since it was in the room a pair of *Otus choliba* had been singing outside every night. On 25th October, the pet owl also sang at 02:00. Its song was rather weak and short but it was excited and flapped its wings. The outsider approached the window where the pet owl was. From this night on, it emitted a few faint and short songs every night, often flying around the larger adjoining room.

In early December I took the pet owl to Sao Paulo City, where it escaped while I was feeding it. It perched on top of a high building and later flew away.

Other nestings

At Belem, on 17th and 21st November, 1972, I found two nests of



Y. Oniki
The same young Tropical Screech Owl on 15th November 1966, front and back

Screech Owls (Oniki and Willis, op. cit.), on old kiskadee nests, each containing two white, rounded eggs. The average weight of four eggs was 15.1g (range 14.5-15.5g).

On 19th October 1967, in the same warehouse where the young had hatched in 1966, two fledglings were discovered. (One white downy young about five days old weighed 24.1g.) This suggests that a pair was nesting in the same site year after year.

ACKNOWLEDGEMENTS

I am grateful to Edwin O. Willis and Johan Ingels who commented on an earlier draft of the manuscript. Field work and writing was conducted while I held two different fellowships from the Conselho Nacional de Desenvolvimento Cientifico e Tecnologico (CNPq) of Brazil.

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SOME BIRDS SEEN ON A VISIT TO AUSTRALIA, NEW ZEALAND AND FIJI

By TONY SILVA
(Illinois, USA)

To a parrot enthusiast Australia is a paradise, for it contains 52 species of this family, including some unique forms such as the Long-billed Corella *Cacatua tenuirostris*. Therefore it was with great expectations of seeing some of the native species that I visited this continent. That Australia is the "land of parrots" was evident the minute our plane touched down at Tullamarine Airport in Melbourne; as the plane made its way down the runway, a pair of Galahs *Eolophus roseicapillus* was seen feeding in a strip of grass - just a token of what was to be seen in the weeks ahead.

One of the delights of my trip was observing the Long-billed or Slender-billed Corella in its habitat. I had thought that it would be rare, as sugges-

ted by some reports which have documented a contraction of range and decline in numbers, yet this was clearly not the case: in a day and a half of travelling, Gordon Aitken and I observed some 20,000 specimens. They were wary of man, a trait that could probably be attributed to persecution as an agricultural pest. Within parts of the range visited it could be described with only one word - numerous.

The Sulphur-crested Cockatoo *Cacatua g. galerita* was sighted on numerous occasions, with one of the largest concentrations being observed feeding on the ground at Rutherglen in Victoria. They make a magnificent spectacle while in flight. Similarly, Galahs provide a treat for the bird watcher and their antics while flying, as they dart between trees, calling all the time, make them stand out in my memory.

Numerous other species were observed in the wild. Some seen in aviaries are worthy of noting. An Eclectus Parrot *Eclectus roratus* in the collection of Paul and Joan Sperba of Ballarat, Victoria, is unique in its colour scheme. Briefly, it could be described as having the colours of both male and female. Probably a cock, it has shown no interest in nesting. The Sperbas also breed Golden-shouldered Parrots *Psephotus c. chrysopterygius*, a species which I found in numerous collections and which could be said to be established. Probably the most consistent and successful breeder of this species is Joe Mattinson of Wollongong, New South Wales. He told me that in a 20-year period he has bred some 600, a remarkable achievement! Mattinson also has Naretha Blue-Bonnets *Psephotus haematogaster naretha*, which I also saw in the aviaries of John Fell of Victoria, and of several others.

The Hooded Parrot *Psephotus c. dissimilis*, which, in my mind, is far more attractive than the Golden-shouldered, was also encountered in a number of aviaries, in which it is established. This species' display is most attractive: males ruffle their black crowns, bring their wings slightly forwards to reveal the rump and sway their tails from side to side.

A unique hybrid was seen in the collection of Victoria aviculturist Stuart Anderson. When first told about it - a cross between a hen Australian King Parrot *Alisterus scapularis* and a male Rainbow Lorikeet *Trichoglossus haematodus moluccanus* - I was sceptical, yet after viewing and talking to the breeder, there is no question as to its authenticity. Produced in an aviary a couple of years ago, it could be described as having lorikeet markings with the length of a King. Its actions contained features of both parents and its voice was like that of the *moluccanus* parent.

Non-parrot birds were many. Red-browed Finches *Aegintha temporalis* were seen in small numbers in the vicinity of the Sir Colin MacKenzie Fauna Park and in the southern part of Mornington Peninsula, both in

*T. Silva*

Kaka in the wild on Little Barrier Island.
This tree was visited regularly by several birds.

*T. Silva*

Tui. Note white "tufts" on throat of this male in a threat posture. This individual kept about two dozen afield for over an hour, guarding several dates offered.

the state of Victoria. The Common Myna *Acridotheres tristis* was also seen in numerous places, with a cinnamon-coloured bird being sighted in the vicinity of Sid Smith's house in Harkaway.

New Zealand is not nearly so rich in avifauna as its neighbour Australia, but the birds that it does have are impressive. In parrots, all of which have Maori vernacular names that start with the letter "K", it has a most distinct group. One that I saw was the Kaka *Nestor meridionalis*; this was on Little Barrier Island, which was visited through the assistance of John Craig of Auckland University. Their presence here is quickly seen, as these magnificent parrots fly about the ranger's home at West Landing. They are tame, allowing a close approach.

Birds seen on Little Barrier could be classed in both subspecies according to their dull or bright colours, suggesting that *septentrionalis* is invalid.

This island contains some equally interesting birds, such as the Tui *Prosthemadera novaeseelandiae* which is quite common, the less abundant Bellbird *Anthornis melanura* and the very large New Zealand Pigeon *Hemi-*

phaga novaeseelandiae, a largely fruit-eating bird that can be seen without difficulty. The former are rather aggressive, chasing the second species away from a feeding station baited with sugar-water. Kakas visited here sporadically for sips.

Red-fronted Kakariki *Cyanoramphus novaezelandiae* were seen occasionally, in forests but more frequently in trees that grow along the rocky shore. Unlike Kakas they did not allow a close approach.

In the aviaries of Fred Rix, a noted New Zealand aviculturist, I had the privilege of seeing a pied mutation of the Yellow Rosella *Platycercus flaveolus* of which he has a number of breeding pairs; several of these were nesting at the time of my visit. They are striking, in my eyes, much more so than birds of normal appearance. Fred also had a red Blue-cheeked Rosella *P.a. adscitus*, whose colour is probably due to liver malfunction, and a hybrid Blue-cheeked x Northern Rosella. The last could be spotted as "impure" by the pale head coloration.

My short stay on Viti Levu, the largest island in the Fijian chain, was most rewarding for I was able to see three captive specimens of the Collared Lory *Phigys solitarius*. They reminded me of *Vini* in their actions, though they were not nearly as active. In the Nausori Highlands a single individual of the rare Red-throated Lorikeet *Charmosyna amabilis* was spotted as it flew across a road; it then settled on a wild-growing orange tree, where it soon became inconspicuous. The antithesis of the status of *amabilis* is that of the Common Myna, which has to be considered the most common bird on Viti Levu. An hour did not pass that this bird was not seen. They were especially abundant in open areas, clearly shying

away from thick forest. One cannot help but wonder what effect this bird and the introduced mongoose have had on avifauna.

Reporting on every bird observed in the field would take many pages, because the countries visited are so rich in avifauna. Similarly, aviaries house a melange that would excite even the least interested individual. For this reason, those described here are some of the most noteworthy.

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DO CHICK AND DUCKLING DOWN PATTERNS FUNCTION AS RECOGNITION MARKS?

By DEREK GOODWIN
(Petts Wood, Kent)

Among my more valued books is a Victorian masterpiece (Bingley, 1852). It is written in the form of stories told by a loving and learned uncle to his small niece and nephew. In the first chapter, Uncle Thomas narrates what the Norwegians allegedly believed were the remarkable (and remarkably unpleasant) methods by which the Golden Eagle managed to bring about the deaths of Oxen that it fed on. The little girl comments: "It is a very sagacious stratagem indeed, I really do not see how it could proceed more efficiently if it was endowed with reason." The little boy asks: "But is it true?".

Sometimes I feel like that little boy when confronted, in yet another book, by some oft-repeated "ornithological fact". Here is one such, on which I propose to give reasons for my doubts about its correctness. It is a matter on which it would seem likely that many of our readers can give first hand information and I hope these notes will stimulate many to do so.

The young of all nidifugous birds, that is birds that have active chicks that leave the nest (whether for good, as with ducklings, or at first only for short excursions as with some rail chicks) within from a few hours to about three days (according to species) after hatching, and run or swim actively thereafter, are clad in down. In the rails (Rallidae) the down is usually black, except (sometimes) on parts of the head and in some waterfowl (Anatidae) the ducklings or goslings may be uniformly blackish, as those of our common Tufted Duck *Aythya fuligula*, or only obscurely

patterned as in most true geese (*Anser* and *Branta*). In most, however, and this includes all (at least, I think all) gamebirds and most ducks, the young are strikingly patterned in light and dark colours, these patterns being usually most striking when viewed from close to and from above.

In most young chicks or ducklings the down pattern is highly cryptic and serves to camouflage them in their natural environment, especially when the young, after first fleeing *from* the parent in response to its warning calls, crouch motionless, either in the open or (according to species or circumstances) in whatever cover they can find to hand. In some waterfowl, notably the shelducks and their allies, the black and white down pattern of the young is, however, far from inconspicuous under normal circumstances. At least this is the case with our common Shelduck *Tadorna tadorna* and, I imagine, with its exotic relatives also.

Thus in most gamebirds and in many waterfowl the down pattern of the young helps to conceal them from enemies that hunt by sight, such as predatory birds and humans. The same is even more obviously true for the chicks of many waders, the colour patterns of whose down blends in an almost miraculous manner with the usual backgrounds of their natural breeding habitats. Anyone who, like myself, has at times *failed* to find the immobile crouching chicks of such birds as the Golden Plover *Pluvialis apricaria*, Woodcock *Scolopax rusticola* or Oystercatcher *Haematopus ostralegus* will have no doubt about this and will, perhaps, have been saddened at the realisation of the scale of the "massacre of the innocents" throughout countless generations which alone could have brought about the present near-perfection.

It should, however, be noted that in our present man-dominated and man-manipulated world, birds often breed in man-made habitats against whose background their natural camouflage may be far from perfect. In a predominantly green water meadow, the predominantly rich russet chicks of the Snipe *Gallinago gallinago* are not hard to see, and the same is true of some other species under comparable conditions.

As a general rule the more closely two species of birds are related, the more alike the colour patterns of their downy young will be. Where there are marked exceptions to this, as with the ducklings of the Pochard *Aythya ferina* and the Tufted Duck, this is usually because in one of the two concerned the general darkening of the colour has obliterated the pattern. Again, as a general rule (to which there are exceptions) the pattern seems to be more conservative than the colour of the down. However, although chicks of closely related species may be very similar indeed, usually there are specific as well as generic differences in the colour pattern, especially on the head.

In connection with this, another function has been widely claimed for

the down patterns of gamebird chicks and ducklings (and sometimes, at least by implication, for other nidifugous birds as well). This is that the down pattern as a whole, or that on the head, serves as a species recognition mark, and that the mother (or, presumably, the father in such birds as phalaropes and bustard-quails) will kill or desert any chick which has "wrong" markings.

The Heinroths, who placed the eggs of many different birds under broody domestic hens, found that (I quote from Dr. M. Cullen's 1959 translation) - "By no means every hen will raise ducklings she has hatched out. Some will not accept Pheasant chicksand there are even those who will only accept (Domestic Fowl) chicks whose down is coloured like that of the South Asiatic Red Jungle Fowl, the wild ancestor of our domestic Chickens". Immelman (1983) says that wild Red Junglefowl *Gallus gallus* (formerly *G. bankiva*) will only care for young of their own species "which they recognise by the head markings" and adds that this selectivity has been lost to differing degrees in different breeds of domestic fowl.

Lorenz (1971, p. 293) says that a mother Muscovy Duck will show parental defence in response to the distress calls of a Mallard Duckling seized by a predator but will then "treat it with utter enmity" because "the species-typical head markings, upon which parental responses depend, are markedly different" (from those of a Muscovy Duckling).

The only detailed account I have read of a parent gamebird (or other species) responding to the head pattern of a chick was that of a hen Golden Pheasant (Lorenz, 1971, p. 169). She had hatched a young Common Pheasant *Phasianus colchicus* along with her own brood. She did *not* harm the Common Pheasant chick but showed apparent conflict between attacking and parental behaviour, pecking it *gently* but only when it was close under her bill. "She would always fix her gaze on the head of the changeling".

That mother ducks of some species will attack ducklings that are not their own is common knowledge. Anyone who has watched tame Mallards on park lakes and village ponds will have seen all too many examples of this and will also have seen that it occurs whether or not the strangers have the "right" species-specific down pattern. That, as the Heinroths have recorded, brooding domestic hens will often, perhaps usually, kill at hatching time any fostered young (such as the Raven and the Little Bustard instanced by the Heinroths) that differ from domestic fowl chicks both in appearance *and* voice is not to be doubted.

What I do doubt, however, is whether gamebirds, waterfowl or other birds that have active chicks recognise them innately by their down pattern (either as a whole, or the head pattern alone) and normally (if

ever) kill or reject a chick or duckling *that is otherwise normal* because it does not show the normal down colour pattern.

Lorenz (1966, p. 100) describes experiments with deafened Turkeys *Meleagris gallopavo*, that seemed to show that previously inexperienced hen Turkeys recognise their chicks as such by their voices. I think it is likely that in other birds that have active chicks, the same may be true.

There seems to be much evidence that many (perhaps all) individuals of many different families and species *will* accept chicks or ducklings that do not show the normal down pattern. If the wild Red Jungle fowl hen really does recognise her chicks by their colour pattern and kills wrongly coloured young, then clearly this innate selectivity must have lapsed in domestic fowls *before* the first white (yellow chicks) or black (black chicks) mutations could have occurred *and* been successfully reared.

The melanistic form of the Common Pheasant arose spontaneously among introduced stocks in England and elsewhere (Delacour, 1951, Goodwin 1982). The chicks of this form are dark chocolate or blackish, with pale areas (sometimes) on the head, quite unlike the much paler and intricately patterned normal chicks.

Yet, obviously, these strange-looking dark chicks were, and still are, accepted by their mothers. I have myself seen a wild, normally coloured hen Pheasant, caring for four half-grown chicks, one normal in colour, the



Female Pheasant with three normal and one melanistic chick

other three melanistic mutants.

Where Mallard breed in numbers in places where they are little, or not at all harrassed by birds of prey, it is common for a variety which is dark chocolate to greenish black, with a white patch on the breast, to crop up. Less frequent, but still not really rare, are pure white or partly white individuals. I am talking here of birds that in size, shape and flying ability differ in no way from normal wild Mallards, not of strayed domestic ducks or

obvious crosses between them and the wild Mallards. The ducklings of the dark form are almost uniform blackish olive, those of the white form bright yellow (fading after the first week or so). Yet, so far as I have seen, their mothers accept and care for them, even when there are only one or two such freaks in an otherwise normally patterned brood.



I saw this freak Mallard duckling at Weymouth in 1983. It had what looked like a white (not, to my surprise, yellow) "powder puff" on the back of its head. It and one perfectly normal duckling were evidently the sole survivors of the brood. They were not more than five or six days old and their indiscriminating mother was normal in appearance.

It is not clear whether the Muscovy Duck that Lorenz wrote of was of the wild or domestic form of the species. Domestic Muscovies of the wild colour, and also those which, though otherwise of the wild colour pattern, develop white or partly white heads at the second moult, are, when ducklings, patterned in blackish-olive and yellow very like (to human eyes) the ducklings of the Mallard (though not exactly alike). I have watched many domestic Muscovy Ducks with broods comprised of some wild patterned and some partly or entirely yellow (white when adult) ducklings and have never seen the mother discriminate between them.

The Black-shouldered or Japanned morph of the Peafowl *Pavo cristatus* has repeatedly cropped up among wild-coloured stocks. The chicks (and females) of this form are whitish and differ strikingly from the normal cryptically patterned Peafowl chick. When they occur (as they probably often do) in a wild state they are no doubt soon eliminated by predators but, so far as I know, there is no evidence that such conspicuous little freaks are ever rejected by their mothers, even when these are normally coloured Peahens. That acute and observant aviculturist the late Miss Frances Pitt bred both forms, and had Black-shouldered (= whitish) chicks produced by normal hens. She would certainly have noted and recorded any such discrimination in the bird she so carefully observed and so lovingly described (Pitt, circa 1924, and 1931).

Besides the above concrete evidence there is much circumstantial but I think good evidence with other species. Whether good ever comes out of evil is a debatable point but it is certain that knowledge often does. One result of the past and ever continuing mass slaughter in Britain of thous-

ands upon thousands of gamebirds, waterfowl and Woodcocks for sport (an activity approved of by many of our most influential bird protectionists who are so horrified if a boy has a pet Kestrel or if a starving peasant in the "third world" kills and eats a lark or a tern) is that such freaks as do occur among these objects of the "legitimate sport" are usually shot; and some at least of those that are, end up usefully as museum specimens.

In the British Museum (Natural History) collection there are many silver, fawn, pied and very dark varieties of the Red-legged Partridge *Alectoris rufa* and the Common Partridge *Perdix perdix*. There are also a few pied, fawn and very dark Woodcocks. I have myself seen an entirely white wild Oystercatcher *Haematopus ostralegus*. There can be no doubt that all these birds must have differed strikingly when young from normal chicks of their species yet it is quite impossible that they could have survived in the wild had their parents failed to care for them normally.

It would be interesting to hear, via the pages of this magazine, from any readers who have had abnormally coloured young of any nidifugous species hatched and reared by their own parents (or by foster parents of the same species) as to the parent's responses. It would be useful to know in such cases whether or not any of the brood were normally coloured.

Of course, any observations of unusually coloured chicks in wild broods of any species would be equally welcome.

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THE BLUE-FRONTED AMAZON PARROT AT LIBERTY

By J. STRUTT
(Cumbria)

Bird gardens and zoos are sometimes privileged to be given parrots and parrakeets by people who are concerned about the future of a pet bird which they have found difficult to keep due to a change of circumstance.

Thus it was that in 1978 I was given "Polly", a Blue-fronted Amazon *Amazona aestiva*, which has subsequently proved to be a cock. He was followed by "Chaka", a hen of the same species. She arrived in 1980. I do not know much about Polly's past, only that the man who gave him to me married a woman who was not too keen on parrots! Chaka was bought out in Africa and is named after a Zulu chief. Her owners decided to part with her due to the arrival of their own offspring plus the fear of a parrot's beak. Both parties concerned liked the thought of their respective birds flying at liberty with the many other species of parrots here.

Polly has flown at liberty since 1979 and when the hen Chaka arrived, it was love at first sight, so her confinement lasted only for a few weeks. Since then, their relationship has become closer with the result that they reared a chick in 1982, in a nest-box in a tree some 20 yds from the site where two Scarlet Macaws were also nesting.

This potentially dangerous situation did not lead to bloodshed, despite the fact that macaws are well-known to be extremely aggressive when breeding. Frequent visits by the macaws to the Amazon's nest-box was repelled by the two Amazons, who retaliated by seizing the macaws by their tails and so managed to drive them away from their nest-box. The young Amazon was still being fed by the parents when it had been out of the nest-box for three months. The noise the chick made was similar to the bleating of a sheep which caused surprise to passers-by who were puzzled by what sounded like an airborne sheep!

It is encouraging that these Amazons are extremely hardy. They roost away somewhere at night and during the course of their freedom have had to face extremes of cold, wet blizzards and storm force winds. They appear unaffected by this. They are extremely active birds and spend a lot of time on the wing in the early mornings and evenings. This is contrary to what many people believe since I have heard it said that Amazons, like African Greys, are sedentary birds. In my experience, African Greys are strong and active fliers.

Before coming here, both Polly and Chaka were kept in the conven-

tional way, as parrots in a cage, with freedom in a room when their owners allowed them out to exercise. Both birds were steady with me but not tame though I gather that they were tame with their previous owners. I do not think that they were truly humanised, as I have found some parrots to be. On first meeting, although it was evident that they were strongly attracted to each other, Chaka seemed to be cautious if Polly came too near. However, during the course of 1981 this cautiousness improved until they reached a point of entering a nest-box together. Although well able to defend their own territory, they have not caused any trouble to other nesting birds. Within 100 yards there are two African Greys, who are constantly entering a box but sadly have not produced any young up to now.

As a species at liberty, the Amazon is the least troublesome of parrots. I have not seen them defoliate the trees or known them to attack my neighbours' fruit but I wish I could say the same of the other parrots.

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LORIES AND PARROTS IN THE STEPHAN COLLECTION

By F.C. BARNICOAT
(Johannesburg, South Africa)

Harry Stephan has amassed one of the most notable psittacine collections in South Africa on his fruit farming estate at Somerset West, a beautiful town at the foot of the Hottentots-Holland Mountains, some 40 kilometres east of Cape Town. His extensive ranges of aviaries are set out in a wooded area and probably benefit from the partial shade cast by many magnificent tall trees. The standard aviary length is 8 m of which approximately 1.25 m is taken up by the shelter, which may be closed by a door. Losses have been much reduced by closing all birds in the shelters at night from 17h 30 until 08h00 the following morning. Each shelter is supplied with a small heater, so that the shelter temperature may be thermostatically controlled at 50°F, and a 15 watt red light bulb for night lighting. There is double wiring between all aviaries. The floors are all of concrete because it is thought that worm survival may be less than with earth floors and concrete may be easily and more thoroughly cleaned.

All birds bred at "Hathersage" are closed rung while in the nest with dated and initialled aluminium rings. Not only does this procedure facilitate record keeping, but it is likely to become more significant in the future as governmental and nature conservation laws the world over make the movement of birds increasingly difficult. These closed aluminium rings provide irrefutable proof of aviary breeding and it may be easier to legally transport birds which have been so rung.

Harry Stephan has worked on three themes in his vast collection - the Loriidae, Australian parrakeets and the smaller American parrotlike species, especially the conures. Of these, the lory and lorikeet collection is the most spectacular and, having been established on a fruit farm it is in a unique and idyllic position for relatively easy feeding, and outstanding results, and it is probably the biggest such collection in this country at the present time. It is only possible to enumerate most of the species it comprises with a note here and there on the breedings achieved.

Most of these birds take years to mature for breeding. The Black Lories have not bred yet, nor the Yellow-streaked in six years, even though they have been surgically sexed. Duivenbode's reared a young male in 1980, after five years, and a pair in 1981 reared by the mother alone after the death of the cock. A pair of Black-winged has produced 35 chicks through the years. The Violet-necked reared three offspring; the father died and unfortunately all three are hens. The Blue-streaked lost their young in the nest. The Red or Moluccan do well and were down on eggs again. The Dusky seem well established and one of the pairs had two young in the nest at the time of my visit in February 1982. The Scaly-breasted breed intermittently and a young aviary-bred pair has now been established. The Ornate breed like a machine, yet there was a five-year-long wait before they commenced. Swainson's had two young ones in the nest. Forsten's had bred regularly. Coconut Lorikeets had young in the nest and have always bred well. Edward's and Perfect have not bred yet. Two pairs of the delightful little Goldie's Lorikeet are consistently successful, rearing two young at a time; a second generation young pair has still not nested in the third season, hinting at a fairly long maturation period even for this small species. The Black-capped had eggs in the nest and had bred in the past, while a pair of Purple-naped were still too young to have nested. Chattering Lories breed quite well; they are inclined to nest only in summer and not all the year round as with many other species. There were two pairs of Fairy Lorikeets; they have not succeeded in breeding yet. The male of the beautiful pair of Stella's regrettably has a growth on his abdomen which may prevent breeding success. Two pairs of the recently imported Musschenbroek's looked in excellent fettle, and one of the pairs had had three young but had allowed them to die. This species appears to

eat more seed than other lorikeet species.

Among the Australian parakeets are the King, which has bred in the past, and the Amboina King, still to be bred. Crimson-wings have proved fairly prolific. The Barraband's is, strangely enough, one of the few species never to have reared young at "Hathersage". Ill fortune has dogged every pair that has been kept, but the effort still persists. The Princess of Wales does exceedingly well once a good breeding pair is obtained, and Rock Peblars have also bred frequently. Pileated had had a good season. The Barnard's, Cloncurry, Port Lincoln and Twenty-eight were all represented and the intermediate form between Port Lincoln and Twenty-eight. The Cloncurry looks like breeding soon and the others have already bred easily. There are all the Rosellas including the Green and the Brown's which are, of course, the most valuable. In two years the Brown's reared four offspring; then the breeding cock died. Now an effort is being made to settle a young cock with the old hen, but he is belligerent in the extreme and his wing has to be kept clipped. There was a lovely pair of Red-vented Blue-bonnets reared at "Hathersage" and the old pair had given six youngsters for the current season, which proves them to be successful here. The pair of Yellow-vented Blue-bonnets had not yet bred. Except for the Golden-shouldered all the *Psephotus* were represented, pride of place going to the Hooded. There was an aviary containing nine young Hooded from the current breeding season just coming into colour and showing signs of becoming aggressive towards each other. This species has not, despite these results, proved easy to breed. Though they are willing enough to go to nest, the babies are frequently lost, often at quite a late stage, and they may cause many bitter disappointments. There is a breeding pair of Yellow-fronted Kakarikis, but the Red-fronted, with which excellent results were achieved in past years, had happened to die out, so that a new stock is now being sought. This can easily happen in great collections where only one or two pairs of each species can be kept. Particular success has been achieved with the Swift Parakeet here, and four were bred in the last season; they are going to be set up on a colony system. They are a lovely bird, particularly brightly coloured and sleek in plumage.

Among the American species the small macaws - Yellow-collared and Illiger's - are comparatively new additions and not established yet. The Illiger's have twice laid fertile eggs but deserted them. A good collection of conures is being built up, but here nomenclature can be a problem. For example, in the trade the Green-cheeked, Azara and Red-bellied were all offered at different prices and on receipt proved to be exactly the same bird apparently offered for sale without reference to species or subspecies! These birds have all bred extremely well, however. Other conures in the collection are the Blue-crowned, which breed only once per year and only

one out of the four eggs was fertile owing to the poor feet of the cock, two pairs of Red-headed, the Golden-capped, which had reared a youngster and subsequently killed it, though one had been fully reared the previous season, Sun Conures, which had just reared offspring, the Brown-throated and Jandaya, which, strange to say, did not reproduce and the Golden-crowned or Peach-fronted which breed well. There are odd specimens of Petz and Cactus, as well as pairs of Patagonian and Painted which have not bred to date. Celestial Parrotlets are also kept and have bred prolifically.

No doubt I have missed quite a number of species, but enough has been said to indicate that here is an extremely productive collection of parrot-like birds making a valuable contribution to aviculture in South Africa.

* * *

NEWS AND VIEWS

The discovery of new species takes a little time to filter through the scientific literature but it is well worth wading through the mound of technical jargon in the hope of finding such a report. *The Wilson Bulletin* Vol. 94, No.2, p. 105, outlines the history surrounding the discovery of the Pale-bellied Antpitta *Grallaria carrikeri*. The first specimen, a juvenile was collected during 1976 but was thought to belong to an already named species. Since then, both sexes, more juveniles and a nest containing three young have been found. The species has so far been found at three cloud forest sites, all from Peru.

* * *

By coincidence, several days after writing the previous note, another copy of *The Wilson Bulletin* disclosed the discovery of another antpitta. Volume 95, No. 1, documents the appearance of the Ochre-fronted Antpitta *Grallaricula ochraceifrons* from northern Peru. Two specimens, both males, were collected in epiphyte-laden, stunted cloud forest in 1978.

Australian ornithologist John Courtney has for several years been using tape recordings of food soliciting calls of parrot chicks for taxonomic research. In Australia the number of non-native species available is very few indeed. Members are asked to assist Mr. Courtney in his work, which has already produced some important results, by sending tapes to him at Swan Vale, Glen Innes, New South Wales 2370, Australia, or to Rosemary Low (13 St. Wilfrid's Road, New Barnet, Herts.) who will forward them on to him.

If possible, chicks should be recorded at several stages during their development, the age in days being given as an introduction to each recording and, of course, the species.

* * *

On the same subject, it is pleasing to note a change of attitude by some scientists when a new species is discovered, especially as most regions of the world are comparatively well-explored and numbers of the species must surely be low. In bygone years, a whole series of skins would be collected for the world's museums.

However, no skin of Campbell's Fairy Wren is represented; instead colour photographs taken at the time of discovery, along with measurements, have been distributed among leading institutions.

This bird owes its discovery to R.W. Campbell, a bander working for the Australian Bird Banding Scheme at Bosavi, a remote area in western Papua New Guinea. On three visits (4th-11th February 1980, 6th February, 1981, and 6th-8th November, 1981) a total of five birds were netted and banded. Other visits failed to find Campbell's Fairy Wren, underlining the fragile status of the species. Rather optimistically it is being stated that the range is likely to be a belt of forest some 300 miles long. Although christened *Malurus campbelli*, it appears to be a victim of "lumpers" as it is unlike the typical *Malurus* Wrens of Australia. If conventional methods had been adopted in its classification, it would reside in the genus *Chenoramphus*.

* * *

The Masked Bobwhite *Colinus virginianus ridgwayi* is the subject of an interesting article in the November 1983 issue of the *Audubon* magazine. Its ornithological history is discussed in detail and includes conservation measures projected for the future which, incidentally, revolve around the release of captive-reared birds into carefully selected areas. Previous releases have only been partially successful.

Very rarely does an item appear in this column centering on a mammal but a report in the same issue of *Audubon* may surprise members. The Giant Panda, the symbol of the world's premier conservation organisation, the World Wildlife Fund, is not covered by CITES, the international agreement convering trade in endangered species. Although given full protection in its homeland, the report goes on to say that three skins were recently offered in Taiwan and yet another was reportedly sold in Japan for 50,000 US dollars. A total ban on commercial trade cannot be enacted until the next CITES general meeting in 1985.

* * *

To the delight of American ornithologists, last year proved to be the most productive in recent times for the low population of Whooping Cranes, a total of 40 young being fledged. Thirty were reared in the wild with a further 10 at Patuxent where a flock is maintained to supply eggs, either for rearing there or cross-fostering in wild Sandhill Crane nests. A world population of 150 is now estimated.

* * *

The cross-fostering technique has been mentioned previously in this column in relation to the New Zealand Wildlife Service and their endeavours to save from extinction the Black Robin *Petroica traversi*. It is a slow process, hindered this season by unusual weather, but the population has now reached 11. A record 18 endemic Black Stilts *Himantopus novae-zelandiae* have also been reared with the aid of cross-fostering. The efforts of the New Zealand Wildlife Service in conserving their bird life is to be greatly admired.

* * *

The Lord Howe Wood Rail *Tricholimnas sylvestris* has been the subject of a captive breeding project by the New South Wales National Parks and Wildlife Service over the past three years. Only 15 individuals remained in mid-1980 but by April 1983 the population had risen to 120. The intended five-year project will probably finish halfway through the fourth breeding season.

* * *

Since its rediscovery in 1961, after 72 years when it was thought to be

extinct, the Noisy Scrub-bird *Atrichornis clamosus* has been the subject of an intensive research and management programme. Numbers have doubled to about 180 individuals (80 pairs and 20 batchelor males) and it is now intended to establish a new colony of 12 pairs in suitable habitat 25 km away. Eight males and one female have already been successfully established.

* * *

Blood tests on the four Californian Condors hatched at San Diego Zoo in 1983 have revealed that one is a female - the only one at present in captivity.

* * *

Several species of grebes are restricted to either one or a closely grouped series of lakes in South America. Most are rare but doubts are now being expressed as to whether the Columbian Grebe *Podiceps andinus* remains extant. A survey of Lake Tota in the eastern highlands of Columbia has failed to locate the species and it is now feared to be extinct.

* * *

The second newsletter of the WWB Fund for International Bird Conservation contains items pertaining to preserving stock of Ibises, Cranes and Storks. An interesting account covers the Crested Ibis which is barely hanging on in China - three young were reared in the wild during 1983.

* * *

Television is not a habit I give way to that much but I must admit that the Autumn/Winter programming of Britain's four channels made certain evenings very entertaining - some weeks as many as five evenings included a showing of a wildlife programme, occasionally two. Admittedly, some were repeats but when the quality ranked as high as the award-winning three-part series by the B.B.C., "The Flight of the Condor", there were no complaints.

One Sunday in November must surely have been the best night's viewing for a long time with the showing of two 55-minute films: the first part of "Flight of the Condor", undoubtedly one of the finest wildlife series yet made, featured a sequence on Torrent Ducks amongst its gems but even this was eclipsed by "Birds of Paradox", a BBC and New Zealand Television Service co-production. Not only a whole programme devoted to birds

which is something in itself, but film of some very rare species indeed was included. Covering flightless birds, it commenced with the familiar Ostrich and progressed through sequences on Kagu, Takahe, recently discovered species of Rail and Steamer Duck, and climaxed with unique footage, taken with night-vision cameras, of the Kakapo. If this film has not yet reached overseas television services, keep a look-out for it - it is truly a superb piece of television.

Another highlight of the winter has been David Attenborough's new 12-part series entitled "The Living Planet" which has easily equalled his previous excellent series "Life on Earth". This series is to be shown worldwide and overseas members should keep a watch out for it. Amongst the sequences in the programme covering rain forests is that of displaying Orange Cocks-of-the-Rock.

* * *

All four feature articles in the latest copy of *International Zoo News* (Vol. 30, No. 5) are devoted to birds. They cover breeding the Noisy Pitta, Egg-laying and incubation in the Emu, The Galapagos Penguin at the Bermuda Government Aquarium and advances in hand-rearing techniques for Thick-billed Parrots at Jersey Wildlife Preservation Trust.

D.C.

CORRESPONDENCE

Red and Yellow Diamond Doves and Domestic Pigeons

I have read with interest Mr. W.D. Cummings' letter, commenting on mine about red and yellow Diamond Doves. Not having had the pleasure of seeing the Diamond Doves in question, I cannot, with any authority, suggest whether Mr. Brickell's or Mr. Cummings's descriptions are nearer what I, or others, would see in the birds.

I am, however, puzzled by an apparent contradiction in Mr. Cummings' description. He says: "The colours red and yellow can be likened to those same colours in the domestic pigeon." Then, at the end of the same paragraph, "The red is clear red, not a brown red."

But all the various shades termed "red" by fanciers of domestic pigeons are some shade of reddish brown, not a clear red in the ordinary meaning of that term. True reds (clear reds) are seen in such birds as Scarlet Tanagers, Crimson and Eastern Rosella Parrakeets, and many others, but among pigeons only in some of the fruit doves *Ptilinopus* and in some of the bleeding-heart pigeons *Gallicolumba*. Similarly the "yellow" of domestic pigeons is at best a warm sandy buff, certainly not the yellow of, say, a Golden Oriole, Yellow Wagtail or yellow Canary.

In domestic pigeons the "dominant red" or "ash-red" may be any shade from a rather washy mauve-tinged greyish brown to a warm reddish brown on those parts of its plumage which (depending on pattern) would be black in a bird of the "blue/black" colour. The colour known as "recessive red" can vary from a dingy reddish brown with considerable bluish grey tinge on rump and tail to a uniform rich, deep chestnut "red", which latter is what fanciers breed for in most show breeds of pigeons (when they are breeding "red" birds, of course).

The other day I received from Mr. Brickell a colour slide of a Diamond Dove that was classed as a "cinnamon" in a show in South Africa. This bird, so far as one can see (it is in a show cage and the wings and tail are, of course, folded so one cannot see inner webs of primaries or rectrices), is very similar to many "dominant red" domestic pigeons in coloration and, like them, has washy pale grey primaries and tail.

Let us hope that some artist or photographer will soon favour us with accurate pictures of all these varieties of the Diamond Dove, either in some book we can buy or, if the *Avicultural Magazine's* available cash will run to it, for publication in our magazine.

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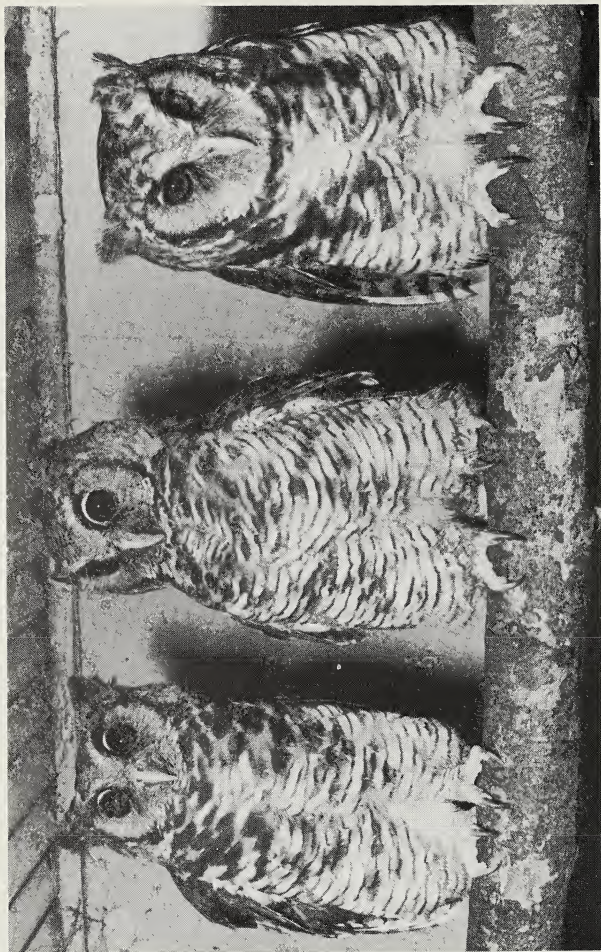
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ADDRESS OF EDITOR

Mary Harvey, Windsor Forest Stud, Mill Ride, Ascot, Berkshire, SL5 8LT, England.



Zoological Society of London
Three adult Nduk Eagle Owls at the London Zoo

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THE RARE NDUK EAGLE OWL *Bubo poensis vosseleri* or *B. vosseleri* AT THE LONDON ZOO

By PETER J. OLNEY
(Curator of Birds)

This rare forest-dwelling owl is found only in the Usambara Mountains of north-eastern Tanzania. Very little is known about the bird, and there have been no more than 20 positive records since it was discovered at the beginning of this century. It was first described by Reichenow in 1908 from a specimen collected near Amani and sent to the Berlin Museum by Dr. Vosseler (Kothe and Haase, 1908). Reichenow designated this bird, which subsequently was shown to be a sub-adult, a new species *Bubo vosseleri*. There were no further records until 1962 when a fledgling, unable to fly, was found in April in the high forest near Amani, at an altitude of about 3,000 ft. This bird was transferred from the East Africa Malaria Research Institute in Amani to London Zoo in August of the same year, and died of cardiac and circulatory failure some nine years later in September 1971. Moreau (1964) used this individual to describe the juvenile and subsequent sub-adult plumage, and to make comparisons with the closely related Fraser's Eagle Owl *Bubo poensis*. He concluded, on characters of size and pattern of underparts, that the Nduk Eagle Owl is a subspecies of *poensis*.

In December 1971 another individual was presented to the Zoo, having been taken, in December 1969, as a downy young by local people to the Research Institute in Amani, where it was looked after by Dr. White and his wife. They kept it, almost as a house-pet, for nearly two years, feeding it exclusively on rats and raw beef wrapped in cottonwool. In April 1975 two more birds were received by the Zoo, both having been picked up as

fledglings near Amani. One was found in December 1972, kept at the Research Institute and fed on beef and occasionally mice. It was so tame that it was allowed to live in a Jacaranda tree near the building and each evening would come to collect its food, though it was also seen to hunt for itself. The second bird was found in late January 1975 on the road near Amani and when it came to the Zoo in April was still in its white juvenile plumage with pale bluish beak and very pale bluish feet.

These three birds are still at the Zoo and are, as far as I am aware, the only ones in captivity. We now know that we have a male and female, and the other is probably a female. The pair, of which the male was hatched in Tanzania in late 1969, and the female in late 1974, are housed in an aviary measuring 18 ft long x 7 ft high x 6 ft wide (5.49 x 2.14 x 1.83 m). There is a pond, some plants, and a 7 ft (2.14 m) long shelter at the back with a peat floor, logs and a nest-box. Though generally inactive, especially during the day, they are obviously now closely bonded. The nesting season in Tanzania, from the evidence of when the young have been found, must be between October and March. In the Zoo, what little breeding behaviour has been seen has been between November and April. This behaviour has been food-passing (November, December and January), and calling (November to April), but has not yet led to egg-laying. The single bird, hatched in Tanzania probably in late October or November 1972, was separated from the obvious pair in 1981.

They are all fed on rats, mice, or strips of beef with a vitamin/mineral supplement SA37, and have had no health problems since they arrived, apart from a recurring 'bumble-foot' in the single bird.

The Nduk Eagle Owl is listed as rare in the Red Data Book (King, 1981; Collar, 1982) because of its limited distribution and apparent confinement to the one area of evergreen mountain forest. This habitat has been subject to considerable destruction, particularly between 1880 and 1935 with clearance for subsistence farming, and also more recently, with tea and cardamon cultivation. Though much reduced in size, the remaining forest areas are mostly within forest reserves even if they are not always adequately protected. Possibly an undisturbed forest is not as essential as was once thought, for most of the young owls found have been on the ground in areas cleared for cardamon but where there is still a forest canopy. The most recent population estimate suggests about 500 pairs, i.e. a density of two pairs per square kilometre (Stuart, in Collar, 1982).

The problem remains as to whether the Nduk Eagle Owl is a full species or is a subspecies of the nominate Fraser's. The few people who have studied the living bird are tactfully non-committal: Moreau (1964) concluded from plumage similarities, though he was not emphatic, that it is a subspecies; White (1974) pointed out that the call is similar, but significantly



Zoological Society of London

Young Nduk Eagle Owls - 3 years, 5 months old, and 4-5 months old

different to the Fraser's; Olney in White's (1974) paper recorded a number of differences in plumage between the Nduk and Fraser's, which were not seen by Moreau. Comparisons between the three individuals now at the Zoo, and two adult Fraser's also at the Zoo show there are distinct differences in adult plumage. The most obvious differences are that, compared with Fraser's, the Nduk Eagle Owl has (1) dark brown patches (the blackish brown spots noted by Reichenow in his original description) on the breast, which are more prominent and extend in two ill-defined lines down each side of the body (in Fraser's these patches are confined to a broad band across the upper breast), (2) the dark bars on the underparts are less thick and more widely spread, and are, therefore, not so clearly differentiated, (3) the border of the facial disc is wider and darker, (4) the facial disc is lighter and more orange than orange-brown. The white shoulder bar formed by the scapulars, which Reichenow used as a diagnostic characteristic in describing his new species, in fact virtually disappears as the adult plumage is assumed. In none of the adult Nduk Owls examined at the Zoo has there been a white shoulder patch, though there have been one or two whitish scapulars. The type specimen on which Reichenow based his original description is, therefore, quite definitely a sub-adult.

When alarmed both the Nduk and Fraser's Owls fluff out their body

feathers and make a low clucking sound - *chuk, chuk, chuk*. There appears to be no difference between these sounds in the two owls. On three occasions in November, December and January, in the semi-darkness of early evening, a series of calls were heard from the Nduk Owls. In each case the calls consisted of a repeated (three to four times) regular double syllable note. This was the same call that White (1974) heard, and different from the call which he thought was made by Fraser's Owl. The pair of Fraser's at the Zoo have not been heard to make any call apart from the alarm 'chuckle'.

There is no doubt that the Nduk Eagle Owl and Fraser's Eagle Owl are taxonomically close, though there are a number of marked differences. Whether these differences are sufficient to justify the separation into two species, or whether the separation should be kept to the subspecies level, is still a matter of speculation. Fraser's Eagle Owl is found in the forests of west Africa, across to northern Zaire, with two specimens being taken in south-west Uganda (Snow, 1978; Britton, 1980). The closest record is still at least 1000 km from the isolated population of the Nduk Eagle Owl in Tanzania, and vegetation maps (Keay, 1959) show that the land between is not forested. It seems likely, and there is corroborating evidence from other birds, and butterflies (Moreau, 1964), that there must have been at some time lowland forest extending right across Africa from west to east, including parts of Uganda and Tanzania where forest no longer exists. The disappearance of parts of this interlinking forest left isolated populations in the coastal mountain forests on the eastern side, which have become sufficiently different to deserve at least subspecies, and in some cases, species categorisation. This is almost certainly what has happened to the Nduk Eagle Owl. On the evidence there is at present, I would consider the Nduk Eagle Owl is justifiably a subspecies, and in an evolutionary time scale could become a full species.

ACKNOWLEDGEMENTS

I am most grateful for the observations of two of the people who have looked after the owls, Marion Boast and Andy Coughlan.

PRODUCTS MENTIONED IN TEXT

SA37: Multivitamin/mineral supplement - Intervet Laboratories Ltd., Science Park, Milton Road, Cambridge CB4 4BH.

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BREEDING THE RED-EARED BULBUL

Pycnonotus jocosus

By ROBIN BARNDEN

(Frome, Somerset)

A common bird, the Red-eared or Red-whiskered Bulbul has a large range through India, Indo China, southern China and Malaysia. It shows little fear of man, favouring villages, gardens, cultivated land generally and is even found in and around large cities; it has also been introduced into the United States. It is very popular as an aviary bird in Britain and is also widely kept in its native countries.

The following notes form an account of a successful breeding by a pair in my possession:

Background

Two birds were received from a dealer in September, 1982; they were both in poor condition on arrival, neither having tails and, with few wing feathers, were unable to fly. Their plumage was dirty and soiled, one bird being almost bald on its head and neck. Their condition was worsened by having undertaken a 27-hour train journey.

The birds were put into a box cage and the lights remained on throughout the first two nights; the bald one, being very weak and hardly eating, was put in a hospital cage where it died during the first night. The survivor recovered well and by 20th November, when it was released into a small indoor flight, had moulted completely and regained its power of flight.

A replacement bird arrived in November after a much quicker journey by road; he too was in poor condition but could fly reasonably well and by the end of December had completed his moult. His general condition being much better than the other's had been, he was released into the flight immediately quarantine ended.

Sexing

I spent a great deal of time studying both birds, eventually coming to the conclusion that I had a true pair. Initially I was struck by the coarser build, especially the head and beak of the second bird, the cock, than that of the hen; however, as he was also slightly bigger I did not discount the possibility that they belonged to different subspecies. After moulting, the cock had a richer, darker brown on his back; furthermore, when the cock, an intruder, was introduced, he immediately assumed dominance over the resident hen. My efforts at identification were made easier by the cock having a split crest which, as it has not moulted out, I assume to be a permanent fault.

Taming

The hen remained in a box cage for two months, during which time I endeavoured to tame her. On arrival, as is often the case, she was very wild and would never feed until I was out of sight. After a few weeks she lost this terror although she remained very wary and would normally remain frozen on her perch at the back of the cage whenever I offered her mealworms. If I put my hand in the cage, either to change the food pots or to offer a mealworm, she would panic. The cock, though slightly bolder and less panicky, behaved in a similar fashion but as he was in his cage much less time, could possibly have been tamed if I had tried for longer. When in their indoor flight, any mealworms were quickly snapped up by a tame pair of Pekin Robins, purchased at the same time as the cock bird. Any attempts to tame them in the outside aviary were hopeless, both birds retreating to the far end whenever I entered. During incubation of eggs and young, the hen overcame her fear of me, remaining on the nest when I passed by, little more than 3 ft from her.

Aggression

The Bulbuls shared their indoor flight amicably with Zebra Finches, Green Singing Finches, Pekin Robins and a Diamond Dove. On only one occasion did I observe the cock threaten a particularly cheeky Zebra Finch. When they had young, the hen became very protective and if, when she was off the nest, I put my hand too close, she would fly down and attack it. Both parents would threaten the starlings in adjoining aviaries if the fledglings were clinging to the wire netting division.

Diet

The regular non-breeding diet consisted mainly of fruit: apples, pears, bananas, peaches, grapes and oranges, varying with availability, diced into fine chunks. To this was added mixed dried fruit soaked overnight and bread mixed with malted food drink, whilst minced beef was offered once or twice a week. During late summer, elder, hawthorn and blackberries were offered but these had limited appeal and were often ignored. 'Haith's Softbill Food' was provided, as well as a few mealworms daily; any millet or seeds given were totally ignored.

During rearing they were given a mixture of nectar, rice pudding and hard-boiled eggs, together with nectar in a separate dish; these items they refused to try at all but possibly, had they been provided earlier, they might have sampled them. Mealworms, ants' eggs, minced beef and small grasshoppers were offered daily in large amounts, all of which were relished and became almost the staple diet during this period. Two days before nest-building was observed, food intake dropped by a third: the weather had been very hot for at least a week beforehand but, if anything, consumption had been higher than normal. The amount of fruit taken remained low until about a week after fledging.

Housing

They remained in their indoor flight throughout the mild winter, the room was moderately heated and, apart from the initial loss, no problems were encountered.

On 26th April they were released into an outdoor planted aviary which measures 2.95 m x 1.52 m x 1.93m high (9ft 8 in x 5 ft x 6 ft 4 in high) with a small night house, 0.92m x 0.61m (3ft x 2ft). Additional shelter is provided by covering part of the aviary roof with Perspex. Various shrubs had been planted, most prominent being a bush of suckers surrounding the trunk of an old pear tree standing almost centrally in the aviary. The back is sheltered by a stone wall covered in ivy, whilst the front and right side have aviaries adjoining. The night house is situated on the left side and is only accessible from the outside by climbing up from the neighbours'

terraced garden, thus affording the birds plenty of privacy.

Display and courtship

The main drawback of this secluded and thickly planted Bulbul aviary is that observation of the birds is extremely difficult. With aviaries in front and to one side and the back wall of stone, the only view I had of them was from the valley on the roof of our house which, being built on a hill, was almost at the same level as the aviaries. Even from this uncomfortable, and in good weather extremely hot, position my view is restricted to half to two-thirds of the aviary. It is hardly surprising, therefore, that only on two occasions did I witness an attempted display by these shy birds. Both were disturbed, the first in early May, by a cat; observation on this occasion was from a different position, my view being obscured partially by creepers climbing up the side of the aviary and I could not confirm whether the cock was, in fact, displaying. The second display, in August, ended when a pear fell on to the aviary roof, but the raising and fanning of wings and tail whilst calling to the hen corresponded with the description given by Rutgers in *The Handbook of Foreign Birds* .

Apart from the first display, no interest in breeding was shown whatsoever until the beginning of the nest construction in July, except for the cock occasionally singing his melodious if repetitive song from a favourite perch; however, the unseasonably wet weather until mid- to late June may well have been partly responsible.

Nesting

An open-sided nest-box, partly filled with hay, was placed amongst the ivy on the end wall but the Bulbuls were never interested in this. It was during a routine inspection of this box on 13th July that I noticed a few strands of hay and some leaves woven together crudely in the fork of a pear shoot, about 3½ft (1.06 m) off the ground. Leaving as quickly as possible, I climbed up to my uncomfortable vantage point to watch.

Construction of the cup-shaped nest was undertaken solely by the hen, with the cock trailing behind, chirping excitedly. Whenever approaching the nest, she would look round for signs of danger before disappearing into the bush: the cock rarely visited but would wait until she emerged and follow her down to the ground where she collected the materials. She completed her task by the 16th having used hay, grass, feathers, and dead leaves, lining it with fine grasses.

The first of three eggs was laid on the 19th; the eggs measured approximately 22-24 x 16-17mm and were pinkish white, heavily blotched with reddish brown and a few blue-grey markings. Incubation by the hen commenced on the 21st; the cock was never seen to feed her and would never

go near the nest, the hen usually coming off to feed, mainly on mealworms, after I had left the aviary. Before returning, she would bathe thoroughly in fresh water, afterwards preening herself on a nearby perch, whilst the cock would sit alongside, sometimes singing to her. These visits would rarely last more than five minutes and were usually carried out twice daily.

Despite her nervousness, she never left the nest whilst I was in the aviary but would not return if she had left before I entered, until after I had gone; if on these occasions I examined the nest, she became very agitated.

On 31st July, after only 10 days' incubation, I discovered eggshells beside the water dish. I increased the supply of live food, collecting ants' eggs and small grasshoppers from a nearby, south-facing bank to supplement the mealworms of which, at that time, I had only a limited supply. Though the cock was seen to take several of these, he was never seen feeding them to the young and after carrying them around in his beak for several minutes, would eat them himself.

Rearing and development

Taking Day 1 as the day following hatching, I have compiled the following sequence of events. Two chicks hatched which were pinkish grey with yellowish beaks; the remaining egg disappeared between five days and fledging, the exact date not known.

- Day 1 A thunderstorm during the night gave me cause for concern but there seemed to be no ill effects.
- Day 3 Black pin feathers broke through on the wings and there was a slight increase in size. They were being fed almost solely on grasshoppers at this stage.
- Day 4 The chicks were seen begging for the first time; before, they had lain in the bottom of the nest until the hen attracted their attention.
- Day 6 Pin feathers erupted on head, neck and back and started to open on the head; they had grown well and covered the bottom of the nest.
- Day 8 Feathering well on their backs and wing primaries.
- Day 9 Eyes opened for the first time.
- Day 10 Apart from having no tails, they were fully feathered.
- Day 11 Both chicks left the nest for the first time; initially they perched just above it, but during the day they flew clumsily about the aviary. The parents at this time were very nervous, especially when I entered with mealworms.

The chicks were less than half the size of the adults, their colouring, though similar to the parents, was a lighter brown on back and wings, their heads were blackish but, again, not as dark

as the adults; their crests were almost non-existent. Throat and breast white, speckled with brown, they had no red on them whatsoever.

Day 12 They were flying more, the parents following them anxiously. Both chicks spent the night above the nest and showed no desire to return.

Day 16 The chicks had attained more confidence; their tails just beginning to appear.

Day 17 It was clear that the nest had been re-lined and the cock started making half-hearted displays to the hen. At 19 days the chicks were nearly three-quarters grown and by the 20th August the cock was left in almost sole charge of them. The hen laid the first egg of a new clutch and began sitting in the afternoon. It was not until 29th August that they were first seen to feed, one chick taking some mealworms, although for several days previously they had both been sitting by the dishes; the following day both parents refused to feed them, eating any mealworms themselves. Both young were independent and almost fully grown by 4th September (Day 35), and, apart from a total lack of red, resembled their parents.

On 11th September, I first noticed pink feathers round the vent and, at the time of writing (31st October), the red is just beginning to appear on their cheeks.

Second Round

Incubation began after the first egg, differing from the first round, when the hen started after the second. Two chicks hatched out on 1st September, after 11 and 12 days' incubation, the third hatching the following day, again after 11 days. The weather had deteriorated by this time and, after three days, the nest began to disintegrate. All the chicks were begging lustily from two days, something the first clutch rarely did, but by four days, one had disappeared. It could easily have fallen out of the badly listing nest but a search of the ground below revealed nothing.

Any attempts of mine to repair the nest resulted in an attack by the courageous hen whilst the cock and fledged young joined in the alarm chorus. Development of the chicks was about a day behind the first round but both chicks remained healthy until the evening of the seventh day, when one fell out; this was found dangling on a briar below the nest. I attempted to remove it but it was well hooked and the hen became very alarmed and attacked me. I made quite sure that it was dead, then left it until the following day, by which time she had lost interest.

The cock was regularly seen feeding the surviving chick and I suspect that he had fed the first round young as well, thicker foliage allowing him to be more secretive. The hen removed and ate the faecal sacs and the nest always remained clean.

The chick was seen perching on the top edge of the capsizing nest after 10 days: it was fully feathered but, with a cold wind blowing, it looked extremely uncomfortable standing with both eyes closed, refusing food offered by the parents. Deciding it had left prematurely, I again endeavoured to repair the nest, with some success, and placed the chick inside; the hen, after much scolding, returned to brood the chick when I left. My hopes of it staying were short lived, for, by lunchtime it had clambered out. I waited until early evening to replace it but, when it would not stay, reluctantly I left it out. The night was cold and the chick, which had eaten little during the day was found dead the following morning.

No further attempts at nesting were made. The old nest finally collapsed about three days after the chick died. During the rearing of the second round, no aggression was ever shown towards the independent young birds; they, in return, showed little interest in the chicks except to join in the alarm calls whenever I interfered with the nest. All four have remained amicably together ever since and will probably remain so until next spring.

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BREEDING THE BLUE-EYED COCKATOO

Cacatua ophthalmica
AT CHESTER ZOO

By PETER J. BLOOMFIELD (Assistant Curator of Birds)

Chester Zoo was lucky enough to purchase a pair of Blue-eyed Cockatoos from Mr. J. Best in March 1966. These birds are still in the collection today and from that original pair we now have a collection of eight birds. We were presented with a male Blue-eyed Cockatoo by a member of the public in November 1975; this bird was suffering from a bad case of feather plucking and has remained in the same state since that time, only on occasions moulting out into good plumage - this happening after breeding. Nevertheless, he has proved to be a good bird to breed from.

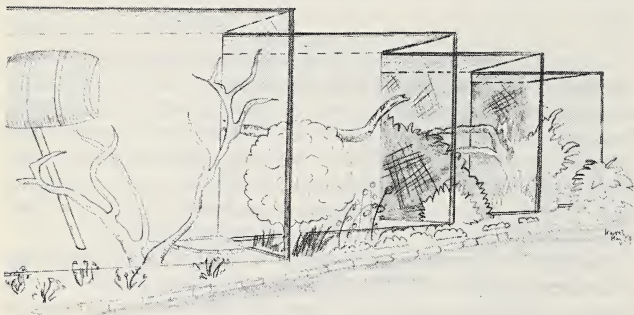
The first breeding occurred at Chester in 1973 when the birds were housed in an isolated aviary away from the public in the garden of Mr. W. Timmis, the Curator at that time. The birds were left completely alone except for feeding, and as a consequence, few records were kept of that early success. The youngster reared in 1973 turned out to be a female and so we were able to make up another pair on receiving the presented male in 1975.

For unexplained reasons, no further breeding took place until 1979 when both pairs of birds, now housed in the Parrot House, produced one chick each. In both cases, the young bird was reared and they turned out to be a male and a female. The parent birds had been given a barrel to nest in, with a top opening, and this was filled three-quarters full with a mixture of peat and wood chippings which were placed on an upturned turf cut to a depth of about four inches.

Breeding again took place in 1981 and once more each pair produced one chick, both of which were reared to maturity and turned out to be two males.

1982 was a disastrous year for the Blue-eyed Cockatoos. Both pairs went to nest but an egg from the 1966 pair disappeared, we think to a predator, and it was then decided to remove the egg from the other pair and place it in the incubator to avoid the same thing happening to that egg.

The artificial incubating went well and the bird hatched without any problems but it did not appear to respond well to the diet we were rearing it on, despite the fact that it was a diet which had proved successful for rearing other cockatoos. As a consequence, the bird grew up with a slight deformity and we had to keep it in its rearing pen in the Parrot



K. Campion

Outside aviaries for Blue-eyed Cockatoos at Chester Zoo

House. It was from here one afternoon in October 1982 that the bird was stolen, and we have not heard anything more about it since then.

In 1983, our youngest breeding pair went to nest about mid-May and this time the female laid two eggs which turned out to be fertile. The first chick was noticed on 14th June and the second on 20th June, the eggs having first been seen on 11th May. The exact incubation was not determined but we put it down to approximately 30 days. Both parents seemed to share the incubation duties and both birds were very protective of the nesting area whenever it was approached by a keeper. Disturbance by the keepers was kept to a minimum, but the design of the Parrot House only allows us to place the nesting barrels, at most, 12 ft from the public, however this does not appear to upset the birds.

We now have a group of eight specimens of this species at Chester and in February 1983 we sent a pair of these birds to Rotterdam Zoo on breeding loan. Although our original birds are now getting old, we are very hopeful for the future of this species at Chester Zoo, and aim to continue to breed them and keep our colony going. This now seems especially important in the light of recent correspondence with Mr. Roy MacKay of the Baiyer River Sanctuary in Papua New Guinea, who informs me that a party of American bird watchers passed through New Britain recently and did not record this species at all.



K.W. Green

Blue-eyed Cockatoos at Chester Zoo

The attached drawing shows the four outside aviaries in the Parrot House that house our collection of Blue-eyed Cockatoos; these measure 12 x 12 x 12 ft (3m 66cm), with the same measurements for the inside area.

The diet for the Cockatoos during the breeding season consists of a normal parrot mix plus a varied selection of fruit and vegetables. On the hatching of the young, we add soaked seed, egg rearing food, boiled maize, vitamins including Vionate and Bemax.

As a postscript to those interested in the breeding successes of psittacines, in September 1981 our male Red-tailed Black Cockatoo was sent to Rotterdam Zoo, Holland, to make up a pair of this interesting species. I am pleased to report that, in the summer of 1982, these birds reared one youngster to maturity and talking to the Curator of Birds, Han Assink, on 19th December 1983, he informed me that another chick was hatched this year and fledged only that morning.

* * *

MORE FINCHES AND OTHER SEED-EATING BIRDS

Part I

By ROBIN RESTALL

(Tokyo, Japan)

In 1972 I wrote a book about finches. I had been keeping birds for some 25 years by then. The first birds I ever kept were an unfortunate pair of Tri-coloured Nuns, as they were invariably referred to in those days. A friend sold them to me, and lent me a Yorkshire Canary show cage to keep them in. This lad had been given a couple of elderly Norwich Canary hens by his father, and his great ambition in life was to breed a Chaffinch mule. He reasoned that the best way to do this would be to place a Chaffinch's clutch beneath one of his old hens. Then, from the resultant brood of tame Chaffinches he would select a good young male to breed with his canary. He never succeeded in rearing the Chaffinches, let alone creating the elusive Chaffinch mule. However, his case stayed in my mind for many years afterwards and, together with the experience with the Munias, was probably as much the cause of my addiction to finches as anything.

When I wrote the book, I attempted to synthesise in one source a reference to every finch that had ever been recorded as being kept in captivity. As much as possible, I relied on personal experience, but to cover all the species in this way would have been impossible. The tally of about 350 was not bad. However, it never occurred to me that in the space of ten short years my company would send me to three different continents of the world, nor that in each I would succeed in finding many species of finches that I had not only not kept, nor seen, but had not even listed in my book. In the following notes I would like to list those species. I will also mention species that *are* in the book but only where I have learned something new in the intervening years.

My motivation in writing about the birds I have kept is not to lay down any rules but to prompt readers to add their experiences to the benefit of all. I am continually surprised, and a little distressed to find how often there are expert and experienced bird keepers who have never shared their knowledge - and how many countless thousands of birds live out their lives non-productively, even anonymously, because their keepers simply did not realise that the species could be bred (for example) or might have lived twice as long on a different diet, or might have enchanted the neighbourhood with its song.

From Spain in 1974, I went to live in Venezuela for three years. I became a director of the Audubon Society there, led expeditions and

outings, and carried out an exhaustive 13-month survey of a large ranch that covered both hill country and lowland. I set up netting stations for banding and photographing the local birds. Venezuela is an incredibly rich country in its variety of geography, and the number of species of birds being second only to Colombia. From the Andes to the Llanos, the Amazon to the Caribbean coast, it is a bird-watcher's paradise.

In 1977 we moved to Chicago, living on the lake shore. The migrating birds moved up the lake shore in vast numbers each spring, and back down again each autumn. I soon discovered that scores of birds would hit the windows of the modern ape house at the Lincoln Park Zoo, and also the enormous McCormick Place Conference Centre. Every day at dawn during the migration seasons I collected dead and injured birds, keeping perfect specimens for painting, nursing invalids back to health (and being forced to keep some over winter) and consequently became a good friend of the Curators of Birds at the Zoo and the Field Museum. My job at that time took me around the world two or three times a year but, living in the US, I could neither import nor export any birds.

In 1980 we moved to Tokyo. I soon contacted the Yamashima Institute and they introduced me to a man who is the main importer of birds into Japan, and nearly all of his stock comes from China. We have become good friends and he saves me "new" species and odd individuals of great interest.

In each of the three countries I have discovered the pet shops where the owner is a bird enthusiast and, in the case of Venezuela and Japan, the source of local native birds.

It can readily be seen by the reader that my peripatetic life has enabled me to acquire a very wide experience of bird life, and bird keeping, but I am equally lacking in profound experience. Not since I left England to live in Denmark in 1967 have I had my own good-sized aviary where I have been able to keep birds in something approaching a natural situation. Some of my cages have been large - I have kept owls, magpies, toucans, rollers, parrots, buzzards and others - and I have bred some finches. I mention this to avoid giving the wrong impression. My bird keeping has been rather more like that of Arthur G. Butler than that of Frank Meaden. So, if the reader has kept any of the species mentioned in the following notes and can add to the information given, *please* write to the Editor.

For any reader who has a copy of my original book, I would like to point out that the list of "Records of Birds Bred in Captivity" (pages 292-303) does include references to lengthy and valuable reports that are *not* breedings, but will be of considerable utility to an aviculturist intent on breeding the birds concerned. This is clarified in the introduction (page 16) but not in the introduction to the list on page 292. This over-

sight on my part led my good friend Derek Goodwin, in his review of the book, to say “.....(I find myself) not only credited with the breeding of those waxbills with which (I) succeeded, but with two - Jameson's Firefinch and Black-crowned Waxbill - with which (I) did not!” In each case, in fact, I had recorded the reference for the *first* successful breeding, and then added the Goodwin references for the benefit of the researcher. Both of those being infinitely more readily available to the average reader than the *Avicultural Magazine* for 1935 and 1936 - and, if I may say, much more useful references for somebody attempting to breed the species himself.

Several years ago the name Charles Sibley gained some notoriety on account of the studies this scientist was carrying out. It seemed that he needed the albumen from the eggs of birds to analyse the chromosomes in the protein. There were several cases where the eggs of rare birds of prey had been obtained, and the judge in the ensuing court cases always seemed to speak up on the side of the protectionists and against the researchers. Since then Sibley's DNA studies have become widely recognised, and there is little doubt that considerably valuable and relevant discoveries have resulted. I regret that I cannot give a reference, since the following came by the way of personal correspondence from a friend who attended a symposium last year in the USA. It seems that in a paper presented by Dr. Sibley and two associates, A.H. Bledsoe and J.E. Ahlquist, DNA-DNA hybridisation comparisons indicated that several South American “finch” genera (*Sicalis*, *Volatinia*, *Haplospiza*, *Oryzoborus* and *Diuca*) are tanagers, not emberizines. Other genera (*Tersina*, *Catamblyrhynchus*, *Nephelornis* and *Cyanerpes*) are also tanagers. For the purpose of this paper, I have left the former group in my collection of finches, but it is certainly worth recording the fact here.

1. EMBERIZIDAE

The buntings are perhaps the most disparate and most widely distributed subfamily of finches. They range across North America and Asia to Japan where political and legal restrictions result in very many species being unknown to the average aviculturist and - in many cases - virtually unknown to the serious ornithologist as well. It is this group that has produced the most exciting discoveries for me, in each of the four continents in which I have lived.

CHESTNUT BUNTING *Emberiza rutila*

From the coloured plate in a text book one could assume that this bird is a race of the Red-headed Bunting *E. brunniceps* but in life it is significantly different. It is a smaller bird, noticeably so, and with a more lively, tit-like nature. The males in autumn are extremely variable, depending on age, but it is always easy to distinguish the sexes.

My birds showed a liking for plain canary seed and the occasional mealworm. They are peaceable in a mixed collection, in my experience, and if anything are inclined to be slightly cowed by their more robust companions (e.g. Yellow-browed and Red-cheeked Buntings). A lone male kept in a cage by itself sang sweetly, and often.

JAPANESE GREY BUNTING *Emberiza variabilis*

This is a largish bunting, fairly typical in shape and character with a slightly longer tail than usual. It varies in length from 6½ to 7 in (16.5 to 17.8 cm). An adult male is instantly recognisable, being grey all over with a horn coloured bill, pink legs, and whitish undertail. The juvenile male is similar but more brown and heavily streaked above. The female is a very difficult bird to identify if seen separately, being buff below, well streaked, brown and heavily streaked above. The pale malar stripe is very noticeable and a russet rump also distinctive. Neither bird has any white in the tail.

My experience with this bird is very limited. I bought a single male in a pet shop in Tokyo. It was very wild and had been kept in a secluded corner in the company of a few Chestnut Buntings. Its plumage is remarkable, being thick and soft with a dense black down at the base of the body feathers. Despite being essentially grey all over, it is a beautiful species. During the six weeks I had it in my collection it was very active, apparently quite fit, but one morning I found it dead.

Many finches will live quite happily on what is virtually an all seed diet until they sicken with something. Then they will begin eating soft food, mealworms, fruit, in fact almost anything. Very often such birds will prefer to eat only one kind of seed. This Grey Bunting showed no such tendencies at all. It was quite a mystery.

Subsequently I found a female that I kept over the winter of 1983/3. It too was very wild and never settled down. It also had a very dense down on the body feathers. It was occasionally irritable with other birds with which I kept it.

It is a bird of thickets and is happy in cover. Given the chance, I would keep it in a well-planted, roomy outdoor flight.

JAPANESE REED BUNTING *Emberiza yessoensis*

Similar to, but smaller than the European Reed Bunting, and lacking

the white malar stripe of that more familiar bird. This species also lacks the black head in fresh winter plumage, but on the male there are clear vestiges of black showing that will distinguish it from the female. The female can be told from the European bird by the lack of streaking on the breast, and an even, rust-coloured rump.

Out of a shipment of about 2000 birds from northern China, there was just one pair of this lovely bird. They were both sick, suffering from gastro-enteritis, and the female soon died. The male lingered on for some weeks, regularly suffering a relapse before eventually dying. From two sick birds one can hardly get an accurate idea of what the species is like as an avicultural subject.

From this limited experience, however, together with some observations in the wild, I would say that the male is a bold territorial bird, an open songster, and a good subject for a collection.

TRISTRAM'S BUNTING *Emberiza tristrami*

A sparrow-sized bird with the sexes rather similar, and not easy to sex in winter plumage. The head of the male is black with a white stripe down the centre of the crown, white eyebrow superciliaries, a white malar stripe and a small white patch behind the ear coverts. The upper parts and flanks brown, reddish, streaked on back wings and flanks. The female's head is dark brown, her throat is whitish, and ear coverts buffish. The Yellow-browed Bunting is quite similar but can be told by the yellow on the frontal superciliary.

It may also be referred to as the Black-throated Bunting, or Taiga Bunting. It has a small distribution in Manchuria and winters in Korea and China.

From the big importation mentioned earlier, I sorted out many corpses and identified several bodies as being Tristram's Bunting. I kept a good pair for painting. To look at, they are extremely dull and unexceptional birds in any sense. According to the Japanese importer they are rather delicate and of little interest.

GREY-HEADED BUNTING *Emberiza fucata*

Another sparrow-sized bunting from Siberia that migrates south to northern India, Burma, southern China and southern Japan. As it is only likely to show up in dealers' lists in winter plumage, it might well be confused as something else. In fact, a shipper's lot of winter-plumaged Siberian buntings is a nightmare to sort out. This species has the top of the head greyish, ear coverts russet, white malar and white throat separated by a thin black mesial line, but it is distinguished by a broad necklace band of black, and a lower band of russet divided by a white band. The

GREY-HEADED BUNTING

Emberiza fucata ♂

female is very similar, only being duller and less clearly marked. Juveniles are a little duller yet.

This is another rather dull and drab species that I could only recommend for the dedicated bunting enthusiast. No doubt in a roomy aviary one would see the bird at its best, fit males would sing and become more showy. However, it was not at all noteworthy. As with the preceding species I have only collected this bird from those dead on arrival from China.

JAPANESE YELLOW BUNTING *Emberiza sulphurata*

A delightful and slender little bunting, indigenous to Japan. It is yellowish all over, olivaceous on the upper head becoming brownish on the back, wings and tail. The head is an even colour except for dark lores and a most distinctive whitish eye ring. The bird also has two pale wing bars. The female is similar to the male but a little paler and duller. Not always easy to sex.

This is a prized and popular cage bird in Japan. While a few specialised shipments get out of China each year, the Japanese prefer to keep the locally-caught birds. Only males are kept, as the females are not regarded as songbirds.

In a large cage with other species of bunting, it seems to be a slight and delicate species. But, despite the overwhelming similarity of many buntings, the white eye ring of this one, while not being unique, is very distinctive. I had great difficulty in obtaining a female. The various shipments

and cages that I saw were usually all males, adult and immature. Eventually I did sort out one female from a cage of about 40 males. I have found that the text books that show both sexes in colour all seem to exaggerate the brown, striated distinction of the female.

The lone male I kept over one winter developed into a sweet songster, but not an exuberant extrovert by any means.

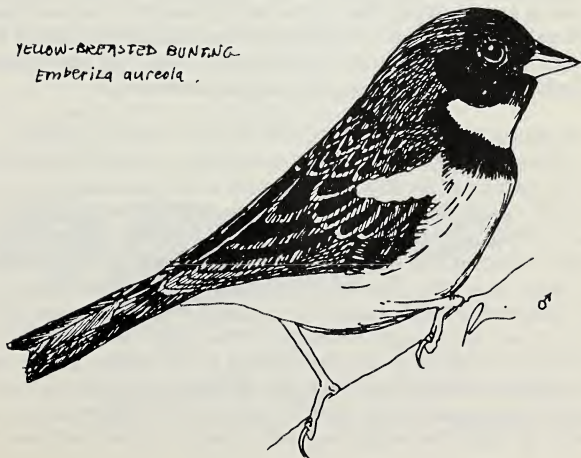
EASTERN YELLOW BUNTING *Emberiza citrinella erythrogenys*

On one occasion, while inspecting a shipment of birds from China, I saw an unknown single bird which I immediately bought. I am ashamed to say that I could not identify it. I finally forced myself to recognise it as a Yellowhammer. Dement'ev says that the eastern race *erythrogenys* is a little smaller, less yellow, less streaked on the flanks and less yellow on the head. This bird was distinctly smaller than the European Yellowhammer. I kept it from October through to June and my hopes that it was a young male were not realised. There is nothing like wishful thinking in an aviculturist to keep cages full and crowded, is there? I released it before taking off on home leave that summer.

USSURIAN YELLOW-BREASTED BUNTING *Emberiza aureola ornata*

The eastern race of this bird is larger and more richly coloured than the one we occasionally see in Europe, and it has a larger amount of white on the shoulder. I obtained a young male of the year and had great difficulty

YELLOW-BREASTED BUNTING
Emberiza aureola.



in identifying it. The importer and the man from the museum both had no doubts, however.

In personality it was a lively but very steady bird that kept its crest erect most of the time. The browns of the face and back were very soft and lovely. Whilst it was very peaceful it was always first to the mealworms which it gobbled with great enthusiasm. It was a frequent and enthusiastic bather as well. I have since kept several pairs under varying conditions and found this to be a peaceful and beautiful bird, and a fine songster.

ELEGANT BUNTING *Emberiza elegans*

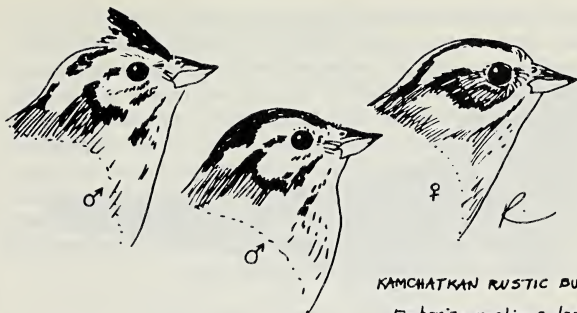
In my book I reported that it was a highly prized cage bird in Japan where it was valued as a song bird. The bird I kept in England 20 years ago was not a songster, and I could find no record of its song in the literature. I speculated that it might not be such a good songster by western standards.

Since coming to Japan I have kept it on several different occasions. I bought a pair in 1980, and since females are very rare in captivity, hoped to be able to export them to England for breeding but, failing to get a licence, I released them. I then bought a locally-caught Japanese bird and kept it over the winter of 1981-82. It settled well, sang occasionally in company but when caged by itself quickly became a rich and persistent songster and I could see that its reputation and price (a good male would be about £40 to £50) were justified.

Subsequently I kept another solitary male which would frequently throw its head back and utter a short sweet phrase which became rather a bore because of the lack of development or variation. I found that they all ignored greenfood, fruit and mealworms, but when I put some greenfly-infested branches in their cages, they gobbled them eagerly.

KAMCHATKAN RUSTIC BUNTING *Emberiza rusticus latifascia*

Previously I had written of the Rustic Bunting, "I doubt whether these or any other small buntings from the north of Europe would stay fit and in perfect condition if deprived of insect food permanently." I had kept a pair in a large, planted garden aviary and had drawn this slightly odd conclusion from watching their behaviour and great affection for mealworms. In Japan I have kept a fine pair of the large race to our north, known as the Kamchatkan Rustic Bunting. I should interject here that some authorities do not recognise any subspecies of this bird. I believe the plumage variations and sizes may be individual and not geographic. In this case, the male was a full half-inch longer than the female and much more boldly marked. She appeared more sandy in coloration too. They were good and lively cage birds that settled very well, showed a distinct preference for



KAMCHATKAN RUSTIC BUNTING
Emberiza rusticus latifascia

canary seed and took the occasional mealworm.

Regarding the food issue, it seems unnecessary to keep buntings on seed all year round. I have noticed in Japan it is common for dealers to feed buntings, and other finches, on softfood in the summer months. If kept indefinitely on dry hard seed, some birds will develop melanistic or pure white feathers.

LITTLE BUNTING *Emberiza pusilla*

Herbert Murray wrote to me telling me about his Little Buntings. He had a pair that he found quite inoffensive. The sexes were distinctly dimorphic in breeding plumage, but in fresh autumn plumage they became very similar indeed. They nested - on the ground - but never hatched young. These birds spent most of their time on the ground, seeming to eat a wide variety of food and giving the impression of being quite insectivorous, especially during the breeding season.



LITTLE BUNTING
Emberiza pusilla

I have received a few odd single birds from northern China. In my cages they have always been peaceful, very shy and easily disturbed by their more rumbustious and larger congenors. I would say they were definitely best kept in secluded and peaceful - meaning uncrowded - quarters. One male sang freely and sweetly, with a Skylark-like continuance. A note I have made says that the chestnut cheek patches are *not* diagnostic in autumn plumage. It may be distinctive in Europe, but in Asia many buntings have very similar plumage. One bird I bought had several white feathers, in matched even positions - outer tail and inner greater wing coverts. They successfully disguised the bird. I believe the shipper had kept it on simple seed (mainly millet) for a long time.

YELLOW-BROWED BUNTING *Emberiza chrysophrys*

This bird may be rare in western aviculture but it appears regularly in the trade in Japan and Hong Kong. I have kept it twice now, each time selecting a good pair for painting. An old adult male in early summer is most strongly marked and the touch of yellow on the black-and-white striped head is very clear. In flight, away from the observer, the russet rump and white outer tail is very noticeable.

In fresh autumn plumage the sexes are very similar, but males definitely seem (and usually are, in fact) larger. From the number dead out of a shipment of 2000 or so from China, I would say that they did not travel well, and my first pair arrived with gastro-enteritis that took me ages to cure. In general it seems to be a peaceful bird but I have clear memories of a female occasionally being irritated and rather bitchy. One note in my diary remarks on them being "a little pushy". They took both green food and mealworms and were most enthusiastic bathers.

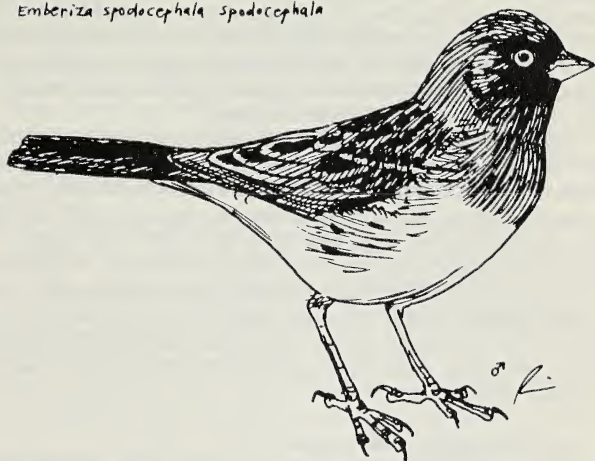
GREY-HEADED BUNTING *Emberiza spodocephala*

Also known as the Masked Bunting, but something of a misnomer. Basically a typical yellow-bodied bunting, brownish and streaked above, female duller than the male but similar. The four distinct subspecies all differ mainly by head markings but when seen live, the races are sufficiently different as to appear to be different species. By an extraordinary stroke of good fortune, I have kept - or have corpses - of all four.

The nominate race *E.s. spodocephala* I have not kept, but retrieved several fine corpses from the disastrous shipment mentioned a few times already. Of the four subspecies, the adult male of the nominate race is the one that truly justifies its name as its head is entirely grey with a slight olive tinge and a little streaking. *E.s. oligoxantha* is similar but noticeably paler with only a slight yellow tinge to a white belly. The grey head is much paler.

EAST-SIBERIAN GREY-HEADED BUNTING

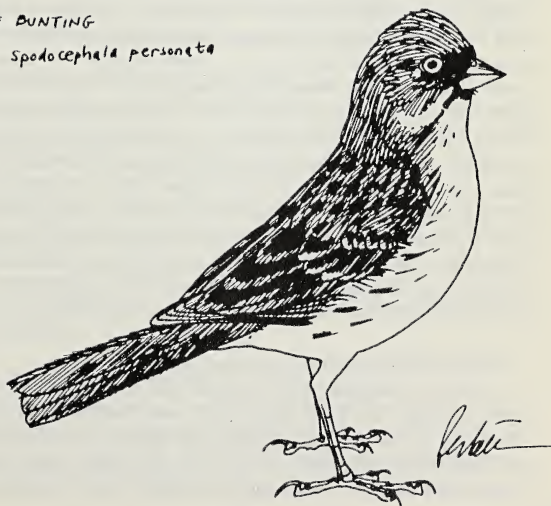
Emberiza spodocephala spodocephala



JAPANESE BUNTING

Emberiza spodocephala personata

♂



E.s.extremi-orientis is regarded as synonymous with *E.s. melanops* by some authorities. We had several birds of both "types" in the shipment, identified by the skins from the Yamashima Institute, and I found the former similar but not as brightly coloured as the latter. These birds are somewhat olivaceous on the head, yellow below and streaked on the flanks. The Japanese race *E.s. personata* is the brightest of all, but quite variable. It is the only race with a yellowish chin and throat.

Six *extremi-orientis/melanops* birds arrived with bad gastro-enteritis and most soon succumbed. The sexes were very difficult to distinguish in fresh autumn plumage. In their healthier periods they ate a variety of seeds, nibbled greenfood and took mealworms. The Japanese birds I have kept have settled well, but males have definitely tended to be aggressive, to their own females especially but eventually settled down to peaceful co-existence. They definitely preferred canary, hemp and white millet, taking a little greenfood and a few mealworms. In roomy, uncrowded quarters the male is bold, displays himself well, and is a cheerful and regular song-bird. I think they would make a positive addition to a roomy mixed uncrowded aviary.

CIRL BUNTING *Emberiza cirlus*

Not much has been written about this bird in confinement, least of all breeding. I note that it was first bred by Teschemaker in 1909, but was delighted to see that P.J. Adams bred them in 1981 and reported the details on the front page of *Cage and Aviary Birds* (1st May, 1982). They bred in a roomy, well-planted aviary. After a couple of occasions when the nestlings died at five weeks, Mr. Adams took a brood from the nest at eight days and hand-reared them. Not enough breeders bother to report their breedings and many of those who do fail to give the kind of details that other aviculturists find particularly relevant. Mr. Adams is one of the good ones and he reports on diet in great detail. The staple diet for his Ciril Buntings is plain canary, paddy rice and millet sprays. In the breeding season they also have Avivite insectile mixture mixed with grated cheese, moistened with honey, and blended with chopped mealworms peppered with Vionate. A point of distinction worth noting is that 30 to 40 moths were taken daily, collected with the aid of a mercury lamp.

RED-EARED BUNTING *Emberiza cioides*

A full-sized bunting, with a longish tail, reminiscent of the common Rock Bunting with its chestnut body and chestnut upperparts heavily streaked with blackish and a slight white wing bar. The crown is chestnut, the superciliaries are white, sides of the face black, white malar with a black mesial line, throat and chin white. The female is similar but a little

paler with dark brown on the head instead of black. The books may refer to this bird as Siberian Meadow Bunting and Dement'ev gives each race a different adjective.

The Siberian Red-eared Bunting, *E.c. cioides*, is basically a Siberian bird and it has reddish-brown ear-coverts as the name suggests. The Chinese Red-eared Bunting *E.c. castaneiceps* comes from China and Korea and has brown ear-coverts. Both races may migrate a little southwards in the winter but appear not to reach the areas from which birds are commonly exported to Europe. A few may come out of Hong Kong. The Japanese Red-eared Bunting *E.c. ciopsis* has *black* ear-coverts and does not occur outside Japan.

For me, it is a common bird, that can be found easily in lowland forest and cultivated fields and open countryside. The male is a bold and frequent singer, perching on an exposed branch and seems quite unafraid of one approaching close. I have kept a few pairs for painting and found them to settle very well. Females were far less steady than males. I also acquired a fine pair of the Chinese race which I was fortunate enough to be able to send to England a couple of years ago for a serious A.S.P.E.B.A. breeding attempt. My diary contains the following notes on feeding: great fondness for canary seed, and took canary mixture readily but ignored the hemp. Mealworms were taken occasionally but not with the frantic enthusiasm that some buntings display. A female kept over one winter settled well and sang well and sweetly in the spring before being released. The Chinese birds were enthusiastic bathers but in contrast the Japanese birds were not.

CINNAMON-BREASTED ROCK BUNTING *Emberiza tahapisi*

The first recorded breeding of this bird was in 1930 in the *Avicultural Magazine* (page 311), referring to A. Martin's achievement in 1911 but virtually nothing has been recorded that can encourage the aviculturist. A more recent breeding by Mr. Hodges of Devizes was printed in *Cage and Aviary Birds* (5th July, 1980). The birds bred in a small aviary that was sparsely planted. The young were fed on soaked seed, small maggots, "nectar blend", and insectile mixture, and the report also made mention of ".....ants' eggs when available". There was some aggressive behaviour toward a Singing Finch and a cock Firefinch. the Singing Finches were removed at one point.

GOLDEN-BREASTED BUNTING *Emberiza flaviventris*

Following my remarks in my book, Herbert Murray wrote to me about his Golden-breasted Buntings. He found it to be delicate, and usually only bought one pair at a time which was unfortunate as he always lost one by the time the breeding season came around. However, it did

nest once, building about 5 ft (1m 53 cm) from the ground but the birds failed to rear.

CRESTED BUNTING *Melophus melanicterus*

Another bunting my old friend wrote to me about was the Crested Bunting. He found it to be very lark-like, rather delicate, and never hardy. In his considerable experience it did better in a large flight. He said it took a wide variety of food. I watched it in the giant walk-through bird zoo aviary in Singapore where it was obviously doing very well. I suspect that climate is a key factor. There is a good recent reference to the breeding of the Black-crested Bunting *Melophus lathamii* by Mats Tell in the *Avicultural Magazine* (1983, Vo. 89, 3, pp. 133-135). I believe it is the same species as *M. melanicterus*.

WHITE-THROATED SPARROW *Zonotrichia albicollis*

6-7 in (15-18 cm) long, sparrow-sized and rounded of body. At a glance a typical North American bunting. Brownish above with brown to black streaking and centres of flights, white edges to median wing coverts and pale tips to greater wing covers give two wing bars. Blackish stripes on head, white superciliaries with the part between the eye and the bill yellow. Distinctive difference is white throat with greyish cheeks, sides of throat and upper breast. There is a colour form of this species with the superciliary cream or pale brown.

Juvenile birds are duller, more streaked below, and less distinctly marked on the head. It is not so easy to tell juveniles from freshly-moulted adults in the autumn.

According to Peterson, the two colour forms, brown-striped heads and black-and-white striped heads, occur in both sexes, but the species pairs polymorphically. However, this is not confirmed in the Audubon encyclopaedia.

This is a ground-feeding species - like so many North American buntings. It hops forward over leaves and ground debris, scratching with a forward-and-sideways kicking movement, each foot moving outwards. They are noisy and active feeders. It is important to know this about these and related species because it makes them somewhat unsuitable as cage birds. I have kept them in small normal cages, and large flight cages. In the latter I have covered the floor of the cage with peat, leaves and bark, and scattered seed and mealworms. In this way, the birds kept active and obviously in better condition. Sick birds recovered much more rapidly in this cage type. However, the mess caused in the room is not funny, and dust will get everywhere, so be warned. They are excellent birds for a roomy open aviary that is well planted with shrubs and trees where you



WHITE-THROATED SPARROW *Zonotrichia albicollis*

can keep areas well scattered with diggings from the woodland floor.

For some reason this was the most common species to crash into the shore line windows in Chicago. To begin with, I brought every dazed staggering bird home - up to a dozen at a time - but my limited facilities could not cope. I kept a late juvenile over winter one year and it was a model cage bird. My notes suggest that it is not an aggressive bird under normal circumstances (I kept singing males in the spring). It was the first species to the clean bath every morning and first to the mealworm bowl. In North America it is too common to be regarded as an ideal aviary subject, but clearly it is a species well worth keeping and studying. Incidentally it has hybridised with several other American sparrows.

HARRIS'S SPARROW *Zonotrichia querula*

Eight individuals of this species were donated to the Lincoln Park Zoo, Chicago, while I lived there. The curator gave them a large (20 ft/6 m long or more) flight with a few companions like thrushes to provide a little variety and extra interest for the public. I visited often, drew them, and discussed them. They seemed to be rather dull in the sense that they sat around a lot doing nothing. In contrast a Shama and some Swainson's Thrushes that I remember, were always active and on the move, and a White Wagtail was a joy, running up and down the stream and pond. Harris's Sparrow is a big bird and apparently a peaceful and gentle species.

RUFIOUS-COLLARED SPARROW *Zonotrichia capensis*

In the cordillera of the Andes in Venezuela I found this to be a common bird, particularly around habitation. I caught almost the entire population of the area where a friend lived. Over a period of a full year, we banded dozens and dozens, developing increasingly complicated combinations of colours on both legs to facilitate recognition in the field. Like House

Sparrows, these birds are very intelligent and will never enter a trap twice. They quickly learned to spot a mist net and would jink up and over, or into reverse with amazing skill.

One year I caught several individuals with balled swellings of the feet. Most of these I kept in an attempt to cure them. Some bad cases required surgery, but in general I found a vitamin-rich diet, combined with daily application of a cortisone cream, usually did the trick. Some cases were actually cured by diet alone. It seemed to me that the habit some people had of throwing out rice and white bread was causing the damage.

Herbert Murray wrote to me in Venezuela to tell me of his experience with the species. He said: "The last time I had this bird it bred in my aviaries. The nest was placed near the roof about 6 ft (1m 83) above ground level. The adjoining aviary was being re-roofed and the cock bird escaped. There were young in the nest at the time. The cock did not disappear but stayed close by, hunting for insects which it passed to the hen through the wire roof. When repairs were completed the cock was recaptured and returned to the family. The young were reared."

To the best of my knowledge that is the only recorded breeding of the Rufous-collared Sparrow. Incidentally, in my book I wrote ".....females are similar but are a little larger." That may well be true of southern races from Argentina or Chile, but in Venezuela I found the bird to be impossible to sex visually. There is a tremendous amount of variation of plumage. I once drew a series of detailed head markings to check this and provide a record and came to the conclusion that the coloured plastic bands were not really necessary as - with a bit of concentration and practice - every individual could be identified by its head and throat patterns.

SONG SPARROW *Melospiza melodia*

5-6½ in (12.5 - 16.5 cm) long; sparrow-sized, brownish above and whitish below, heavily streaked with darker browns. The streaks of the breast form a spot in the centre. The adult male will sing frequently and at length from one of several favourite song posts, and the large spot in the centre of the breast is a sure identification of this species. It is quite variable in density and amount of colouring (there have been 31 races described) and difference in plumage is no diagnostic to sex at all.

In my experience it is a bird of suburban gardens, parks and shrubby woodland, but in fact it ranges over a wide variety of habitat. The Song Sparrow feeds on the ground, taking insects of various kinds, berries and small fruits, and all kinds of seeds. I found it very easy to keep on a diet of mixed seed, a few mealworms and seeding weeds like chickweed. It is a highly territorial species, and a fit male will drive other males away

with fierce energy. I have no doubt that in a mixed collection a fit male Song Sparrow might cause problems if there are similarly-plumaged species present.

Mrs. Nice wrote a great deal about the Song Sparrow forty or so years ago, and I believe that her exhaustive studies included keeping birds in cage and aviary. Anybody fortunate to be able to keep a pair would be well advised to obtain copies of Mrs. Nice's work, if possible. The Song Sparrow is a night migrator and so was one of species I collected in numbers as a result of window strikes at crack of dawn. One bird that I picked up had a broken leg and a dropped wing. It was extremely nervous for the first couple of weeks but it gradually settled, and became quite tame. The wing healed, but always drooped a little. Similarly the leg also mended, and was able to grip a perch but it too was permanently a little askew. I kept this bird in a flight cage with a pair of Bengalese. The Bengalese had a globular wicker basket that they always roosted in, and pretended to breed in. To my fascination the Song Sparrow always roosted in this basket, sharing it with the female Bengalese. The male Bengalese, however, could not take this and would go off to a quite corner to roost alone.

This individual Song Sparrow sang a great deal, softly and very sweetly, and also during the night. I was very sad to release it late in May by which time it was clearly fit and healthy again.

LINCOLN'S SPARROW *Melospiza lincolnii*

5-6 in (12.5-15.5 cm) long, very similar to the Song Sparrow but with a shorter, rounder tail. The eyebrow superciliary is greyish and the bird is noticeably greyer on the side of the head and neck. Also the breast has a band of cream, finely streaked. This may form a spot in the centre of the breast but it is unlikely to be the cause of a mistake in identification.

In the wild this is a secretive, skulking and shy little bird that seems to live entirely on the floor of dark shrubby woodland. Roger Tory Peterson says that it is "...afraid of its shadow", and I think this is an apt reference.

SWAMP SPARROW *Melospiza georgiana*

5-6 in (12.5-15.5 cm) long, and very similar to the preceding two species. However, the Swamp Sparrow has the crown all chestnut and the breast is clear greyish. The books do not pay too much attention to the chestnut edging of the wings but I found this to be a very helpful way to identify the Swamp Sparrow.

It is much more likely to be found in wet areas than the preceding two birds but, like Lincoln's Sparrow, it is very much a skulking and secretive little bird. However, the male establishes regular singing posts in its terri-



LINCOLN'S SPARROW
Melospiza lincolni



SWAMP SPARROW *Melospiza georgiana*. ♂

tory, and will broadcast its simple repetitive song regularly.

The individuals I kept all settled very well and quickly but remained nervous when in human company. They were quite vociferous birds when held, I remember. Whilst they would undoubtedly do well in an aviary - and a well-planted flight could well induce them to breed - the owner would have to give up hopes of a species that would show itself off to visitors.

FIELD SPARROW *Spizella pusilla*

5-6 in (12.5-15.5cm) long, it is a smaller bird than its measurements suggest because of a longer tail than is usual in American sparrows. It is a rusty brown bird above, not so streaked as most finches, and buffy below without any streaking. The bill is a distinctive pink, and there is a noticeable whitish eye ring. The sexes are alike and I was not able to find any difference among those that I found.

One bird I found almost dead during the spring migration of 1978 I took home and placed in a small cage with a mystery Munia hybrid that I had been given. It settled immediately, becoming close (literally) friends with the Munia. They roosted tightly snuggled up to each other. It took a wide variety of seeds, soft food and a few mealworms. It impressed me as being a lively and active bird, rather tit-like in its behaviour. Another individual that I picked up settled down very well but I see from my notes that while it ate a variety of seeds, it showed no interest in mealworms, fruit or greenfood.

GRASSLAND SPARROW *Myospiza humeralis*

A very nondescript and uninteresting little finch, drab below and above, streaked with chestnut-edged blackish above. A faint superciliary has a touch of yellow. It is a South American species ranging over grassland, found from Colombia to Argentina.

Despite hundreds of field trips in South America, mostly in Venezuela where I lived for three years, I can count the times I saw this bird on one hand. It is a ground-loving, furtive little bird that prefers to stay under cover among grass. It can be seen when a breeding male perches on a high grass stem or shrub twig to sing. Sad to say, I only caught it once, and kept it for a couple of months. My diary records: delightful little bird that creeps about the floor of its cage, preferring to feed on the ground. It will hop up to snatch at the seeds of suspended grasses. It is very quiet, easy to cater for, and peaceful.

FOX SPARROW *Passerella iliaca*

I collected many Fox Sparrows during my three years in Chicago. I was



FOX SPARROW

Passerella iliaca

impressed by their size, for they are big finches. I was also impressed at the considerable variation in plumage - amount of rufous, extent of streaking, etc. It would be tempting to infer some sexual dimorphism here but there is none. Despite the large size of the species, I found it to be peaceful and none of the smaller sparrows ever seemed to feel threatened. One individual had obviously crashed very heavily into the windows for it was badly concussed and had great difficulty co-ordinating its feeding. It would crack seed and crumble it but not actually swallow. It went light and died, one of the very few losses I ever experienced in Chicago.

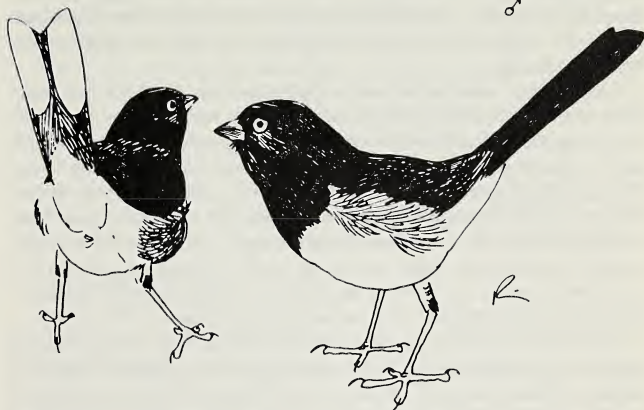
Having now seen a lot of this species in the wild, I can thoroughly endorse my earlier remarks in my book. It is a handsome finch and well worth the space it would need. It is also a fine songster, considered by many to be the best of the American sparrows. Incidentally, my notes indicate that Fox Sparrows will eat a wide variety of seeds, but I made no record of them taking mealworms.

RUFIOUS-SIDED TOWHEE *Pipilo erythrophthalmus*

One dawn, at the end of the autumn of 1978, I was walking around the McCormick Place Conference Centre, wondering whether there would be any late migrants when I came across an exhausted and nearly dead Towhee. It never moved nor squeaked, and it was many hours of quiet warmth before it showed signs of life. I kept it over winter and released it in the spring. It was an utter joy to keep. Despite its large size it was quite peaceful and never threatened another bird. It came into full song in the early spring. Just two days after releasing the male, I collected a female in exactly the same place where I had found the male six months earlier. It was in much better shape, and was released just a week later.

I have watched these birds carefully at the Bronx Zoo in New York where they share an American Finches aviary. They are lively and very

RUFous-SIDED TOWHÉE *Pipilo*
erythrophthalmus



showy, attractive birds. Like all the American finches, they are ground feeders and will make a heck of a mess if kept in a cage because of the scratch-kick method of food searching. The postures and body movements of this species are particularly attractive.

Both my Towhees were enthusiastic bathers, ate almost anything and everything, seeds, weeds, fruit and live food, polishing off mealworm beetles with the same enthusiasm as the larvae.

SLATE-COLOURED JUNCO *Junco hyemalis*

In my book I listed the Slate-coloured Junco as the sole representative of its genus. I had no reference to them in the avicultural literature at all, and was only enabled to record them because of a vaguely-remembered friend's collection of many years ago. Since writing then, I have kept a large number of the species. I should record that it is now generally recognised in the US that what were previously recognised as full species are now all considered to be geographical races of one species. Terres lists it as follows:

Slate-coloured

(Dark-eyed) Junco

Guadalupe Junco

Oregon Junco

White-winged Junco

Junco h. hyemalis

J.h. insularis

J.h. oreganus

J.h. aikenii

In my notes I recorded that the sexes are alike. This is not accurate. In the field in autumn they are certainly all very much alike, and a freshly-moulted male will look exactly like an old female. In the spring, however, the males are clearly a more distinctive grey, lacking the brownish wash of the female. Immature birds in the autumn have a slight streaking on the breast and flanks.

I picked up considerable numbers of these birds, both live and dead. They were always lively and highly-strung and in most cases were released as soon as they were feeding well and obviously recovered. Those that I kept for longer periods remained shy and nervous. They are similar to the Diuca Finch *Diuca diuca* in appearance, but very different in personality. My birds always kept to the floor of their cages and it was rare to see them perched. I once saw a couple in a dealer's cage in Chicago. The man obviously knew he was running foul of the law by keeping a native bird but he claimed they came into the country with a bunch of exotics. As in my direct experience, they sat about on the floor of the cage.

In America the Junco is often called the Snow Bird as it appears in numbers when snow is on the ground, and it is a common visitor to feeding stations. On these occasions it will often fly to a bird table to feed, but will clearly prefer to feed on the ground searching for scattered seeds. I have no experience of any of the races other than the Slate-coloured. From a study of their varying habitats, nonetheless, I would guess they would all respond to a similar care and diet in an aviary.

PILEATED FINCH *Coryphospingus pileatus*

My diary in Venezuela reads as follows: recently fledged birds caught at Carnatagua, late October '75. Adult male and young female kept. They sorted over seeds furiously, obviously looking for something else. Gave both mixtures, plus insectile mix, green grass seeds and mealworms. The latter were quickly eaten, also a mealworm beetle. The female accepted handfeeding three times, but she was very weak and did not adapt quickly. The handfeed was a mix of cream cheese, chopped mealworms and Vionate. She was well-streaked on the breast, slightly greyer with the cap definitely browner. An immature male was caught showing short but well defined crest (half in "paint brushes"). It was quite vociferous when caught.

These are surprising birds in the wild and definitely *not* regular "finches". They are rather like regular warblers found in woodland, feeding among the leaves in low canopy foliage and dense shrubberies where there is little or no seed to be found. Over a couple of years I caught them many times and often kept them for a day or two deliberately to see if they would take seed. I always had difficulty, usually serious difficulty in keep-

ing them. They never took dry seed, and sometimes would not even take mealworms. I often sat by a netting station in the foothills and watched them hunting for insects beneath the leaves. Males can occasionally be seen singing, short simple bursts, repeated continually. A song that was not at all structured or melodic according to my ear.

The reader should note that these notes refer to newly-caught birds. I have had 20 years' experience with keeping newly-caught wild birds in five continents and rate this species as one of the most difficult. Birds that survive in the bird trade must be rather robust. The fact that they take seed is no reason to keep them on such a diet. I revise my book, they should *not* be treated as if they were "normal" buntings. Incidentally, I have been told by a friend that the Sibley egg white protein analysis studies indicate that the *Coryphospingus* and *Rhodospingus* are tanagers.

RED-CRESTED FINCH *Coryphospingus cristatus*

Herbert Murray told me about a pair he had kept. They preferred 'a low bush to live in'. His birds attempted to breed one year. According to Herbert, they built a perfectly good nest, laid a full clutch, sat and brooded perfectly, and hatched them. However, a pair of European Goldfinches had built their nest close by, and their brood hatched about the same time. Both adult Red-crested Finches seemed to be distracted by the nestling Goldfinches, and fed them rather more often than they did their own brood. Unfortunately, the Goldfinches did not return the compliment. The Red-crested would feed the Goldfinches whole mealworms, which appeared to go down very well.

The outcome of the story is that the Goldfinches fledged, strong and healthy, while the *Coryphospingus* died in the nest.

I bought a pair of these birds in Caracas. They were part of a shipment from Argentina. They mixed in very well with other small finches in their enclosure. They adored mealworms, took lettuce eagerly, and were equally fond of apple and orange. I have not observed them in the wild. In Chicago there were a few in the open birdhouse of the Lincoln Park Zoo. Under pseudo-tropical conditions they behaved very much like the Pileated Finches in Venezuela. There was an excellent report in *Cage and Aviary Birds* recently by Stuart K. Johnson. The birds successfully bred in a small planted aviary shared only with some Chinese Painted Quail. The young were reared on "small live food and egg yolk". Mr. Johnson declared the ambition to establish a breeding strain.

SAFFRON FINCH *Sicalis flaveola*

This is quite a common bird in Venezuela, especially around the cities where it fills the ecological niche normally taken by the House Sparrow. In

its behaviour in this habitat it has apparently developed much the same set of characteristics, being intelligent, bold, strident but very wary of man. For about 18 months I set traps in and around my garden, banding every bird I caught and carefully noting all its specifics before releasing it. The Saffron Finch proved to be a very hard bird to trap. A decoy would always pull in immatures and if one were able to catch one of a pair, using it as a decoy would be sure to catch the other, but, as with House Sparrows, it is almost impossible to catch the same bird twice.

Venezuelan Saffron Finches are sexually polymorphic and it is extremely difficult to distinguish the sexes unless in the hand. With a known (banded as a rule) pair under regular observation, the male can be seen to be bigger, bolder and more upright.

They retain juvenile plumage until their third year, pairing and breeding in the second year. During this second year males show more yellow than the females, a difference not noticeable in the first, third or, as far as I could tell, subsequent years. The fully adult male in definitive plumage tends to be more orange on the crown than his mate.

The many younger birds I kept all settled well and were amiable enough. Older birds tend to be more aggressive. I agree with Arthur Butler when he said many years ago that sparrow would be a more appropriate appellation than finch. However, the rest of the genus is a homogenous group of grassland finches, and *S. flaveola* seems to be the aberrant one.

BLACK-FACED GRASSQUIT *Tiaris bicolor omissa*

In my book, I correctly described the male as being dull olivaceous all over with a black head, but somewhat misleadingly described the female as being a "duller, drabber version". I failed to convey that she lacks any black on head or breast. This is an important distinction to prevent a young male being taken for a female. Immatures are a duller, slightly browner olive but males show traces of black at a very early age. However, they do not acquire the rich black until a full moult.

Thanks to a very exhaustive and comprehensive banding programme, I did a thorough population study in the suburb of Caracas where I lived. I found the old males to be quite territorial, defending an area the size of a tennis court, but many immatures drifted through, hanging around for weeks and months. Fully black-faced males were immediately challenged and driven away by fierce song and display chases.

The nest is a spherical affair made entirely of dry grasses with an entrance hole at the side, normally placed in a shrub or bush 3-5 ft from the ground. The nestlings will eject themselves very easily, as do all tropical species in my experience, then sit dejectedly in some secluded spot chirruping regularly. I found that if nestlings were placed in a cage, the

parents would still come to feed them.

They settle very easily in captivity and, like their cogenors, the better-known Cuban and Olive Finches, are good subjects for domestication. They take all kinds of seed readily, some fruit (mine liked orange and papaya) and I often saw them combing the stems of weeds apparently looking for insects, aphids, or something similar. Paul Schwarz and I both found it an easy to bird to handrear.

DULL-COLOURED GRASSQUIT *Tiaris (Sporophila) obscura*

I found this bird along the northern cordillera of Venezuela. It is such a dull-coloured bird amongst the brackens and brown grasses as to be very hard to see. When one flies up out of a hummock and drops down into some ferns it looks exactly like the very common Black-faced Grassquit. However, an adult male of the latter will defy you with a burst of song as you pass, and it is possible to find him quite often because of this. I am not aware of the Dull-coloured Grassquite doing this. Both Paul Schwarz and I kept it with other *Tiaris* spp. and with some *Sporophila* spp. Paul went to far as to hand-rear them and record the songs, calls, etc., and make sound spectrographs. Neither of us had any doubt that this bird is a *Tiaris* Grassquite and not a *Sporophila* seedeater, as listed in most reference books today.

It does, in fact, have a song, but it is much weaker than that of the Black-faced. The sexes are absolutely alike. It is very easy to cater for.

JACARINI FINCH *Volatinia jacarini*

I would like to add to the description I wrote in 1970 that the female may be distinguished from all other grassquits by the streakings on throat, breast and flanks. Immatures are very similar to adult females but are generally a little more olivaceous but young males show some black on the wing coverts very early on. Once some black has begun to show, they begin to sing.

They take to cage life easily and settle down almost immediately, but an adult male in breeding condition takes a long while to come back into song, although one male I caught was in full song again within 24 hours of being placed in a cage. They were the first birds to enter any decoy trap, indeed if they are in the vicinity it is difficult to catch other birds without resort to a mist net. They will invariably gorge themselves on millet before then attempting to find a way out.

Having now seen the bird in the wild on countless occasions, I can say that the novelty of the display song-and-dance flight should not be denied either the bird or the owner, and they should definitely be kept in an open flight outdoors. I noted two successful breeding reports in 1975.

LESSON'S SEEDEATER *Sporophila bouvronides* and LINED FINCH *Sporophila lineola*

These two birds both occur in Venezuela; they are migratory but seem to have the most fascinating overlapping range. One is an off-season visitor in the other's breeding range and vice versa. I believe *lineola* ranges and breeds further south than *bouvronides* which is more northern. The only significant difference between them physically is a white stripe along the crown of *lineola*. De Schauensee seems to be of the opinion that they are conspecific. The late Paul Schwarz carried out lengthy comparative studies from hand-rearing both types to recording call notes, display songs, etc. Then to the west of Venezuela appears another form, probably a true species, the Black and White Seedeater *S. luctuosa*, which has no white on the head, nor any white on the rump. *But* there are specimens in the field which are intermediary between any two of the three, or all three!

The fully adult male has a white rump, not scalloped black as in younger birds. The song is a typical *Sporophila* song, being a strung-out series of very attractive warbles and whistles. It always begins the same way with predictable phrasing but gradually develops until it ends with loss of pattern and free improvisation. I kept several in all combinations and collections. Males together bicker and occasionally scrap - when breeding they will scrap fiercely. A pair will settle well but the male will sing much less. Females settle less easily and tend to be more nervous.

They prefer the various millet seeds to any other, both dry and fresh. They have never shown any interest in mealworms, softfood and virtually none in fruit.

BLACK-HEADED SEEDEATER *Sporophila collaris melanocephala*

Rather large for a *Sporophila*, mostly chestnut with blackish and white on the wings. My first was a male from Argentina. My notebook reads: Immature; *May 1975*. Sings a great deal, free-flowing, non-patterned song that lasts 10 minutes or so. It will hop about the cage exploring, nibbling, etc., all the while singing softly. Known in Argentina as Gargantilla. *Sept. 1975*. Showing signs of basic plumage, will sample any food, all seeds, grasses, fruits, etc., bathes every change of water, spends lots of time in the dirt bowl picking and sampling. A very steady and really charming bird. Left it with a friend over Christmas home leave, five weeks found it wild and traumatised. By *March 1976* moulted into full first adult plumage, flights moulted *November 1976 - February 1977*, and head moulted again in March. Now in basic definitive plumage, black head richly velvet. In full song. I can detect notes and phrases from the wild birds in the garden and other birds in the bird room, including the Kiskadee! and the Cowbird. It is now less adventurous with food but will still taste



anything offered. Loves mealworms, and will chew the skins dry.

I then found a female, a lone bird as part of a mixed shipment from Holland. The pair settled very well. The male sang less often, and not anywhere near as long rambling as before. In a large cage with other birds he has become mildly aggressive to other seedeaters, but not bullying. The female is very peaceable. They were placed in a large flight cage alone, settled very happily with never a bicker. They loved lettuce, but only sampled orange. Then in the early summer I was transferred to Chicago.

RUDDY-BREASTED SEEDEATER *Sporophila minuta*

There are several species of ruddy-breasted seedeaters, of which *S. minuta* is probably the best known. Others I have come across during my South American period were *S. hypoxantha*, *S. ruficollis*, *S. castaneiventris*, and possibly others. Very little is known about this complex and I think it is outside the scope of these notes to enter into a long debate on them now. They are all tiny birds, undoubtedly closely related and possibly sibling species, if not races all of *S. minuta*.

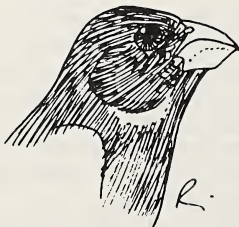
My book prompted letters from several birdkeepers on the continent, but for some reason there seem to be more breeders of *Sporophila* in Denmark than anywhere else. In personal correspondence I learned that

Mr. H.H.Jacobsen was breeding the Dark-thoated Seed eater *S. ruficollis* in 1977 and 1978. If he should read this now, I do hope Mr. Jacobsen and some of his friends will write to the *Avicultural Magazine* with details of his breeding results.

For my part, I am resolved to produce a monograph on the *Sporophila* which will include every plumage form of every species illustrated in colour. Any and every contribution or lead to information would be gratefully received.

GREY SEEDEATER *Sporophila intermedia*

I bought a male in very poor condition from a boy at the side of the road in the interior of Venezuela, November 1974. It took three months for the bird to recover and gain fresh plumage, but it became a fine bird, very steady and an excellent songster. However, it was very aggressive, would chase away any bird twice its size and would complain vociferously if another bird sat on the same perch. (The cage was about 5 ft cube) It took all kinds of seed, fresh grass, apple and pear but did not like orange or banana. It was an enthusiastic bather. I caught a female for him and she settled well, her black bill looked large and out of proportion. I released them once painted. Subsequently I caught a beautiful male in immaculate condition and took it to paint and compare. It was still wild and unsteady after two months, when I released it. About this time, while netting humming birds for photography and identification, we caught a pair of Slate-coloured Seed eaters *S. schistacea*, a species that would be virtually indistinguishable unless the two were side by side. The white throat patches are not consistently diagnostic as they do not appear in all *schistacea* and may appear in *intermedia*. Side-by-side the Slate-coloured Seed eater is larger, longer, and slimmer, but the key in any case is the bill, and I trust that my sketch shows clearly the narrower upper mandible of *schistacea*. It is not sufficiently clear in the illustration in my book.



SLATE-COLORED SEEDEATER
Sporophila schistacea



GREY SEEDEATER
Sporophila intermedia

Another very similar grey *sporophila* is the Plumbeous Finch *S. plumbea*. The race that I am familiar with is *S.p. whitleyana*. It is virtually identical to the Grey Seedeater but has a brownish-horn bill, and whitish chin and mesials. It replaces *S. intermedia* at higher elevations. In my experience it is a shy, solitary species. Males will select a high exposed branch for a lookout post.

DRAB SEEDEATER *Sporophila simplex*

Whilst visiting Peru in 1978 and 1979 I saw many small finches in the bird markets. Mostly they were either *S. peruvianus* or the Drab Seedeater *S. simplex*. It is a slightly larger bird than the average *Sporophila*, being drab olive-sandy all over. The bill and feet are horn-coloured in both sexes and juveniles, but paler in juveniles. I saw plenty of these birds around Lima and in September (the time of both visits), males were singing on an upmost exposed branch every time, and chasing each other around vigorously. They certainly ignored other seedeaters (I saw *S. peruvianus* and *S. telasco* in the same areas) but I gained the impression they might be quite bothersome in confinement.

To be continued in the next issue

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REARING HYBRID HISPANIOLAN CONURES

By TONY SILVA
(Illinois, USA)

West Indian *Aratinga* conures have never had a wide appeal in aviculture. This is due in part to their largely all-green coloration and rarity in captivity. Most are legally protected, the exception being *Aratinga nana* of Jamaica, and *A.p. pertinax* on St. Thomas. The former is considered an agricultural pest, and the latter is an introduced species brought to the island by early Dutch seamen.

The largest and least known of these insular *Aratingas* is the Hispaniolan *A. chloroptera*. A predominately green bird, it has a conspicuous white periophthalmic ring and red under wing-coverts. These two features are prominent even in flight, and could prove an ideal field identification.

A. chloroptera occurs on Hispaniola and two off-lying islands, Beata and Soana. It favours jungles, but also occurs in the lowlands. It is an agricultural pest to pigeon peas ('gandules', the vernacular in the Dominican Republic) and guavas, also possibly corn. Preference for arboreal termitoria as nesting cavities is shown, but if these are absent, hollow trees or palms are used.

Aviculturally speaking, it is a rarity that has been bred in very few collections in the Dominican Republic, Denmark and the USA. In the latter, it was bred around 1936 by Vance Wright. Subsequently, hybrids were reared at Lincoln Park Zoological Gardens, Chicago, Ill., and in my collection.

The single bird that is now in my possession was privately imported around 1975. He resided at a zoological park in New Jersey until early 1981 when he arrived in my collection.

In behaviour there are affinities with the Noble Macaw *Ara nobilis*, but his voice is much harsher and does not resemble that of any other insular *Aratinga*.

When I acquired the bird, I hoped to obtain a mate for it so that a breeding programme for this species could be started. This, however, was easier said than done and up until now, none has been located. I would very much like to hear from any American aviculturist who has this species.

Also, the bird is extremely aggressive and refused all mates until a female Nanday Conure *Aratinga nenday* was offered. This bird had been a friend's pet for many years, and had never been offered a mate. On introduction, he immediately walked over to her and fed her. If there is such a thing as avian love at first sight, this is a supreme example.

While I do not favour hybridisation, the Nanday was offered out of necessity; I wanted to know my bird's potential as a breeder and to learn more about his reproductive behaviour.

After being together for exactly two months, the first of four eggs was laid; three were fertile, one was clear. After 26 days of incubation, the first chick hatched. It was totally covered in white down, very much resembling a true *Aratinga chloroptera*. Two more chicks hatched, and were all removed for hand-rearing so that notes on their development could be made.

The secondary down was very dark grey, different in this respect from *chloroptera* chicks which have an almost white secondary down. Development was similar to that of other *Aratingas*, except that growth was much slower and that chicks were extremely aggressive. When the eldest chick was four weeks old, it was severely injured on the bill and wing; this degree of aggression has been noted in other conures, notably *Aratinga jendaya*. After a fortnight the three chicks were reunited, and no further problems were encountered.

At three months old the chicks differed slightly from the male parent in coloration. The plumage is green, except for the breast feathers which have a bluish cast, and the thighs which have red feathers, undoubtedly inherited from the hen bird. The eye-ring is like that of the male parent but is off-white. This has lightened and may continue to do so as the young age. A conspicuous feature is the dark green crown, and reddish coloured feathers that surround the lower mandible. Underwing coverts show slight traces of orange, but this colour will probably intensify with age. In true *chloroptera* young the underwing coverts take about a half-year to reach the intensity of adults.

The mandible is large with grey streaking near the base. Feet and tongue are dark grey.

The young are extremely attractive, much more so than the male parent but with a considerably higher inflection to their voice. This makes them almost unbearable and in this respect they are surpassed only by Golden Conures *Aratinga guarouba*.

The pair went back to nest, and hatched three young from four eggs; one was infertile. These three chicks are almost identical to the first, differing only in the conspicuous red feathers on the bend of the wing and underwing coverts.

If no hen *chloroptera* is found, one of the hybrid young will be paired to its father.

* * *

Since this article was received, Mr. Silva has written to say that very recently several *chloroptera*, which had been imported by a private aviculturist through legal means, were received. In addition, one of the hybrid females laid last year, but all of the eggs were clear, almost certainly due to her young age (under 12 months old).

NEWS AND VIEWS

We have received some interesting correspondence from Uwe Wagner in Scharfstedt, Germany, which Stephen Lacey has very kindly translated. Mr. Wagner is a keen ornithologist and his birdwatching expeditions have given rise to some unconventional avicultural experiences.

In May 1982 he found a young Cuckoo at the base of a house wall, surrounded by broken eggs. The only place it could have come from was a Swallow's nest under the eaves, so he returned it and waited patiently. Sure enough, the parent Swallows greeted it warmly and fed it at once, and continued to care for us until it was fully fledged. Unfortunately, on the day it embarked on its first flight, the young Cuckoo was surprised by a neighbour's cat and collided with a stone pillar, breaking its wing in the process. It had to be rescued, therefore, a second time. The wing was repaired by Mr. Wagner and during its two-week convalescence, the bird was fed on a diet of caterpillars, flies, mealworms, fruit and greenstuff. When it was fit enough, it was released.

In the same month, he discovered two pheasant's eggs in a cornfield which would have been destroyed by the farmer's tractor if they had been left alone. Mr. Wagner collected them and took them home.

Coincidentally, he had a solitary female Buzzard which had just laid some eggs in a nest in her aviary and Mr. Wagner decided that it would be an interesting experiment to see if she would rear the pheasant chicks. She hatched them alright but failed to entice them to feed on meat. Fortunately there was alternative food available and the chicks did not starve. Every evening the chicks sheltered under their foster mother who cared for them as fastidiously as any natural mother. Eventually, they too were released into the wild - and so was the Buzzard. Mr. Wagner has sent several colour photographs showing the chicks in the nest.

* * *

In an interesting article in *The Grassfinch* (1984, p. 49), Mike Fidler describes in some detail the breeding of the Bamboo Parrot-Finch *Erythrura hyperythra*, the first such breeding in Britain.

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A pair of Griffon Vultures at Riber Castle Fauna Reserve and Wildlife Park have nested for the last five years. Unfortunately, young have only been reared during the last two. Director of Riber Castle, Eddie Hallam,

writes to say that there are plans to reintroduce Griffon Vultures to France and some reared at Riber Castle may be used if the project proceeds. Lynx reared at Riber Castle were released in the Vosges Mountains last year.

* * *

The January 1984 issue of the *Western Australian Avicultural Magazine* contains several interesting breeding accounts. The Purple-crowned Lorieet *Glossopsitta porphyrocephala* is the subject of a brief article while a much longer and more detailed account covers the breeding of the New Holland Honeyeater *Phylidonyris novaehollandiae* by Alwyn Pepper. This author has, over the years, had considerable success with difficult species and his accounts always prove of great interest.

* * *

As mentioned previously in this column, Black Cockatoos form a special interest for South Australian aviculturist, Fred Bohner. Over the past few years he has been most successful with the Red-tailed *Calyptrorhynchus magnificus*, an account of which has appeared in the *Avicultural Magazine*. After several years of trying, he has at last managed to rear the White-tailed *C. baudinii*, details of which appear in *Bird Keeping in Australia*. Vol. 27, No. 2.

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The Echo Parrakeet *Psittacula echo* is the subject of an article in the latest issue of the *W.W. Brehm Fund Newsletter* (Vol. 2, No. 1). The Fund sent Indian researcher Preston Ahimaz to the island of Mauritius for three months to initiate a thorough investigation on its status, and to propose a management plan for the critically endangered species. The population, which was thought to be as low as four birds, is now put at between eight and ten. A number of suggestions were put forward, one of which was a proposed captive breeding project. Attempts failed to capture any birds but further efforts will be made shortly.

* * *

The breeding of the Sooty-headed Bulbul *Pycnonotus aurigaster* is the subject of a report by Patrick Tay in *Singapore Aviculture*, Vol. 4, No. 1. One chick was reared.

The Crested Shelduck *Tadorna cristata*, long thought extinct was reported in the *Journal fur Ornithologie* (125:1) as being sighted in the Democratic People's Republic of Korea in 1971; six birds were seen at the mouth of the Pouchon River where it flows into the Sea of Japan. At the 18th International Ornithological Congress held in Moscow during 1982, Dr. Eugeniusz Nouak put forward the suggestion that a full search should be made for the bird which he clearly feels is still extant. Likely areas include the Korean Peninsular, parts of the USSR, China and perhaps even Japan (*British Birds*).

* * *

Two exciting hatchings have occurred at San Diego Zoo during the early part of this year. Three Pesquet's Parrots *Psitttrichas fulgidus* chicks are now being hand-reared and will eventually be placed on exhibit once adult plumage is attained. In 1985, a pair of Chinese Monal Pheasant *Lophophorous lhuysi* were received from the People's Republic of China and, with the aid of artificial insemination, four chicks of this brilliantly coloured pheasant have been hatched.

* * *

Another important pheasant hatching has taken place, this time with Blyth's Tragopan *Tragopan blythii*. The parents were sent to the World Pheasant Association in Britain by the Government of Nagaland to help establish a viable captive population outside their native homeland. Four chicks have so far been hatched.

* * *

The overall population of Kirtland's Warbler *Dendroica kirtlandii* is believed to be as low as 200 pairs. Nesting in a tiny region of northern Michigan and wintering in the Bahamas, this tiny bird is causing problems for the protectionists who are trying to increase its numbers. The bird nests only in stands of Christmas-tree size jack pines, growing on dry, sandy soil, with low ground cover. Under natural conditions, this habitat is maintained only by forest fire and therefore occurs only in scattered tracts. Although jack pines grow across the continent from Nova Scotia to British Columbia, a combination of factors seem to be restricting population growth. Experiments have shown that the bird will nest amongst red pines so it may give preference to size and form. Ground cover is also of importance as the tiny nest is embedded in the sand under low ground cover. Under the Endangered Species Act, 135,000 acres of suitable habitat are now protected, resulting in the population stabilising.

The Hooded Guan *Oreophasis derbianus*, considered by Indians to make a choice meal, is the first bird to be wiped out by hunters when new areas of cloud forest are cleared in Central America. Its population is now thought to be well below 1.000 and its habitat is being cleared at an ever-increasing rate. Though Mexico is working towards the creation of a reserve for its small population of this bird in Chiapas, the Guan has no protection in Guatemala.

* * *

Field studies have revealed that Eucalyptus flowers, the main food source for many lorries and lorikeets, produce very little nectar, insufficient to cover the daily requirements of even the smallest member of this family. However, the flowers of Eucalyptus produce large quantities of pollen suggesting a constituent energy source. The tongues of most lorries and lorikeets are adapted for the collection of pollen without damaging the delicate flower and several species, on dissection, have been found to have their alimentary canal completely filled with pollen. Because of these findings, Dr. Karl-L. Schuchmann suggests, in an article in *Trochilus* (1984) 5: 45-48 that pollen, instead of being mixed in with the nectar of captive lorries and lorikeets, should be offered dry in a separate container.

The same issue of *Trochilus* contains, amongst others, papers on the Fiery-tailed Aowlbill *Avocettula recurvirostris* and *Batis* and *Platysteira* flycatchers.

* * *

The third Arctic Tern *Sterna paradisaea* recorded from Australia was ringed as a nestling in the Farne Islands on 25th June 1980, and just 115 days later was picked up in Melbourne after being attacked by Spur-winged Plovers. Unfortunately it died shortly afterwards (*Birds*, Vol. 9, No. 6).

D.C.

* * *



Kenneth Finck



David Rimlinger

THE RED-WINGED LAUGHING THRUSH *Garrulax formosus* AND ITS NEST

These photographs unfortunately arrived too late to accompany Alan Lieberman's article in the last Magazine (Vol. 90, No. 2, p. 87) but they are of such high quality that it was felt that readers would like to see them. In his article, Mr. Lieberman described the successful breeding of this babbler at the San Diego Zoo, which is thought to be for the first time in captivity.

PROPOSED SURVEY OF THE HOODED SISKIN

Carduelis cucullata

IN CAPTIVITY

The Red or Hooded Siskin, endemic to Venezuela, is a highly endangered species on the verge of extinction in the wild. The I.U.C.N. Red Data Book lists this species with an unknown population, but states that there has been a considerable and seemingly irreversible decline in recent years.

One of the main reasons for this decline is the great demand in the cage bird trade, as it hybridises willingly with domestic canaries, producing the highly prized "red factor". Although protected in its homeland, illegal collection still persists, thus threatening remaining populations further.

Following a letter in the *Avicultural Magazine* (1983, p. 120) by Mary Goodwin and resultant correspondence between several aviculturists, it has been decided to attempt an analysis of present captive populations to commence on 1st January 1985. The aim is to assess not only numbers but their success rate and to compile data on techniques adopted by aviculturists in the management of this endangered species.

We appreciate the work involved for keepers but to enable the project to gather as much information as possible we are asking for details to be provided under the headings listed below. Answers should be as complete as possible, clearly defined under the separate headings, and forwarded to the relevant collator listed at the end of this notice as soon after 1st January as possible.

Name of aviculturist

Address

How long have you kept the Hooded Siskin?

How long have you been breeding the Hooded Siskin?

History of stock (where purchased; age; whether captive bred; previous nesting attempts)

Identification features (ring number)

Description of Accommodation (size of cage or aviary; location; how furnished; whether heated)

Breeding (age of birds; display; mating; nest receptical; material used; clutch size; incubation period; which sex(s) incubated; time until fledged and to independence; additional foods offered)

Hand-rearing (methods and diet employed)

Fostering (species involved and at what stage did fostering take place)

Ailments (main ailments; medication; postmortem findings)

Longevity (known age of a deceased or surviving bird)

Numbers held at 1.1.85	Number of pairs rearing in 1984	Numbers reared in 1984
Pairs		Males
Odd males		Females
Odd females		
Total birds		Total
Method of rearing	Type of accommodation	*Data per pair
Parent	Cage	No. of clutches
Fostered	Indoor aviary	No. of eggs
Hand-reared	Outdoor aviary	No. fertile
		No. hatched
		No. reared

*This section should be completed for each pair to enable us to assess fertility and success rates.

Collators

Europe: Bryan Reed, 4 St. Andrews Drive, Tividale, Warley, West Midlands, B69 1PR, England.

North America: Stephen H. Amos, National Aquarium in Baltimore, Pier 3, 501 East Pratt Street, Baltimore, Maryland 21202, USA

South America: Mary Goodwin, Sociedad Conservacionista Audubon de Venezuela, Apartado 80450, Caracas 108, Venezuela.

Other regions: David Coles, Windsor Forest Stud, Mill Ride, Ascot, Berkshire SL5 8LT, England.

* * *

Recently Published Guide Books

Quite a number of interesting guide books have been published recently and readers may care to have some details:

Of these books, probably the most important is *An Atlas of the Birds of the Western Palaearctic* by Colin Harrison, published by Collins (London) (322 pages, price £12.95, ISBN 0 00 2197294). The area covered stretches from the southernmost part of the Sahara as far north as Spitzbergen and Franz Josef Land, and from the Azores in the west as far east as Afghanistan and Pakistan. There is a map for each of 639 species of birds in the Western Palaearctic (Europe, North Africa and Middle East) and the breeding ranges of a further 167 species from adjoining areas are mapped to show patterns of distribution across Eurasia as a whole. This is the first time that all such information has been made available in a single volume.

The maps (excellently prepared by Crispin Fisher) indicate summer, winter and resident distributions and, where relevant, periodic invasions or irruptions and where a bird may occur on passage. The accompanying text gives the bird's status, climatic range, typical habitats and nest sites. Whilst this is essentially an atlas rather than a guide to the birds of the area, there is a small line drawing of each species at the bottom of the page as an *aide-memoire*. The extensive text amplifies the maps.

This is a very valuable guide, with interesting and stimulating text and extremely good value.

Whilst in Europe, two new handbooks are welcome. The first is the English edition of *Birds of the Mediterranean and Alps* by Lars Jonsson, published by Croom Helm (160 pages, price £5.95. ISBN 0 7099 1413 X). This volume is the last of a series of five on European birds by this well-known ornithological artist. One hundred and seventy-two species are described, each with a distribution map, and illustrated by the author in most attractive watercolours showing the birds in characteristic postures in their natural environment.

This will be a most useful, and very inexpensive field guide for visitors to this area, particularly for holidaymakers.

The Birds of the Balearics by David A. Bannerman and W. Mary Bannerman, is also published by Croom Helm (230 pages, price £29.50. ISBN 0 7099 0679 X).

Despite the continuing attentions of resident and visiting birdwatchers, no definitive handbook in English existed on the birdlife of the Balearic Islands as a whole and the eminent ornithologist, Dr. David Bannerman, started work on filling this considerable gap in the 1970s but failing eye-

sight caused him to cease work in 1978 when his wife, W. Mary Bannerman, continued the writing. Sadly, Dr. Bannerman did not live to see the finished work.

This is not a field guide, since only a few of the species included are illustrated. These illustrations are contained in 12 attractive colour plates (average six species to a plate) by Donald Watson and there are some black and white illustrations and line drawings. The text, however, is much more extensive, giving very ample coverage of each species - its description, distribution, habitat, feeding habits, status, etc. Migrants are included.

The book is a very valuable addition to the literature though its high price and few illustrations would perhaps not make it attractive to the hundreds of thousands of holidaymakers to this area for whom the long-established *Field Guide to the Birds of Britain and Europe* by Roger Tory Peterson (Collins) would be more appropriate and helpful.

Les Oiseaux de Chine, de Mongolie et de Corée (The Birds of China, Mongolia and Korea) - *Passerines*, by R.D. Etchecopar and F. Hue, published by N. Boubée, Paris (704 pages, price 520 francs, ISBN 2 - 85004-037-1) follows its companion volume on the non-passerine birds of this area, and completes the series by these two distinguished authors on *The Birds of the Near and Far East* (1970) and *The Birds of North Africa* (1964).

This is a monumental work covering almost 650 species. Nearly all of the 350 species that are resident in the area covered have a distribution map and are illustrated in 22 colour plates by Patrick Suiro and Gilbert Amani, or in line drawings. The accompanying text describes each species with points for identification, behaviour, breeding and local and worldwide distribution. There is an index of latin names, vernacular names (in French and English) as well as a useful bibliography.

With an elementary grasp of French the text is not too difficult to follow and the comprehensiveness of this work makes it an important addition to any ornithological library.

The Birds of Zimbabwe by Michael P. Stuart Irwin, published by Quest Publishing Ltd., P.O. Box 567, Harare, Zimbabwe (464 pages, price 9 Zimbabwe dollars, paperback, ISBN 0 86925 156 2) is a very comprehensive and authoritative work on the birdlife of Zimbabwe. The author was Curator of Ornithology and now Regional Director of the National Museum in Bulawayo and he has drawn extensively on his many years of museum work and field experience in Zimbabwe and neighbouring territories. This is a handbook rather than a field guide and the author's stated aim has been to set out all that is known about the distribution, habitat, migration or seasonal movements and ecology of each of

the 635 species occurring in Zimbabwe.

The value of this book is much increased by the 25 superb colour plates by Peter Fogarty which are so far above the standard usual in handbooks and guides produced today. They are much more than just illustrations, being complete pictures reminiscent of the work of the late D.M. Henry, and are quite remarkable for their clarity, liveliness and perfect composition.

Another book from Africa is *Birds of the South-Western Cape* by Joy Frandsen, published by Sable Publishers, P.O. Box 98014, Sloane Park, 2152, Republic of South Africa (237 pages, price 27.60 Rands plus 2.0 Rands for postage, ISBN 0 620062606).

Whilst this book has been written mainly for birdwatchers in that area of South Africa, it is of general interest because of the outstanding quality of the photographs which have been chosen from the collections of many South African photographers. Two hundred and sixty-two species are described, each accompanied by a really excellent colour photograph and these are more than adequate for identification purposes, showing all the essential characteristics that differentiate similar species. The reproduction is also of a very high standard.

The Carnegie Museum of Natural History, 4400 Forbes Avenue, Pittsburgh, Pennsylvania 15213, USA, publishes interesting regional fauna guides and a complete list may be obtained from the Publications Secretary. A recent example is *West Virginia Birds - Distribution and Ecology*, by George Hall (Special Publication NO. 7, 190 pages, price 20.00 U.S. dollars, plus 2.50 dollars postage. ISBN 0 935868 05 4). This is a very interesting and excellently produced book which sets out the status of the birdlife generally in this state as well as of the individual species resident. There is a very comprehensive and valuable bibliography.

The Birds of the Ligonier Valley by Robert C. Leberman is Carnegie Museum of Natural History's Special Publication No. 3 (67 pages, price 5.00 US dollars, plus 1.00 dollar postage) and is a very attractively produced survey of the present status of the birds living in this valley in south-western Pennsylvania. It is illustrated by watercolour plates painted by H. Jon Janisk and line drawings by Carol H. Rudy.

Finally, *The Handbook of the Birds of India and Pakistan* by Salim Ali and S. Dillon Ripley is being republished by Oxford University Press, the latest of the ten volumes to appear being No. 3: Stone Curlews to Owls (327 pages, price £17.00, ISBN 195613023). Additional forms have been added to the original 1969 production of this standard work, together with four new colour plates by F.P. Bennett Jr.

RSPB NATURE RESERVES. Edited by Nicholas Hammond. Croom Helm Ltd. Beckenham, 1984. 184 pages; 20 colour photographs; six colour illustrations; three black and white photographs; numerous line drawings and 11 maps. Price £9.95.

Practically every country in the world now has its share of areas that are protected for the benefit of wildlife, be they reserves or national parks. The acquisition, management and problems associated with such areas are rarely explained to the amateur naturalist so it is a more than welcome change to be given an insight into nature protection, in this instance, the reserves that come under the wing of the Royal Society for the Protection of Birds, Britain's premier bird protection organisation.

The contents start with a brief introduction followed by sections on how the R.S.P.B. acquires reserves; managing reserves the R.S.P.B. way; seabird cliffs; terns on R.S.P.B. reserves; estuaries and salt-marsh; reed-swamps; lagoons and open water; floodmeadows; upland oak woods, highland birchwood; lowland deciduous woodland; lowland heathland; native pinewood; moorland in Scotland and Wales; Orkney moorland; and a gazetteer of reserves. Two appendices cover habitats for birds in the U.K. and reserves acquired in 1983.

The gazetteer lists alphabetically nearly 80 of the Society's more notable reserves, giving national grid references, directions, brief introduction, composition of habitat, management techniques and an insight into recorded wildlife; preference obviously is given to birds but plants, spiders, mammals, reptiles, amphibians and insects are also touched upon where studied.

Although the book holds little for the aviculturist, many of us have more than just a passing interest in wild birds and as such, this is an excellent and informative guide for those wishing to visit ideal areas to see our native species in their natural environment.

D.C.

VISIT TO CHESTNUT LODGE

Some 67 members spent a most enjoyable afternoon on 1st September 1984 at Chestnut Lodge, Cobham, Surrey, as guests of Miss Ruth Ezra and Mr. Raymond Sawyer.

The extensive gardens were looking superb and members particularly admired the magnificent display of roses as well as the many unusual and attractive shrubs, trees and plants, tropical as well as hardy. The highlight

was the tour of the aviaries, a delight for everyone. Beautiful landscaping, combined with the very practical arrangement of the aviaries, designed for the best benefit of the birds as well as their keepers, amply testified to Raymond Sawyer's renowned taste and knowledge. This is now generally acknowledged worldwide to be one of the great private collections. The birds were all in fine condition, many having bred this year, and there was much of interest to see.

Violaceous Plantain-Eaters, or Touracos, have been bred at Chestnut Lodge this year and reared by their parents, believed to be for the first time in Great Britain. Scissor-billed Starlings were also bred but unfortunately survived for only a few days after leaving the nest (this species is not believed to have been bred in Britain before). Black-winged Stilts have again bred for several years running - their first breeding at Chestnut Lodge is also believed to be a 'first'. Ringed Plovers have bred in the Waders' Aviary, where there were also several families of Avocets, and White-breasted Rails with babies could be seen. Also in this aviary was an attractive group of South American Jacanas, and the White-throated Bee-eater and Golden-winged Sunbird, both of which Raymond has kept since 1972 - this bee-eater must surely be the only bird of its species in this country? Members were delighted to see the Superb Sunbirds and also the Buff-throated Sunbird which Raymond is sure has not been seen in Britain since the 1950s, and a magnificent pair of Toco Toucans on which are pinned high hopes. In the tropical house could be seen a Moho or Oriole Warbler from West Africa, and some very handsome Malayan Black-crested Jays aroused much admiration. Other breeding successes this year include a Satyr Tragopan, Palawan Peacock Pheasant, Green Junglefowl, Tufted Guinea fowl, Congo Peafowl, four Keas and a Stella or Papuan Lory (probably not bred in this country since the last century). Also on the lake in front of the house was a delightful family of six young Pacific Brent Geese with their parents.

Throughout their tour, members were accompanied by a very tame Common Trumpeter and a young Stanley's Crane, bred at Chestnut Lodge this year, whilst Vulturine Guinea fowl, Demoiselle Cranes, and Grey-necked Cranes (some full-winged) strolled about the lawns in front of the house.

After all these, and many more delightful sights, members were ready to appreciate the magnificent tea at which Miss Ezra was a very gracious hostess. Members sat on in the garden for a long time, renewing old friendships, and altogether it was a most pleasant and memorable occasion. We are particularly grateful to Miss Ezra and Mr. Raymond Sawyer for all their hospitality and generosity in donating the entire proceeds of the ticket money (some £144, including donations)) to the Society's Funds. Our sincere thanks for all their loyal support over many years.

First Breeding Medals

Is it not time that the Avicultural Society abandoned the practice of awarding a medal for first breeding? In many cases, these first breedings reflect chance rather than objectivity and are, in any event, of limited value to either aviculture or the Avicultural Society.

Since our Society has a considerable and desirable international membership, would it not be better to establish a policy of honouring those who have made a contribution towards avicultural advance and that these awards should reflect our debt to people in other countries as well the British aviculturist?

It might well be that under a new scheme, recipients would also be some of the first-breeding Medal holders but I would suggest an award reflecting avicultural merit, honoured by our august Society, would have more value than the present system. This seems to me to require the element of good fortune and, after so many years, a cynical look at what is left to be bred for the first time!

Waterton,
Clevelode Lane,
Guarlford, Malvern, Worcestershire.

David T. Spilsbury

* * *

The Lemon-breasted Canary

I read with interest the article by Neville Brickell on the Lemon-breasted Canary *Serinus citrinipectrus* in Vol. 89, No. 3. The facts as I know and remember them are as follows:-

In the 1950s Mr. Scheepers was trapping in Mozambique. This was his livelihood and it can thus be assumed that he was exporting birds to Britain, U.S.A. and Europe. Either in 1958 or 1959 Mr. W. Collard (past Chairman of the Natal Avicultural Society and Director of the Natal Zoological Gardens) and one or two members of the N.A.S. paid a visit to Mr. Scheepers and stayed for a few days with him. Whilst looking through the holding or stock aviaries, Mr. Collard noticed this unusual-looking bird, and mentioning this to Mr. Scheepers, was told it was a rather funny-looking Peach Canary (our local term for the South African Grey Singing Finch). Over the next few days, Mr. Collard and his companion/s visited the native market in Lourenco Marques and there, to Mr. Collard's amazement, was a cage which contained another three of the same species. Although Mr. Collard tried to buy them, the African owner would not sell. Later,

however, Mr. Collard asked Mr. Scheepers if he could buy the one he had, and hoped that he would be able to persuade the market stall owner to part with a mate. Mr. Scheepers then gave the bird to Mr. Collard who luckily managed to obtain a mate from the market.

Unfortunately the birds did not live long in South Africa and their bodies were entrusted to Mr. Monty Baddeley of the Durban Museum. These were kept in the refrigerator until Dr. Clancy returned from leave. When he saw the birds, his first reaction was that they were hybrids but after due thought and consideration, Dr. Clancy and Mr. Lawson set out to collect specimens and succeeded in doing so in 1960.

The puzzling part about this Lemon-breasted Canary saga, which is well-known in local avicultural circles, is *if* Mr. Scheepers trapped about 40 examples in 1959, as stated in Mr. Brickell's article, where did they go to? Surely if they had been exported, one of the dealers concerned would have drawn someone's attention to them? There surely could not be 40 'funny-looking Peach Canaries' or 'hybrids'!

It would be most interesting to find out just who should be credited with the initial discovery of this species - perhaps some of the readers would care to give their views.

Thank you for a magnificent magazine.

P.O. Box 28071

Malvern 4055

Natal,

Republic of South Africa

Eric A. Clewlow

Chairman, Australian Bird Breeders Association

* * *

The Black Siskin

The Black Siskin *Carduelis atratus* has only once been imported into South Africa. I bought one of the eight or so pairs as soon as they were released from quarantine in December 1981, despite their high cost and a previous warning from a bird breeder in Germany that they were "impossible to keep alive in aviaries for long". I hoped that the climate and altitude of Johannesburg might suit them, as they come from the Andes Mountains, between 6,000 and 16,000 ft, of Peru, Bolivia, Chile and Argentina. They were strikingly beautiful, the male being velvety black with golden wing bar and patch under the tail. The hen was readily distinguishable by being greyish black with lemon yellow wing bars and tail patch. They had an attractive hovering type of flight in which the yellow under the wings became visible, and they were reminiscent of some huge,

exotic butterfly. They are far larger than the more commonly kept Siskins being more the size of a Greenfinch but with small, sharp beaks.

I attempted to acclimatise my pair in a spacious 6ft cage in a birdroom in which I breed Red Siskins. Here the use of a heater thermostatically controlled, and a humidifier is available. Black Siskins, however, have the same dense type of feathering as most European birds and seem adapted to withstand low temperatures.

The main problem with them manifested itself at once, viz. an extreme reluctance to eat anything and great shyness even about taking water. I had hoped that niger seed and maw seed, on which Red Siskins subsist, would be an easy answer, but they would not touch either. I supplied every type of seed and at every level, even fixing little dishes among the branches supplied for perching, and finally covering the whole floor with a thick layer of mixed seeds, a procedure that works with some newly-caught difficult species like the Green Twinspot. I tried every kind of softfood and greenfood I could think of, but not even ripening millet sprays grown in my garden or bunches of chickweed laden with ripening seedpods would tempt them.

In desperation I searched through my avicultural literature but, apart from Robin Restall's accurate description in *Finches and other seed-eating Birds*, I could find only one avicultural account written by T.F.M. Williamson in *Bird Notes* of April 1919. He had written about his pair in a mixed collection in his Californian aviary. His Black Siskins "fed entirely on ordinary rape seed, and though they ate sparingly of lettuce they never touched any grass or other wild seeds." Rape was the one seed that I had not tried, as I had given it no chance among such luxuries as gold-of-pleasure, teazle and an excellent wild grass seed mixture. I rushed out and bought both black and red rape, in the hope that the problem was solved. This was the first seed in which my Black Siskins showed any interest, but mine merely picked up the seeds and rolled them around in their beaks for some time before dropping them to the floor again. I gave all seeds dry and soaked and in various stages of germination, but nothing availed.

The male only lived for 20 days and the female for 26 days. Presumably they took a little water when I was not looking and at long intervals they swallowed a few grains of the smallest yellow millet. The manner in which they fed was erratic. They would appear puffed up and about to die, then presumably they swallowed a little seed and they would be better for a day or so. In the end they lost interest altogether and I force-fed them with a syringe. This feeding seemed to totally disagree with them and from this point on, I realised that the whole distressing battle was lost.

Mr. Bill Steel bought a pair on the same day as I did and we compared notes. His were housed in an aviary with an indoor shelter and outdoor

flight. The hen starved to death within 10 days, but the cock took to plain canary seed and was fond of lettuce. It liked to go out into the flight and sing in the sun. We thought that this bird, having settled down, might live to a good age, but within three months it was unexpectedly found dead one morning.

This species was mentioned in one advertisement in England at that time, so presumably a small number of them were on the market in Europe. It would be very good to hear from any fancier who fared better with this difficult species. The other pairs in South Africa sold quickly and I do not know what became of them. The silence about them would indicate that they, too, quickly perished.

Aviculture is not only about success stories, and these should not be the only stories reported in our magazines. There is as much, or more, to be learnt from failures. If I had my chance over again I would try the Black Siskins in an outside aviary with much natural cover in which they could retreat. This might give them a greater degree of confidence and stimulate them into eating a satisfactory diet. Or they might be a species that is stimulated by the flock, because the batch imported seemed to survive the three-week quarantine period in comparatively unattractive surroundings with relative ease.

P.O. Box 40108
Cleveland 2022,
Republic of South Africa.

F.Barnicoat

* * *

The Editor does not accept responsibility for opinions expressed in
articles, notes, reviews, or correspondence

DAVID REID-HENRY

(1919-1977)

Many members will remember the artist David Reid-Henry who was an active member of the Society and wrote many articles for the *Avicultural Magazine*, as well as contributing 37 superb colour plates which appeared in the Magazine between 1951 and 1971.

His widow, Louise Reid-Henry, is preparing a catalogue of all his works and will be pleased to hear from any members who have his paintings or who know the location of any. Strict anonymity will be preserved but Mrs. Reid Henry would be very grateful to have a description of each painting, its size and medium. (He signed his works 'D.M. Henry', in block capitals).

A number of publications are being planned on the work of this important artist and a list of his works, as complete as possible, will be of great assistance to these projects.

If anyone can help, please write to Mrs. Reid Henry, c/o the Editor.

MEMBERS' ADVERTISEMENTS

(10 p. per word - minimum charge £3.00)

"LORIES AND LORIKEETS". Have obtained entire remaining stock from publisher and can offer at £6.50 each, plus £1.50 postage and packing in UK, £3 overseas, airmail extra (published price £15). Rosemary Low, 13 St. Wilfrid's Road, New Barnet, Herts.

CLYDJA, LITTLE PORTH, St MARYS, ISLES OF SCILLY. Comfortable guest house close to all amenities overlooking Porthcressa Bay. B/B. EM. £14.50 inclusive. Reduced rates September-March. Tel. (0720) 22798.

THE AVICULTURAL SOCIETY OF QUEENSLAND welcomes new members. An Australian Society catering for all birds both in captivity and in the wild. We put out a bi-monthly magazine on all aspects of aviculture and conservation. For membership details please contact Ray Garwood, 19 Fahey's Road, Albany Creek, 4035 Queensland. Annual subscription (Australian dollars): 16.00 surface mail, 22.00 airmail.

AMERICAN CAGE-BIRD MAGAZINE features timely and interesting articles on canaries, finches, hook bills, and other birds, by leading breeders and fanciers. All show dates and show information are also published. Monthly subscription 12.00 US dollars. American Cage-Bird Magazine, 3449 North Western Avenue, Chicago, Illinois 60618, USA.

AVICULTURAL MAGAZINE back numbers. Large stock available including early issues. Sales by post only. Price list available from the Hon. Secretary, Avicultural Society, Windsor Forest Stud, Mill Ride, Ascot, Berkshire SL5 8LT, England.

Bird World

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THE CHOICE OF THOSE WHO KNOW



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THE AVICULTURAL MAGAZINE welcomes original articles that have not been published elsewhere and that essentially concern the aviculture of a particular bird or group of birds, or that describe their natural history. Articles should be preferably typewritten, with double spacing, and the scientific names as well as the vernacular names of birds should be given. References cited in the text should be listed at the end of the article. Line drawings should be in Indian ink on thick paper or card; photographs which illustrate a particular point in the article will be used where possible and should be clearly captioned.

ADDRESS OF EDITOR

Mary Harvey, Windsor Forest Stud, Mill Ride, Ascot, Berkshire, SL5 8LT, England.



Nigel G. Hillier
Recently fledged Fire-tufted Barbet at Chester Zoo

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BREEDING THE FIRE-TUFTED BARBET

Psilopogon pyrolophus

AT CHESTER ZOO

By ROGER WILKINSON (Curator of Birds)
and WAYNE McLEOD (Keeper)

Fire-tufted Barbets *Psilopogon pyrolophus* are extremely handsome residents of the montane rain forest in Sumatra and the Malay Peninsula. The mainly green plumage is enlivened by the strikingly marked head and chest, the double yellow and black breast-band being most distinctive. The sexes are similar but the male differs in having maroon mixed with the black of the hind-crown.

On the 27th April 1984 Chester Zoo obtained a pair of these Barbets from a supplier in England and they were housed in one of the indoor aviaries within the Tropical House. This aviary measures 7.0m x 2.6m x 4.0m high and is planted with a selection of tropical plants including *Hibiscus*, *Asparagus plumosa* and *Calathea pulchella*. No aggression was shown between the Barbets and the Red-billed Hornbill *Tockus erythrorhynchus* and Sun Bittern *Europygaelias* which shared the same enclosure.

The Barbets quickly settled in their new aviary and were fed our standard large softbill mixture of minced beef, commercial insectile food, grated boiled egg, carrot and chopped apple, supplemented with Vionate. Fresh fruit (pears, melons, grapes, plums, bananas, etc.) was provided as in season.

On 8th May it was noticed that the Barbets had already chiselled out several holes in the upright old tree-trunks which had originally been provided for the White Woodpeckers *Leuconerpes candidus* that had previously occupied this aviary. By 15th May the Barbets had selected one particular hole (in a log close to the adjacent aviary, now housing the Woodpeckers) and were spending long periods within that hole.

Two more Fire-tufted Barbets were purchased on 17th May. Lacking the maroon hind-crown, these two presumed females (or immatures) were housed in a different aviary within the Tropical House. Although out of sight of the original pair, vocal contact was quickly established with frequent exchanges of lengthy churring call notes.

Over the next month, when it seemed likely that our original pair had indeed laid in the favoured nest-hole, the Barbets were disturbed as little as possible. On 5th June calls from the nest-log indicated that at least one chick had hatched. We immediately provided mealworms (dusted in Vionate) which the parents readily accepted to feed to their chicks. From one to three mealworms were carried per nest visit. The parents normally ran these through their mandibles several times before feeding them to the young. To ensure that the Barbets received adequate amounts of live food, the Sun Bittern and Red-billed Hornbill were transferred to the adjacent aviary housing the Woodpeckers. We then started feeding locusts in addition to the mealworms; these were accepted as suitable rearing food by the parents although mealworms still appeared to be the favourite food item. Both sexes fed the young. Initially one bird would remain in the nesting hole until the second arrived with food, but later in the nestling period both parents spent increasingly longer periods outside the nest. Observations on 11th June suggested that the male was taking the larger part of the burden of feeding the young. Pink mice, and later pink rats, became the major food items over the next few weeks; these were treated as the mealworms, being dutifully mandibulated before being carried to the nest.

Disaster struck on 26th June when the male Barbet was found dead on the floor of the aviary. Despite food being always available to these birds, the *post mortem* examination revealed an empty gut. Why the bird had failed to feed was not revealed. We spent an anxious few hours waiting and watching to check whether the female would continue to feed the nestlings in the absence of the male. The female did continue to feed the nestlings but each time she flew to the nest-hole, the Red-billed Hornbill in the adjacent aviary flew at her through the wire. Relocation of the Hornbill removed this stressful situation and on 3rd July we were rewarded with the sight of a young Barbet peering out of the nest-hole.

Over a week elapsed before the first chick fledged on 11th July, six weeks after the first chick calls were heard, and a second youngster fledged on 14th July. The fledglings differed from the adults in being slightly smaller and were paler in colour. Those parts that are green in the adults were of a bluer shade, and the yellow parts were whiter in the young. The fledglings also differed in having whitish rather than crimson tipped facial bristles. Pinkish-orange orbital rings were pronounced when

they first left the nest but faded over the next few weeks. By 19th July the youngsters were feeding themselves. Interestingly, they then rejected the pink mice and rats on which they were reared in favour of fresh fruit, the favoured items being apple, grapes, pear and banana.

Previous notes in the Avicultural Magazine:

NEUNZIG, R. 1939. p. 251-258. On the care and keeping of barbets (Fire-tufted Barbets p. 253-4).

SETH-SMITH, David. 1929. p. 10. Fire-tufted Barbets presented to London Zoo.

..... 1929. p.175. The Fire-tufted Barbet *Psilopogon pyrolophus* (with colour plate by Roland Green).

As described above, the Fire-tufted Barbet *Psilopogon pyrolophus* has been bred at Chester Zoo and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or of any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

* * *

BREEDING THE GREEN-CHEEKED AMAZON PARROT

Amazona viridigenalis

AT THE ORNITHOLOGICAL INSTITUTE, OBERHAUSEN,
GERMANY

By SUSANNE WOZNIAK and WERNER LANTERMANN

In the summer of 1982 the Ornithological Institute, Oberhausen, was successful in breeding Green-cheeked Amazon Parrots *Amazona viridigenalis*. Until now this Amazon has been bred rarely in captivity. After a few successes in South Africa (Boswell Collection, 1976), England (J. Stoodley, Peterborough, 1979) and Switzerland (Mattmann, 1981), this is the first recorded breeding in West Germany.

In the aviaries of our Institute there lives a pair of this species which was imported in 1977 from north-eastern Mexico. The birds were placed in an outdoor aviary, measuring 2.0 x 2.0 x 1.0m (6½ x 6½ x 3½ ft). The shelter measured 2.0 x 1.0 x 1.0m (6½ x 3½ x 3½ ft). Their diet consisted of a seed mixture containing sunflower seed, peanut kernels, peanuts in shell, pine nuts, hard maize, oats and wheat. They also had fruit, vegetables and dried shrimps. Very milky maize and protein food was a fav-



W. Lantermann

Green-cheeked Amazon Parrot at 11 weeks old

ourite diet for the young birds after leaving the nest-box.

In spring 1981 the parrots were given a nest-box, which was fixed in the shelter, protected from exposure to rain and direct sunlight. Nesting material consisting of rotten wood was placed in the base to a depth of about 10 cm (4 in).

After a short time the birds showed great interest in the nest-box, followed by elements of social behaviour, culminating in copulation. In the middle of May three eggs were laid, of an average size of 26.2 x 35.2 mm, and they resembled eggs of adult *Pionus* parrots (see Lantermann, 1983a).

After an incubation period of 28 days, one of the chicks hatched and developed well for 10 days but died during a thunderstorm one night, as a result of the stress of the adult birds. That year no second clutch was laid. The parrots began moulting in the middle of July.

Already by March 1982 new pairing activities could be observed, especially courtship feeding and social preening. These two elements play an important role in the social behaviour of highly developed neotropical parrots and introduce copulation which took place several times a day. The first egg was discovered in the nesting cavity on 15th April, followed by a second egg on 18th April. The female started brooding on 16th April and the male also seemed to share this activity. The adult birds only left the nest-box to feed and defecate (see Lantermann, 1984a).

Two chicks hatched after an incubation period of 28 days. At first the

begging sounds of the young parrots could be heard several times a day, but in later weeks they became more and more quiet.

The development of the young birds took about nine weeks. The eyes opened in the fourth week and the first feathers appeared at the beginning of the fifth week. Eight weeks after hatching they were nearly fully fledged and sometimes peeped out of their nest-box hole.

Both chicks left the nest at the end of the ninth week. Because of the few nest inspections no exact information about the development of the young parrots can be given here. Both young birds resembled the adult Amazons, but only the forehead and the lores were red; the tail was shorter, the band that runs from above the eyes down the sides of the neck which is violet-blue in adults was pale blue in the immatures; the iris was greenish-grey.

In the coming years the colouring process of the plumage will be studied and compared with related species, also bred in our aviaries. Furthermore, the colour variation of the iris from hatching to sexual maturity seems to be helpful in determining the age of imported birds, especially the Amazon parrots (see Lantermann, 1982, 1983b).

We would like to integrate the young birds into a larger group of Green-cheeked Amazons to obtain more detailed information on the social behaviour of this species. In co-operation with German zoos and birdparks, we hope to be able to repeat this success with other, newly-formed pairs, to see this species, which is apparently becoming endangered in the wild (Ridgely, 1980) become established in captivity (Lantermann, 1984b).

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MAXWELL, P.H. (1948). Correspondence: A pair of rare Amazons at Whipsnade Zoo. p. 175.

PLATH, K. (1945). Correspondence: A Green-cheeked Parrot with yellow shoulders. p. 55.

MORE FINCHES AND OTHER SEED-EATING BIRDS PART II

By ROBIN RESTALL
(Tokyo, Japan)

Continued from Volume 90 (1984), No. 3

BAND-TAILED SEEDEATER *Catamenia analis*

I once bought what I thought was an obscure race of one of the grey seedeaters in a pet shop in Caracas. It was very badly plucked and had spent months in shipment with waxbills and munias. It must have reached Venezuela from Argentina via Holland. A year later it finally recovered its health and plumage and was identifiable as a male Band-tailed Seedeater which ranges from Ecuador down the western Andes to Chile and over into western Argentina.

It looks like a grey seedeater but may be distinguished from *any* *Sporo-*



BAND-TAILED SEEDEATER ♂
Catamenia analis

phila by its chestnut under-tail coverts, which are diagnostic of the *Catamenia* finches. I have not seen the female but according to de Schauensee, she is reddish brown broadly streaked with black above, fulvous below, streaked with dark brown. Both sexes have a white band across the under surface of the tail.

My diary notes this: it takes small seeds but clearly prefers millet over all. It is not at all adventurous with food and rarely does more than taste fruits or greenstuff. The male sings sweetly, a continuous gurgling squeaky burble that goes on and on. It is not in the least aggressive, in fact, rather timid. On one occasion when I had a great shortage of space, I put a tiny ground dove in its cage. It quickly retired to a corner and cheeped plaintively, apparently in fear, as if calling for help. It was very happy when in a cage all by itself. It appears never to bathe.

PLAIN-COLOURED SEEDEATER *Catamenia inornata*

Another species of *Catamenia* I saw, but never caught was the Plain-coloured. There is an excellent plate of it in Phelps and de Schauensee and it appears to be very similar indeed to the Band-tailed. The female apparently is like the female Band-tailed but without any streaking on the underparts. I saw this bird high up in the Andes above the tree line in the Paramos. It kept very much to cover when we were in evidence but when out of danger, it would sit on an exposed stem and watch us.

PRETTY WARBLING FINCH *Poospiza ornata*

I must admit to having difficulty with this genus. In my book I discussed the inadequacy of mentions in the literature, and the difficulty anybody would have in identifying a bird accurately. I sketched the head and upper wing of eleven species, adult males, with the intention of providing a diagnostic reference. I made this chart at the Bird Room of the Natural History Museum in Tring, and used colour in the original. The printer, however, having promised a dozen colour plates when the book was commissioned, cut me down to one, and the serins took priority over the Warbling Finches.

Imagine my chagrin when, a few years later, in Venezuela, I obtained a "pair" of unidentified birds from an importation from Holland, and found my black and white sketches inadequate. They were eventually identified as the Pretty Warbling Finch, an adult male of which I had kept some years earlier. Again, very recently in Tokyo I obtained an adult male of this species and was able to compare it to the colour sketches of my pair in Venezuela which consisted of an immature male and a female.

My notes in Venezuela show that the outer tail feathers of the male

were all white while those of the female were dark brown at the base. The male I have now follows. A single adult male in the Field Museum in Chicago had much broader cream wing bars than either of my males (which have white bars). In the female there is white on the lesser wing coverts.

They are easy birds to keep as they are quiet and in ordinally peaceful, being excellent company for waxbills. However, from a dietary viewpoint they would be much better kept with tanagers. They love ripe green food, and all live food, and will take soft food.

SLATY FINCH *Haplospiza rustica*

Formerly listed as *Spodiornis rusticus* by de Schauensee, this is a rare and difficult bird to find, but it does have a wide range and could find its way on to the market. The bird I caught and examined was about 5 in long and was a uniform slaty grey all over. The bill was coral and the legs orange - not in accordance with de Schauensee, but as I also caught the Plumbeous Sierra Finch for comparison, albeit in a different location, I came to this conclusion. As the plumage was faintly striated, I thought it must be an immature.

I did not keep this bird at the time, regrettably, for I can offer no comment on it in confinement. However, in the wild it appears to be a very secretive bird, keeping well hidden or hopping about the ground among the frailejons (we were in the paramos, above the tree line), and it seemed to be extremely shy. It could be that such behaviour is a function of living in such a habitat, and in a suitable aviary the bird would show more of itself. I doubt it.

BRUSH FINCHES *Atlapetes* spp.

Those interested in South and Central American birds will no doubt have a copy of *The Guide to the Birds of Venezuela* (de Schauensee and Phelps) with its excellent illustrations by Guy Tudor and others. There is a fine plate by Wayne Trimm showing the brush-finches of Venezuela. Finch and tanager enthusiasts must be intrigued by this little-known genus. Before arriving in Venezuela I had not even *heard* of brush finches, let alone knew what they were. Soon after arriving in Caracas, however, I was invited to the home of some keen ornithologists who lived further up the hills (about 5,000 ft, Caracas being about 3,000 ft). While sitting on the porch watching the birds come to feed and drink, I was electrified by the appearance of a tanager-sized bird, all orange on head and breast, yellow belly, and olive green above. It gulped at the papaya and banana for a few minutes, then disappeared. It was my first sight of the Ochre-breasted Brush Finch and I became quite obsessed with the genus from then on.

These are invariably birds of dense underbrush of rainforest hillside.

Occasionally a local bird has become accustomed to the feeding station of somebody's garden, and will come to feed in open view generally; however they are skulking, retiring and very shy of humans. It is extremely difficult to observe them in the wild, and the only times I have ever done so have been when I have been sitting still for a long period just waiting for something to come along. The sign is the kicking or tossing of leaves as a solitary bird comes foraging over the ground through the undergrowth. They are said to feed on small invertebrates but mine ate a great deal of everything - including a lot of seed.

OCHRE-BREASTED BRUSH FINCH *Atlapetes semirufus*

I caught and banded many dozens of these birds in the Cordillera north of Caracas and thus enabled much more accurate observations of territory and behaviour. De Schauensee lists four races, one of which has a white chin, but I only ever saw the northern (coastal area) race. The sexes are alike but I found the male to be easy to detect in the field by his habit of erecting the crown feathers frequently (there is no crest), and in the hand by anal tuft comparison - the male has long yellow "guide" feathers. With matched pairs the male is also almost 10% larger (6½ in). Juveniles are much duller olive with olive heads and yellowish bib and mesial. The orange of the head comes through very soon.

I kept several individuals for painting, both young and adult. They settled easily in large roomy cages and fed happily on mixed seeds, a little banana, apple and orange. They liked mealworms but I gave only a few each day. They stayed in excellent condition. They never showed any sign of aggression, nor did I ever hear them make a noise. I noticed that in the wild, young birds accompany their parents on foraging parties and I never noticed any sign of aggression then. This is the only brush finch that I have seen in groups, however small, and the only one that would forage above ground level, being occasionally seen in bushes and shrubs 10 ft above ground level. It would be an undeniably fine aviary bird.

CHESTNUT-CAPPED BRUSH-FINCH *Atlapetes brunneinucha*

A little larger than *semirufus* at about 7 in. Top of head bright chestnut, forehead, sides of head and pectoral bar black. Throat white. There is a distinctive white spot either side of the forehead. Below, the bird is dingy, being olivaceous above. The sexes are quite similar.

I have caught, banded and photographed this bird at various elevations above 3,000 ft. As with the other brush finches, it was found at ground level in dense underbrush. This bird is a noisy forager, always easy to detect by the way it tosses leaves about in search of food. I kept one for painting and found it to be peaceable, would take all kinds of seeds

readily, a touch of soft food at times, and mealworms. On reflection, I would keep these birds in a well-planted aviary with heavy litter covering the ground, especially leaves.

STRIPE-CROWNED BRUSH-FINCH *Atlapetes torquatus*

About 7 in also, a big finch with the head striped grey and black, white throat, black pectoral band, olive above and dingy below. The sexes are alike. I have never been able to observe this bird in the wild, but one day a friend called at the office to say that a Stripe-crowned Brush-Finch had flown into his bedroom window pane, stunned itself, and he feared serious injury. I duly collected the bird and took it home. I kept it for a few months in a large cage with other local birds, finches and tanagers, before painting and releasing it.

It settled very well and was always peaceful with no sign of aggressiveness. I found that it ate almost nothing but seeds. Subsequently I learned that the sexes are alike, while immature birds are virtually uniform sage green all over.

Skutch devotes a whole chapter of observations on this species. He describes the song as thin, high-pitched and squeaky, and very short being easy to overlook. He was also of the opinion that it fed on small insects and dead leaves. Insects they undoubtedly take, but I am equally certain that small seeds are a basic diet ingredient.

GREYISH SALTATOR *Saltator coerulescens*

When Herbert Murray read my notes on this species, he wrote to me saying that they were very dull in their behaviour, "..... the dullest birds I ever had or have ever seen. They seemed to eat a bit of everything." Apparently his pair led totally uneventful lives and ".....died after a couple of years, unlamented." Herbert Murray was a great aviculturist and we were good friends. I sent him birds from Spain, including the Spanish Sparrow, which he successfully bred. His experience with tanagers was equal, or greater than that of Mr. N. Oregaard-Olesen, and during my time in Venezuela we exchanged a lot of correspondence on tanagers. If Herbert found Greyish Saltators dull, I believe him.

I caught an adult in my Caracas garden and caged it with some other thrush-sized birds, including tanagers. It settled immediately, and very well. It took a lot of fruit but, as I did not keep it alone, I cannot say for sure how much softfood or seeds it took. At the bird table in the gardens they took a lot of banana and orange. I have watched them in many locations in the wild but have only seen them take leaves, biting bits out, and buds.

They are shy and somewhat skulking birds, keeping to cover. The song



GREYISH SALTATOR ♂

Saltator caeruleus.

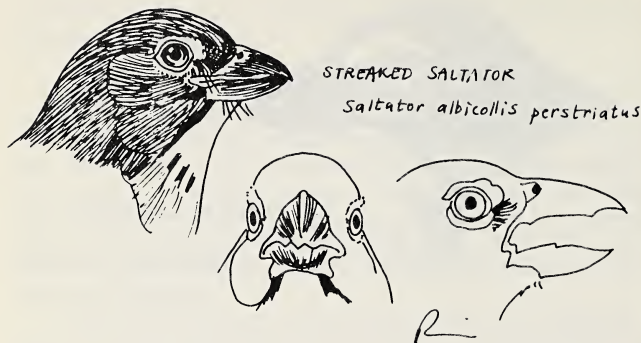
of the male is the most distinctive and easy to recognise in the clamour of a dawn chorus, and the male will sing from on high on and off throughout the day. Its determination and clarity, however, far outweigh its musical ability. I would put it slightly behind the European Missel Thrush in this respect. Incidentally, male and female will “duet”, singing antiphonally.

STREAKED SALTATOR *Saltator albicollis*

During my three years in Venezuela I managed a complex 13-month study of the natural history of a large ranch in the interior. Among the many hundreds of birds caught were many Streaked Saltators, and I became very familiar with the species. I decided to keep an adult male for a while. First I must point out that the Venezuelan race is a richer-coloured bird than those in Central America or the Caribbean Islands. Its plumage is a rich glistening, olivaceous green above, not the “dull olive green” as described in my book. Also, the eyebrow is yellow, not white as illustrated by French. Finally, the cutting edges of the bill are rich yellow as is the gape.

My bird was placed in a large cage with a Kiskadee. This was a mistake as the Kiskadee bullied the Saltator and kept it away from the food. I took the Saltator away in a very thin and half-starved condition. It refused to eat and I had to force-feed it with mealworms for a day or two. I also dropped Vionate in its bill, and mixed glucose in the water. It recovered to settle down on a mixed diet of fruit, softfood and mealworms.

To begin with, I offered different dishes with various seeds, banana, papaya, apple, pear and orange. The softfood was a locally-manufactured dry mix that I combined with honey and grated cheese. At first the Salta-



tor ate only orange, and this fruit remained its outright preferred food until its eventual release. At the end it was eating orange, mealworms (10 a day), softfood and a little millet. From my observations of the bird in the wild, it seems to eat buds and leaves, but mainly buds.

ORINOCO SALTATOR *Saltator orenocensis*

I have not kept this bird but I observed it several times in Venezuela. It was found in the upper reaches of large, open trees in open areas between dense woods. I never saw it low down nor in thick cover. A pair would carefully comb the branches, bark and leaves, picking at unidentifiable things, presumably insects of different kinds, small beetles, etc., and also taking birds and tender bits of vegetation.

I came across a dead one on the highway, still in good enough condition to paint. It has a strong bill like all saltators, and presumably is fairly omnivorous. It is essentially grey above, darkest on the crown. There is a strong white superciliary, and a white spot at the base of the bill. The throat is also white but the rest of the head is black. The sexes are alike.

PHOENIX CARDINAL *Cardinalis phoenicea*

My description of this bird was taken from a comparison of skins in the British Museum. When I finally collected it live in Venezuela, I found it to be a little different from my expectation. In many ways it is intermediate between the Virginian Cardinal and the *Pyrrhuloxia* spp. Also, in the birds that I saw, the male has no black on the face at all. My pair were both longer and slimmer than the Virginian Cardinals I saw in Chicago. The crest of this species is longer than either of the other two.

Herbert Murray told me that he had kept it for a number of years and in his opinion it was the finest cardinal of them all. He found the beak to be amazing and commented on the bulging muscles connected to it. Like me, Mr. Murray found the female to be a very attractive bird in its own right. His birds came from Colombia, according to his shipper and "...they came from semi-desert country". The bird in Venezuela is also found in semi-desert.

I have watched this species in aviaries in the Caracas Zoo and these observations agree with my own experience, and that of Herbert Murray, that it is a peaceful bird and safe in mixed company. Mine took mango, orange, apple, pear and papaya freely, but only took a little banana. They also took softfood and mixed seeds. They really had a fondness for sunflower and my notes suggest that this seed accounted for about 50% by bulk of the food eaten.

BLUE-BLACK GROSBEAK *Cyanocompsa cyanooides*

I bought a male of the Argentinian race from a pet shop in Caracas. It was badly plucked and almost completely bald. After two months with not a pinhead showing, I was resigned to having a vulturine grosbeak in my collection for ever. However, it did eventually begin sprouting when it began a full moult, and became a fine feathered and beautiful bird. It would eat about a handful of sunflower seed a day, would take some fresh millet on the stem, very little fruit, but no mealworms or softfood despite the good example set by tanagers in the same cage. It was quite peaceful. I caught an immature male of the smaller Venezuelan race. At first, I took this bird for a female but it cut its forehead and quickly grew blue feathers. It too was peaceful in the same cage as the older bird.



BLUE GROSBEAK
Cyanocompsa cyanooides



BLUE-BLACK GROSBEAK



ULTRAMARINE GROSBEAK
Cyanocompsa cyanea

I subsequently placed this younger male in a cage with a male American Blue Grosbeak (imported from Mexico). Despite the larger size and seniority of the Mexican bird, the Venezuelan bird pursued it mercilessly and I had to withdraw it. I then placed it with various other, non-related finches and it behaved perfectly.

This bird was a great character. It bathed with enthusiasm and took every food I offered from sunflower to all the other seeds, fruits, lettuce, chickweed, seeding grasses, etc.

BLUE GROSBEAK *Guiraca caerulea*

I came across several males in a shipment from Mexico, and bought one to make comparative colour records against the other blue grosbeaks. In a 3 ft (91.5 cm) cube wire cage with a few other seedeaters, it did well; however, when placed in a cage with a smaller, immature male Venezuelan Blue-black Grosbeak, it was pursued relentlessly and they had to be separated.

It is a large bird with a large bill but the shape of the bill is more like that of a large sparrow than that typical of the grosbeaks (like the Hawfinch). It took a variety of seeds with a preference for sunflower, but not to the overweening degree of all the other grosbeaks mentioned here.

YELLOW-BELLIED GROSBEAK *Pheucticus aureoventris*

This bird is known throughout South America as Rey del Bosque (King of the Woods). We occasionally had a pair resident in the hills above Caracas and could always bring it to within a couple of trees by playing recordings of its song which, incidentally, is strong and attractive. However, it appears to be totally a bird of the tree tops and we could never bring it down to our level. I once saw an old male with one leg in a pet shop in Caracas and took it home at once. It developed a big callous under its leg as it had great difficulty in perching. It would eat nothing but sunflower seed. However, it remained fit and sang sweetly and often. During a five-week trip to England I left it in the care of a friend who claimed it sang well, but then had to leave it with another person who obviously was very incompetent. Upon my return, I found it had gone light, also had chronic conjunctivitis, and died within two days.

Later I found another bird - also imported from Argentina, I understood - but although this bird had both legs it was in wretched condition with bad diarrhoea, eyes dull, and very worn, broken plumage. Like many finches - especially *Emberiza* buntings and Ploceidae weavers - with intestinal problems, it took mealworms avidly. These I dosed with Vionate. The bird soon recovered, taking mixed seeds with a distinct preference for sunflower, also a little softfood, and apple, pear and lettuce.

Both of these individuals would bite me readily, and very painfully. They seemed to be not at all aggressive to other birds, but the conditions were not at all a fair test of their tempers.

DICKCISSEL *Spiza americana*

On one January trip, deep into the interior of Venezuela, we saw great flocks of Dickcissel, North American birds over-wintering in South America. The following year, at the same time, I was better prepared and set several mist nets on one part of the ranch where the birds had been seen that week. At the end of a long and fruitful day, with dozens of species photographed and a few hundred banded, we began rolling up the nets. At the very last net, to my surprise and delight, were about 20 Dickcissels. I kept two very well marked individuals but not for long as their cage was opened by accident. These birds were, of course, in winter plumage with buffish edging to much of their feathering. I was struck by the considerable variation from individual to individual, and also by their size as they seemed to be as large as big sparrows.

In the short time I kept them they were noisy and aggressive birds that ate a normal seed mixture. In behaviour I would liken them to the Common Starling, including the chattering.

PASSERINA BUNTINGS *Passerina* spp.

There is a strong school of thought that maintains that all six species of *Passerina* are, in fact, but races of one species. Conspecific or not, the fact that they occupy significantly different geographic and climatic ranges and, in my experience, have different personalities, justifies treating them distinctly in aviculture. Nonetheless, every effort should be made to make comparative records. All aviculturists, especially those keeping adult pairs in breeding condition, pairs of more than one species, would serve their hobby well if they kept comparative observations.

Breedings of the Lazuli Bunting are extremely rare so it is worth noting a report in *Cage and Aviary Birds* (29th November, 1973) by G.M. Harrison-Wells. One bird fledged from the second brood - other nestlings were found dead on the aviary floor. The parents took various seeds, chickweed, and were very keen on mealworms. The breeding occurred in a mixed aviary and there was no recorded aggression.

I collected a few Indigo Buntings in Chicago, both sexes, in the spring and autumn. I did not keep them for long as they invariably bickered and disturbed their companions. Herbert Murray kept the Varied Bunting over many years. There were several abortive breeding attempts, and his best effort was when nestlings reached the age of 10 days before desertion. With the experience I have now (here in Japan almost everything is

hand-reared from Zebra Finch and Java Sparrow upwards) I think I would have attempted to hand-rear. However, looking back on it, doubtless I would have left my birds the way Herbert did. His flights were very large and well planted. Nonetheless, he attributed his failure to the birds being highly insectivorous when rearing.

I have recorded two reports concerning the Nonpareil Bunting in *Cage and Aviary Birds* (August 1980). One is from M.G. Montague, who gave a well-detailed near miss (2.8.1980). Then there was a letter to the Editor from C.S. Reski (30.8.1980) reporting a successful breeding in an outdoor planted flight in Cornwall. Apparently the birds had plenty of livefood, including crickets and grasshoppers.

Finally, I have the following note recorded in the margin of my copy against the Rainbow Bunting: bred in England in 1975 by Mr. and Mrs. Aberdeen. I am sorry that I did not record the source of this information as it no doubt refers to the first breeding of the species in England.

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This series of articles will be continued in future issues

BREEDING THE WHITE-CHEEKED TOURACO

Tauraco leucotis leucotis

By NIGEL HEWSTON

(Gloucestershire)

Introduction

The White-cheeked is one of the most widely-kept touracos, so probably needs no description. The plumage is described and illustrated by Mackworth-Praed and Grant (1952). It is an Ethiopian bird, *T.l. leucotis* being the western race. The eastern race is Donaldson-Smith's Touraco *T.l. donaldsoni*, which has the crest red, not black. This race is much more rarely kept. *T. ruspolii*, Prince Ruspoli's Touraco, is a closely-related, possibly conspecific form with a very restricted distribution in southern Ethiopia. The other species completing this sub-group within the genus is Hartlaub's Touraco, *T. hartlaubi*, from Kenya and Tanzania. All are birds of highland forest.

The White-cheeked Touraco was regularly imported in the 1960s and early 1970s, but rarely since then. It is the most commonly-bred touraco, young having been reared in at least 13 collections in the U.K. in the last ten years, although the only detailed account of the breeding of this species to have been published in the *Avicultural Magazine* until now came from America (Everitt, 1965). The first British breeding record in the *Avicultural Magazine* appeared in 'News and Views' in 1964, saying simply: 'Interesting breedings: W.H. Rose, White-cheeked Touraco, one and two reared'. According to the Members' List at that time, Mr. Rose was living in Market Harborough, Leicestershire. There was a report of London Zoo having bred them in 1971 (Olney, 1972), although the first breeding there was actually in 1969 (Zool. Soc. London, 1969). Surprisingly I can find no earlier published breeding records for the U.K. Second generation White-cheeked Touracos were reared at Padstow Bird Gardens in 1980 ('News and Views', 1980).

Summary of breeding results

My first two birds were obtained early in 1976. These proved to be two hens, producing two eggs each in 1977. In 1978 a male was obtained and paired with one of the hens (Pair 1); 10 eggs were laid, four hatched and three young were reared. One young cock was retained and paired with the other hen (Pair 2).

In 1979 Pair 1 produced three eggs but the hen was killed by the cock during incubation. One egg was fostered to Pair 2, also incubating at the

time. Pair 2 produced 16 eggs, none of which hatched, but reared one young bird from the Pair 1 egg.

In 1980 a new hen was obtained for the cock of Pair 1. Six eggs were laid but none hatched. Pair 2 produced 19 eggs but again none hatched.

In 1981 Pair 1 produced eight eggs, of which three hatched and two young were reared. Pair 2 produced 15 eggs, of which four were hatched in an incubator and two young were reared, one by the parents and one by hand.

In the winter of 1981-82 the cock of Pair 1 suffered badly frostbitten feet, so a new cock was obtained and paired to this hen. Seven eggs were laid, of which five hatched and four young were reared (two by hand). Pair 2 laid 10 eggs in 1982, all of which hatched and eight young were reared (five by hand). All the 1982 hatched eggs of both pairs were incubator-hatched.

In 1983 the cock of Pair 1 attacked the hen, so was replaced by the original cock. Despite his badly injured feet, of the six eggs laid two were fertile and two young were reared. These were hand-reared from two weeks as the parents were fighting. Pair 2 laid six eggs, of which three were incubator-hatched but the young not reared successfully. The cock bird was then replaced by the one removed from the Pair 1 hen earlier in the season. Two more eggs were laid and one young bird reared by the parents but was later killed by White-browed Laughing Thrushes *Garrulax sannio*. Therefore, in the years 1978-83, a total of 22 young have been reared.

Housing

Pair 1: Outside aviary approximately 18 x 6 x 6 ft high (5.5 x 1.83 x 1.83 m).

Pair 2: Outside aviary approximately 15 x 5 x 6 ft high (4.58 x 1.53 x 1.83 m).

Both aviaries have shelters approximately 6 x 3 x 6 ft high (1.83 x 0.92 x 1.83 m) in wooden sheds and have about a quarter of the roof and sides covered with plastic sheeting. Both flights are planted with shrubs and climbing plants. Some artificial lighting is provided in the shelters during the winter, but no heating until late 1981, since when a minimum temperature of about 40°F has been maintained. The birds are usually shut in at night during the winter, also during the day in severe weather.

Feeding

Food consists mainly of fruit. Bananas, apples and soaked sultanas form the staple diet, but other fruits including pears, grapes, peaches, tomatoes, plums, cherries, oranges, guavas (tinned), elderberries, blackberries and strawberries, are given as often as possible. Other foods such as boiled

rice, potato, carrot, peas, sweetcorn, minced beef, boiled egg and chopped lettuce have occasionally been mixed with the fruit, but usually prove unpopular. Most of the fruit is fed chopped and mixed with a universal food or equivalent, currently Haith's Prosecto, and also a multivitamin powder such as SA37. The softbill food is also provided separately but rarely taken. Whole, peeled apples and pears are sometimes fed, fixed on nails. Powdered cuttlefish 'bone' is sprinkled on to the fruit when hens are known to be laying. At this time hens can often be seen searching the aviary floor and will sometimes take grit and small pieces of cuttlefish.

Maggot pupae are taken when young are being fed, and at other times by some birds. One hen often eats Russian Vine *Polygonum baldschuanicum* leaves when feeding young. The birds are usually fed once daily, but at least twice when feeding young or in hot weather.

Breeding

Nest-sites used have included fruit and fish boxes and a wire basket. Most nests have been in an apple, or similar box, hung on its side with a board about 3in (7.5 cm) wide fixed across the bottom of the open front, and another board underneath to strengthen the base and fill any gaps if necessary. A good base of hay is provided and the birds add a few twigs. They have not successfully built nests in these boxes without the hay.

Clutches are of two or three eggs, more often two, laid on alternate days. Incubation usually begins with the laying of the second egg irrespective of clutch size and is shared by both sexes, taking 21-23 days. The young hatch with eyes open and covered in thick black down except for a line along the crown, which remains naked until the crest grows. The lores are also naked. The bill is black at the tip, pale at the base. The chicks are fed by regurgitation and rarely left alone in the nest, one or sometimes both parents sitting beside them when not actually brooding.

Young leave the nest at 20-27 (most often 21-24) days old. At this stage they are very much smaller than the parents with short wings and tails and the bill mainly black. I have sometimes had to replace young in the nest but they usually find their own way back, although they cannot fly. One flight has a Russian Vine growing near the nest which makes this very easy, and I have seen young running up the wire flapping their wings at 22-23 days to reach a perch near the nest. They continue to use the nest as a roost for some time. It has always proved necessary to remove the young if eggs are hatched from a subsequent clutch, otherwise the period for which they are tolerated is very variable.

The transition from down to juvenile plumage is difficult to determine due to the dark colouring and downy texture of the first plumage on the underparts. The young birds can show a little red on the wings at only

three weeks old. By two months the white facial markings are visible and the beak and eye-wattles are starting to turn orange. Growth continues rapidly after fledging, but full size and colour is not attained until about six months old.

One of the main obstacles to successful breeding is aggression within pairs, experienced by most breeders, including Berry and Todd (1982), Delacour (1973), Steel (1973).. With my birds the males have always been dominant, although other breeders have encountered aggressive hens. The original cock of Pair 1 killed his first mate while they were incubating eggs, after breeding peacefully with her the previous season in the same aviary, and almost killed his second mate while they were feeding young. In both cases the attacks took place during electric storms, although all three cocks have also attacked hens under other circumstances. I have quite frequently had to split pairs for periods from hours to months, and at all times of the year.

Artificial incubation and hand-rearing

I first tried artificial incubation in 1981 as at that stage my breeding results had steadily worsened since the initial success. This was largely due to the cock of Pair 2 refusing to incubate. The hen would initially incubate alone but consistently deserted before the eggs hatched. If the eggs were removed as soon as the clutch was complete and incubated artificially, the hen was usually sitting on another clutch when they hatched and would accept the young if this second clutch was removed. Even the cock would feed and brood young supplied in this way although for only 10-14 days, after which he would turn on the hen, who would rear the young perfectly well on her own if the cock was then removed. Of course, this then left the second clutch to be hand-reared. This technique has also been used with the other pair when necessary.

Since 1982 eggs have been incubated and hatched in a Reliable Thermostat 'Vision' still-air incubator, set at 99.5-100°F with the egg-tray inverted to bring the eggs closer to the thermometer. The eggs are turned twice daily until pipping. The water tray is kept only just wet until pipping, when more water is added. No humidity readings have been taken but high humidity during incubation can be harmful, as I discovered in 1981 with a clutch set in a friend's incubator, of which two died after pipping and one within a day of hatching.

These eggs are, however, otherwise very tolerant of less-than-perfect incubation. The first egg hatched artificially was one of two which spent the first week in a Reliable Thermostat hospital cage, which ran steadily at 98-100°F. The eggs were well insulated from the heat source and a small dish of water was kept in the cage. The eggs were then put into a

friend's 'Curfew' incubator with some chicken eggs, where one hatched (fortunately before the chickens) and was reared by the parents. Several eggs have hatched after being deserted in mid-incubation, probably for several hours in some cases. Since obtaining the 'Vision' Incubator only one fertile egg has failed to hatch and this was probably due to poor incubation by the parents before its removal from the nest.

On hatching the birds are brooded in an incubator if possible for at least the first few days (the 'Curfew' incubator makes a particularly convenient brooder) and are then transferred if necessary to a box with a lamp. The temperature is reduced to 95°F in the first day, then gradually reduced further.

The first feed is usually given 6-12 hours after hatching, although the young will beg after only an hour. Feeds are usually given every 1-1½ hours for the first day, then every two hours, and are gradually reduced to every three hours as the young grow. Intervals between night feeds are two of three hours on the first night, then two of four hours for the next few nights, followed by one of six hours and eventually seven to eight hours.

A variety of rearing foods has been used, including various mixtures of Complan, Farex, Horlicks, baby foods including Heinz Fruit Dessert and Bone & Beef Broth, and Milupa fruit flavours, mixed with fresh banana and vitamins including Cytaccon and Abidec or SA37, and plain yoghurt for the first few days. This mixture, made with warm water, is syringe-fed for the first two weeks, when the diet is gradually changed to small pieces of fruit, mainly banana, and soaked Purina dog meal which is taken from the fingers. This change in feeding techniques seems to make weaning easier and the birds can usually be weaned at four to five weeks.

Several young have died or been culled during hand-rearing, the most frequent cause being badly splayed legs. This problem often seems to be linked to the substrate on which the young are kept. They are best kept in small containers giving some lateral support (e.g. small rectangular margarine tubs), on a relatively rough material (some paper towels are too smooth). I have only experienced this problem once with parent-reared young, when the parents had removed almost all the nesting material from the box.

This condition was cured in one hand-reared bird by strapping the leg to the body for a few days with masking tape, but this treatment failed in two other cases, and seems more likely to be effective if the condition is noticed in the early stages. In my experience, only one leg is affected initially. The same problem has occurred in several other collections in at least *leucotis*, *hartlaubi* and *persa*, often in parent-reared nestlings and for no apparent reason, sometimes affecting only one bird in a clutch of two.

One bird with only very slightly splayed legs, not noticed at first, was reared without developing this condition and one clutch of three young

had perfect legs but bent toes, probably due to a break in incubation towards the end of the incubation period. Otherwise the hand-reared birds appeared perfectly healthy and only one bird, reared alone and kept alone for some months afterwards, showed abnormal behaviour with other touracos. As far as possible the young were reared in groups and put within sight and sound of adult touracos as early as possible.

Conclusion

Touracos in general are often keen to breed in captivity but regular successful breeding is much less common. Young have been reared from only a fifth of the eggs laid by my birds, despite high fertility. Much simpler hand-rearing diets have been used successfully (Berry and Todd, 1982) and I will experiment further if the opportunity arises. I apologise for the imprecision, and in some areas, total lack of my records, and I hope that other breeders will continue to publish data.

Although at least nine species of touraco, of three genera, have bred in Britain in recent years, and at least 14 are currently present in British aviaries, only two, apart from *T. leucotis*, can now be said to be breeding regularly. These are Schalow's *T. schalowi*, and the Red- or Pink-crested *T. erythrophus*, and these only in one and two collections respectively. A large number of Hartlaub's Touracos have been imported in recent years and hopefully these will soon start to breed regularly, as well as several more rarely-imported species which have recently been available in small numbers. It is important that our captive touraco populations do not become too inbred, particularly in view of the ever-increasing difficulties in obtaining wild-caught stock. Birds bred in my aviaries have now produced young in at least three other collections. In two cases these were birds paired to completely unrelated stock from other sources; the birds of the third pair were both bred here but were not closely related.

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NOTES ON THE BROWN- HEADED PARROT

Poicephalus cryptoxanthus

By NEVILLE BRICKELL

(Natal Avicultural Society, Republic of South Africa)

The Brown-headed Parrot is also known as the Brown-hooded and Concealed Yellow Parrot. It is usually seen in pairs or small flocks of four to twelve birds, but up to 40 have been recorded. They are rather wary and therefore keep themselves concealed in thick foliage of the upper branches of trees. Conversational chatter is kept up continuously while feeding. If disturbed, their flight is very fast and direct while they utter very loud, harsh, ear-splitting shrieks and display bright yellow on the under wing-coverts. They have been observed coming to drink at midday.

The sexes are alike and measure between 22-24cm in length. The general plumage colour is green; head and neck dusky brown with a yellowish wash; sides of head, throat and upper breast light buffy olive; mantle and back yellowish green, the feathers laced with deep green; wing-



N. Brickell

Wild Brown-headed Parrot in Kruger National Park

coverts and secondaries olive-green; under wing-coverts bright yellow; primary-coverts and primaries brownish green, tinged on outer webs with blue; under tail-coverts and rump bright olive-green; tail olive-brown, tipped with green; iris pale greenish yellow; bill, upper mandible dark grey becoming blackish towards tip, lower mandible whitish; legs and feet greyish black. There is an excellent colour plate of the Brown-headed Parrot painted by D.M. Henry, opposite the first page of the *Avicultural Magazine* in 1955.

P.c. tanganyikae differs from the nominate race in having the head more olive-brown; rump, upper tail-coverts and underparts brighter and more yellowish. Immatures paler than the adults, the upper breast suffused with dull yellow.

The nominate race occurs in eastern Zululand, eastern Swaziland, Transvaal (lowveld), south-eastern Zimbabwe and Mozambique (south of the Save River). *P.c. tanganyikae* occurs in Mozambique (north of the Save River), southern Malawi, eastern Tanzania and coastal Kenya, including the off-shore islands of Zanzibar and Pemba. This parrot is locally common throughout the lowlands, especially in the coastal districts where it frequents coconut and cashew nut plantations and mangroves. It is also quite common in dry *Acacia* woodland and the edges of undeveloped

cultivation. It feeds on a large variety of seeds, grain, fruits, nuts, berries and nectar. These parrots have been recorded feeding on the nectar from the dark maroon flowers of the Sausage Tree *Kigelia africana*, the fruit of wild figs, *Ficus* spp., fleshy yellow-brown fruit of the Nyala Tree *Pseudocadia zambesica*, globose fruit of cultivated Cassava *Manihot esculenta*, inflorescences of Coconut Palms, seeds of Baobab *Adansonia digitata*, unripe seeds of Kaffirboom *Erythrina* sp., extracting the seeds from the pods of Knob-thorn *Acacia nigrescens*, Umbrella-thorn *A. tortilis* and Smooth-bark flat-crown *Albizzia gummifera*, and probing the blooms of Flat-flowered Aloe *Aloe marlothii* and orange-yellow petals of the Kiaat Tree *Pterocarpus angolensis*. They have also been seen eating the young green shoots of trees. They are partial to 'ripening grain and will raid villagers' millet, maize and sorghum crops, devouring some but wasting far more.

In captivity the birds will accept a basic diet of two parts sunflower seed, plus one part each of white millet and canary seed. This may be supplemented with apple, grape, spinach and raw peanuts. They are also fond of the shoots of Bluegum and Silver Oak. As a rearing food a basic nectar mixture of caramel and brown sugar mixed with warm water is quite adequate as well as soaked sunflower seeds, Cheddar cheese, bread and milk and corn-on-the-cob (maize).

Recorded breeding is in June (Tanzania), May and June (Malawi), June, July and September (Mozambique), April and October (Zimbabwe) and May, June to July in South Africa. From aviary observations of the courtship display the male struts back and forward along the perch with beak held high, and uttering a series of single note twitterings followed by a loud scream. This performance is repeated for several minutes. Six nests in the wild revealed that all were in holes in trees, living or dead, with one being an old woodpecker hole, and with entrances of 5-10m from the ground. The nest cavity of one was 12 cm in diameter and 50 cm deep, while the other measured 90 cm deep. The eggs lay on bare wood. The Baobab is a known favourite of this species for breeding. The 2-3 eggs are white, glossy and measure about 31 x 23mm. Low (1980) reports a successful breeding of *cryptoxanthus* in captivity. One egg was laid in a nest-box which measured 25 cm (10 in) square and 45 cm (18 in) deep with the bottom lined with inverted turf and peat; after 26 days it was assumed that the egg had hatched as a near-naked chick was observed a few days later; the young bird left the nest 12 weeks after hatching. The Brown-headed Parrot is known to hybridise extensively with Meyer's Parrot *P. meyeri* on the Motali River in the north-eastern Transvaal province of South Africa to the Sabi River in Zimbabwe. Museum specimens show the presence or absence of yellow over the head and a loss of green over the

back, and intensity of blueing over the rump and upper tail-coverts. In Mozambique hybrids were produced by crossings with the Meyer's Parrot and with the Niam-Niam Parrot *P. crassus*. The hybrids were reared on bread and water, putu (maize meal boiled until the water evaporated) and corn-on-the-cob.

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NOTES ON KEEPING AND BREEDING LITTLE BUTTON QUAIL

Turnix sylvatica

By Mrs. J.L. SPENKELINK - VAN SCHAIK
(Soesterberg, Netherlands)

The Little Button Quail is about the same size as Chinese Painted Quail - the cock is slightly smaller, the female somewhat larger.

It is a patchy, coffee-coloured bird, its back being bright brown with lighter patches; the patches on the wings are larger than those on the shoulder and on the back. This pattern is formed by the juxtaposition of feathers with darker margins next to feathers with small, brighter patches, which start from the head. On the wing-coverts the margin turns into a dark brown band across the feather, while the patches become larger, covering up to half the feather. This pattern goes on across the breast.

The female has dark brown feathers on the throat - in the male these feathers are lighter brown. The feathers on the abdomen are longer and red-brown in colour; the tail is short. the legs are flesh-coloured and the bill yellowish.

Several subspecies of this quail occur on the different continents, in Asia, Australia and Africa, and there is a subspecies in Europe, *T.s. sylvatica*, formerly found in Spain and Portugal, but now very rare and even feared extinct in most parts of the range.

In the tropics these quail are used for fighting in much the same way as in cock fighting. At night, when the oil candles burn in the cabins and it is quiet in the surrounding bushes, these small birds are attracted up to the burning lights and are then caught. The females are used for fighting which is on a smaller scale than with game cock fighting, and often takes place indoors because the birds are smaller. One can buy these quail very cheaply in the oriental bird markets.

As a child, I kept these charming birds and they became very tame. We played circuses with them making them jump over our finger or through a bamboo ring. When they could be bought in the Netherlands some years ago, I resolved to buy some; the importer found it very strange that I bought three males to one female.

I put one male and one female in an outside aviary, in which I kept *Neophema* parakeets. The bottom of the aviary consisted mainly of pure sand. As our daytime and night time temperatures differ considerably, I decided to enclose the aviary with sheets of glass so that the temperature inside would remain constant, especially when there was sunshine during

the day. To make their surroundings as natural as possible, I put several big stones and grass clumps in the aviary.

Soon the male started to display and to call the female towards a sheltered place he had formed between the stones and the grass clumps. The female laid five eggs which were brooded by the male, and three chicks hatched after 28 days' incubation. As in nature, these young lived on insects though I gave the birds insectile food as well as hard-boiled egg yolk with crushed biscuit. Only the male cared for the chicks, feeding them from food which they took out of his bill. In the same way, the male made them drink by dropping water from its lower mandible into the chicks' open beaks.

Meanwhile, I had put the female with another male and after about a month, these had chicks too, but I was unsuccessful with the third male. As I had no other aviary available, I left the female with the male and though he too brooded the eggs, when the chicks were about two days old, the female became aggressive and after a short struggle, the male was beaten. I put the chicks in a shoe box which was kept to the right temperature and fed them with a fine paint brush. Their food consisted of egg-food mixed with flour and made into a pulp with water and this was then dripped from the paint brush on to the open bill of the chicks. This feed could take up to an hour as the chicks had to have their bills open at the right moment to swallow the food. After about three days, it became easier and every hour they were given about five drops each. From that moment on, the time between each feed was lengthened until they got their food every third hour on the seventh day. From then on they ate germinated millet given by the paint brush. When they were 14 days old, they were able to feed themselves, so I put them into a larger box. I gave them cow heart which, whilst still frozen, was scraped with a teaspoon to give a really fine consistency. This clung to the paint brush and was then fed to the chicks, being mixed with egg after several days, and they grew up successfully.

It was a pity that most of the chicks I bred proved to be hens because, owing to their peculiar method of breeding, the best proportion is five cocks to one hen.

During the winter they stayed on the dry sandy floor, with dry straw in a corner which they hid in. By accident, one bird was trodden to death because they all dived into the straw whenever one went near them. Their protective coloration is very effective and makes them almost invisible in the straw.

It is a pity that these very attractive birds are no longer imported, as my strain will eventually die out from inbreeding as they are all bred from the same hen.

THE ATTRACTION OF LORIES TO THE MADRONE TREE

By FRED BAUER

(Garberville, California, USA)

The so-called 'Strawberry Trees' (Ericaceae) are amongst the most ornamental of the evergreen trees, and there are over a dozen species in both the Old and New worlds. The dark, shiny green leaves, white flowers and strawberry-like fruits are very attractive and various species have been introduced into many gardens and parks all over the world including Britain where very old specimens thrive, mainly in the more southerly parts.

Perhaps the best known member of the family is the Madrone *Arbutus menziesii*, a native of the Pacific slopes of North America, and whilst, of course, there are no lories native to this area, I have discovered that many if not all lories are strongly attracted to this plant.

In the countryside of the Mattole Valley in California where my aviaries are located, the Madrone tree is a common and often spectacular feature. It is said that the largest Madrone in the world lives nearby; this tree measures over 100 ft (30.5 m) in breadth, its trunk being 16 ft (4.88) thick.

After watching native birds (especially the Bandtail Pigeon) eagerly consume quantities of Madrone fruit, I introduced these abundant little globes to my psittacines. The brilliant red berry-like, half-inch spheres were accepted enthusiastically by some (Caiques, Hawk-headed Parrots, Eclectus and Amazon parrots) and ignored by others (macaws, cockatoos and most lories).

The following spring (1983) I offered Madrone flowers to the lories. All species eagerly worked the small white, five-petalled, urn-shaped flowers (somewhat like Lily of the Valley) with their nifty little tongues and many of them then crushed and ate all or portions of them. This was quite pleasing to me as I had not found my lories show much interest in domestic flowers.

Madrone flowers are borne in large clusters in great profusion on a stiff central stem. Since most of them are high off the ground, I use an orchard pole pruner to reach and cut the clusters. They are gathered in large harvest baskets and carried to the aviaries. Strong winds also make them available from time to time. It is a wonderful resource and I feel that these flowers are an important addition to my lories' otherwise largely contrived and unnatural diet. I cannot say that they provide a particular vital ingredient, but they certainly supply a vital element of interest and pleasure.

But there is more to the lory-Madrone story. This winter (1984) I

discovered that some parrots are very fond of the smooth, bark-less skin of Madrone twigs. These are a smooth, deep red in winter and bright, yellow-green when growing. Except for new buds, these birds do not eat the leaves. Most do not chew the wood but quickly peel off the thin skin and eat it.

I was quite surprised at what happened when fresh Madrone twigs were placed in the lory flights. Immediately every bird set about licking the leaf sockets (I had removed the leaves to avoid litter). They then began to preen themselves vigorously, as does a dog with fleas. I examined the twigs and the birds with a lens but could find no parasites. This preening occurs within seconds of contact with the twigs and continues uninterrupted, in an urgent manner, until the source of the exciting substance, whatever it is, is exhausted or every feather is treated. The birds do not show much interest in dry, dead twigs.

After the leaf sockets are licked clean, the skin of the twig is opened by biting, though it is not eaten as it is by the other parrots, and the preening continues. It is very exciting to watch, especially the Stella Lories *Charmosyna papou stellae*, who pull the whole of their long tails through their beaks, requiring a real stretch over their backs to reach the tips. Each bird also coats its feet with the substance until the skin glistens.

What is going on? What substance is this, and what is the requirement? I decided to experiment further. I tried other plants, 28 to date. Several (Douglas Fir, Arizona Cypress, Incense Cedar) generated a similar response but none so far has stimulated the behaviour described above with nearly the vigour that the Madrone does. Madrone will excite the lories even when presented immediately after exposure to one of the other varieties. The attraction is also strongly present when Madrone twigs are introduced to hand-fed fledglings, especially Stella Lories. There is an immediate and instinctive need for this substance.

Those members who are familiar with the terms 'anting' and 'smoke-anting' will recognise a possible connection with the lory-Madrone phenomenon. Anting is a behaviour pattern in which the birds apply living ants to their bodies, or bathe in smoke from burning twigs or chimneys. I have not been able to find a convincing explanation for anting.

At this point let me remind members that such experiments could be dangerous to their birds as some plants might be toxic. I have found, however, that healthy birds that are regularly supplied with non-toxic plant matter do not consume that which is harmful to them and in the wild all birds come in contact with poisonous plants. Nevertheless, perhaps it is best to experiment on the more plentiful species first.

Whatever the attraction the Madrone has for lories, I consider it is necessary if for no other reason than the birds' acute desire for it.



Berries of the Madrone ('Strawberry') Tree *Arbutus menziesii*

Reproduced from *Forest Trees of the Pacific Slope* by George B. Sudworth
(Dover Publications, 1908)

SOME NOTES ON THE SPECKLED PIGEON

By DEREK GOODWIN

(Petts Wood, Kent)

Introduction to the species

The Speckled Pigeon *Columba guinea* has several other vernacular names. In avicultural circles it is often known as the Triangular-spotted Pigeon and in South Africa it is usually called the Rock Pigeon. As some writers of regional avifaunas prefer inventing new English names to using long-established ones, it has also been called Hackled Pigeon, Guinea Pigeon and Red-eyed Pigeon.

It is one of the most widespread of the African *Columba* species, being found from northern Africa (south of the Sahara) to the Cape of Good Hope, although it is not evenly spread over this vast area and is absent from tropical forest and other areas of unsuitable habitat.

In southern Africa it was until fairly recently mainly or entirely dependent on the presence of sea or inland cliffs inaccessible to or not frequented by monkeys and other climbing nest predators. Further north, however, and especially in parts of western tropical Africa where it overlaps geographically with the Rock Pigeon *Columba livia*, it was (and is) associated with the presence of *Borassus* palms, nesting in the cavities at the bases of their large leaves (Harwin, 1963). Over much of its range it has now taken to nesting and roosting on or in buildings, on sheltered ledges under bridges and in mine adits. Hollows in trees and old nests of the Hammerkop and various other situations (see especially Rowan, 1983) are also used as nest sites (Goodwin, 1983, Rowan).

In captivity and doubtless in the wild also, the roles of the sexes in parental and nesting behaviour is similar to that of Rock, feral and domestic pigeons. The cock brings the nesting material and the hen builds with it. The first egg is laid in the evening and the second on the next day but one after, in the very early afternoon I think, but cannot now remember with certainty. The incubation and fledging periods are shorter than those of Rock and domestic pigeons, about 15 and 22 days respectively, in my rather limited experience.

The Speckled Pigeon feeds on the ground in open country or savanna, sometimes locally in towns, very often on arable land. When available, cultivated seeds such as wheat, millet, maize, dari and ground nuts (peanuts) comprise much of its food, which otherwise consists mainly of seeds of wild plants. It is often shot for sport or food. On balance, however, it has probably benefitted from modern man's provision of buildings, food

and water supplies. Also from his destruction of tropical rain forest and its subsequent replacement by savanna conditions or cultivation, this has permitted it to extend its range in the present century.

In the highlands of Abyssinia and Eritrea the Speckled Pigeon overlaps widely with another rock-haunting species, the White-collared Pigeon *Columba albitorques*. The two are much of a size and seem, at least in Addis Ababa where both are, or at least recently were, quite common, to have very similar ecological requirements (Pitwell and Goodwin, 1964). So far neither is known to be having a harmful effect upon the other there but it seems likely that they may compete to some extent. Introduced domestic pigeons have gone feral in many African towns. They would seem likely to prove a serious competitor to town-nesting Speckled Pigeons, perhaps also elsewhere as both species occur together in natural sites on crags in at least one area of South Africa (Rowan). No competition between the two has been recorded but this may merely reflect the tendency of many ornithologists to pay little attention to wild pigeons and even less to feral pigeons.

Description.

The Speckled Pigeon of the nominate race *C.g. guinea*, which is found in tropical western, central and eastern Africa, is about the size of the average feral pigeon, perhaps a little larger than the latter when it is a bird of (mainly) dove-cote pigeon derivation, but a little smaller than a racing homer pigeon or feral pigeons derived from this breed. The mantle and most of the wing coverts are dark reddish purple which may fade to light chestnut brown in worn and bleached plumage. A white triangular mark at the tip of each covert feather results in a profuse white spotting over the closed wing. The neck is encircled with a broad collar of bifurcated feathers that are chestnut tipped with silvery green or silvery pink. The primaries and secondaries are dark grey, the tail blackish with a grey central band and some white on the outer edge of the two outermost tail feathers. The rest of the plumage is pale silvery grey. In flight the dark shoulders and tail contrast with the very pale lower back and rump.

A striking feature at close quarters is the large expanse of red or purplish red orbital skin. The eye is yellow with an orange or golden or red outer ring. The bill is black with a powdery white cere (when the bird is in good condition) and the legs and feet salmon, flesh pink or pale red.

The race from southern Africa, *C. guinea phaenota*, tends to be slightly smaller with proportionately slightly smaller bill, less extensive bare orbital skin and denser, softer body plumage. It is much darker on the grey parts, and to some extent elsewhere, and has smaller white spots on the wing. Juveniles of both forms are duller. Skead gives detailed descriptions

of nestlings and juveniles of the South African form.

Personal involvement

I was about 15 when I first saw Speckled Pigeons. Cycling along a road near Wraybury, I noticed a number of aviaries in the grounds of a large house (or small mansion). At once I stopped and scanned the aviaries through my poor quality 6 x 30 binoculars. I saw Golden, Silver and Amherst Pheasants and, much more exciting, a pheasant and two pigeons completely new to me. Moreover both were very attractive and quite unlike anything I had seen before. They were, in fact, a cock Swinhoe's Pheasant and two Speckled Pigeons. I soon identified the former (from some book, I suppose) but the pigeons remained a mystery until some years later. Then I visited the place again and actually bought a Barbary Dove from the lady in the great house. I took the opportunity of asking what the (to me) mysterious pigeons had been and was told Triangular-spotted Pigeons from Africa.

In May of 1941, the troopship, on which I and some hundreds of other young soldiers were *en route* for the Middle East, stopped for two weeks in Durban. Here, in a place called Clairewood Camp, we stayed for an incredibly luxurious break. We were fed on South African army rations which were not only, understandably, superior in quality to what we had been used to but incredibly generous in quantity. Quite appropriately, this food was served out to us by a genial South African army cook beside whose girth and stature an adult male Mountain Gorilla would have looked like a marmoset. To me, even better than the delights of gluttony, was our being granted a great deal of free time.

Unfortunately I had unwisely taken my parents' advice and left my binoculars at home (a decision I still bitterly regret at the age of 63 and always shall) so I only got good views of the tamer wild birds. I saw no wild Columbidae except some Red-eyed Doves *Streptopelia semitorquata* and one cock Tambourine Dove *Turtur tympanistria*.

The Red-eyed Doves were in Mitchell Park and it was in the municipal aviaries there that I saw Speckled Pigeons again, this time of the dark southern race. As is the case in Britain, so in South Africa, it seems that municipal authorities are unable to resist the temptation (I suppose because they get the birds as free gifts?) to crowd their aviaries with domesticated species to the detriment of the often rare, valuable and interesting wild species that are housed with them and forced to compete, or more often fail to compete, with them. These two Speckled Pigeons were in an aviary with about 30 or 40 domestic pigeons of various breeds. There were only a few nesting boxes for all these birds and, of course, each was in possession of a pair of domestic pigeons. I was, however, able to glut my



D. Goodwin

Female Speckled Pigeon *C. guinea*, six months old, bred from a male *C.g. guinea* x a female *C.g. phaenota* x *C.g. guinea*.

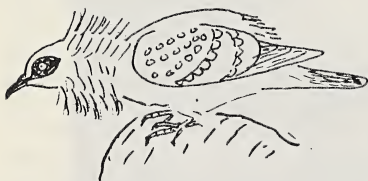


D. Goodwin

Self with two Speckled Pigeons *C. guinea*, about six months old, 1956. Bred from a male *C.g. guinea* by a female *C.g. phaenota* x *C.g. guinea*.

eyes on the (to me) strange, dark beauty of the South African Speckled Pigeons. It did not then, I think, occur to me that I might one day own some birds of this species.

In the early 1950s I began keeping Speckled Pigeons through seeing a pair advertised for sale, in *Cage and Aviary Birds* I think, and sending off for them. When they arrived one had an injured wing, although it could fly, and I think both were cocks but as neither came into breeding condition, I am not sure of this. Some few Speckled Pigeons, the most effeminate-looking hens and the most masculine-looking cocks, can be sexed by minor details of head shape and expression but many cannot.



Speckled Pigeon in lowest point of the bowing display (digrammatic sketch).



Speckled Pigeon, adult, resting by day.



Speckled Pigeon *Columba g. guinea* inviting female to mutual billing (sketched from a captive male).

The bowing display of a vigorous male in full breeding condition is more emphatic and exuberant than the self-assertive version of the bowing display, which both sexes habitually use, but there is not a great deal in it. I must confess that I was hopelessly wrong at first about two individuals which later proved their sex by breeding successfully. One was a bird that I had picked out from eight others in a dealer's cage because it had the most effeminate-looking head, and which later turned out to be a cock. The other was a young hen which I bred, from a cock of the southern race paired to a hen of the nominate race. While assuming and just after having assumed her first adult plumage, this bird was so demonstratively aggressive and so constantly chasing after and displaying to other Speckled Pigeons that I assumed she was a cock, until the effeminate-looking cock mentioned above suddenly began to display to her, when they paired and shortly bred successfully.

In all I kept, at one time or another, a total of ten Speckled Pigeons, seven of which I had bought and three of which I had bred. Both for aesthetic and scientific reasons I had hoped to be able to keep some or all of them free-flying and, in view of their often living in or on buildings in Africa, thought (wrongly as it turned out) that this would not prove difficult.

The first "liberation" was quite unplanned. My only *phaenota* cock and his 21 day-old daughter, who had fledged only the day before, escaped accidentally and flew off into a snowstorm. I feared the worst but some ten minutes later the cock was back, walking about on the roof of the converted garage in which he lived. I thought it was only a matter of time with him, so opened the doors (first penning his mate in their nest-box) and also the door of a nearby aviary, while I searched for the young bird. To my surprise, I never saw the cock bird again. It is most unusual for a pigeon to be lost *after* it has once come back and I am still surprised at his disappearance.

I had little hope of his daughter but, again to my surprise, she was back next day and eating some corn by an aviary. This seemed a remarkable feat as she had never fed herself before and was only 22 days old. Her growing up had also involved her becoming timid (though from the time she was eight days old I had spent some time handling and talking to her each day) and when I went out, she flew off right away. However, next day she was back and went inside the aviary whose door had been left open.

This 50% success under very adverse circumstances, led me to think that it should not be difficult to "settle" Speckled Pigeons. I cannot now remember the details but know that I liberated two under what I thought were more suitable circumstances, but they went off and never came back, and two others that escaped also never returned though one was picked up

dead five miles away two weeks later and returned to me (all had name and address rings on them).

I think a probable reason for my failure may have been that the area in which I lived was rather densely wooded and, from the air, in spite of open areas created by large lawns and roads, was probably too unlike the natural habitat of *C. guinea* for them to feel at ease in it or to return to it once they had flown to a distance. I suspect that anyone living in a more open area and who was more careful than I was to experiment at first with only one of a pair of nesting birds would be luckier.

Though I found most of my Speckled Pigeons were tame enough to be watched from a few yards away, as with many other birds, *complete* tameness could only be got by hand-rearing. The young bird mentioned above was handled, brought into the house among people and so on during her early days (eighth to 20th days) but nevertheless did not show complete tameness. However, two of her young ones that I took from the nest when eight days old and hand-reared became and remained absolutely tame.

Unfortunately, I had to move to London in 1956, and my Speckled Pigeons and other birds had to be given away. I tried to find good and suitable homes for them but am not, with hindsight, at all sure that I succeeded in this. Since then my Speckled Pigeon watching has been confined to specimens in zoos, especially in the Snowdon Aviary at the London Zoo in the 1960s and up to 1976.

Captive care and breeding

Though, of course, as for all birds, the bigger the enclosure they are kept in the better, I found my Speckled Pigeons thrive and bred successfully in enclosures of quite modest size. Some were housed mainly in a garage, converted into an aviary but wired only in front, about 25 x 10 x 8 ft high (7.62 x 3.05 x 2.44 m); others in an aviary rather larger and higher and with a shelter about 10 x 6 x 8 ft (3.05 x 1.83 x 2.44m) attached to it. The birds always seemed rather quieter and more ready to breed in the garage, probably because there they never had cats or hawks try to get at them from above.

In *very* large aviaries, like the Snowdon Aviary at the London Zoo, it is possible to have several pairs of Speckled Pigeons breeding in one enclosure but in a more confined space, it certainly is not. I found that once a pair came into breeding condition they would start attacking any other conspecifics kept with them. Only when these latter were removed (and as soon as they were) would they begin to nest. I have been told of a case where a South African aviculturist habitually kept many pairs in an enclosure of moderate size and found that if they were all left together then

eventually the dominant breeding pair would get tired of persecuting the others and nest in spite of their presence. Such a course is, I think, to be deplored on humanitarian grounds and those with enclosures of moderate dimensions should be content with one breeding pair of Speckled Pigeons in each.

I fed my birds on wheat, millet, canary seed, maple peas, peanuts and hemp. Peanuts were a favourite food so I used to give these as titbits when I was with the birds and also, in the winter months, to give each bird a peanut or two that had been smeared with a drop of halibut oil, every few days. As I had no heating in my aviaries, I thought giving such allegedly "heating" seeds as hemp and peanuts could do no harm and might do much good. The first pair to breed reared a single young bird (the other egg had been broken), in freezing winter weather, very largely on hemp. It was in perfect condition when it left the nest and remained so. Grit, "Kilpatrick's Pigeon Minerals" and salt were supplied *ad lib*. Like all my other pigeons, these birds ate lots of the Kilpatrick's minerals when feeding young from four to 20 days old.

I used to put sawdust down deeply - 6-8in deep (15-20 cm), so it would not blow about - on the floor of the garage aviary and the sheltered part of the other and scatter and bury panicum millet in it. This kept the birds busily searching about in it for some time each day. Speckled Pigeons will nest in any sort of box or other receptacle that a domestic pigeon would use.

Racial hybrids and varieties

A hen that I bred from a cock *C. guinea phaenota* to a hen *C.g. guinea* was intermediate in coloration and plumage density but closer to her father, especially in the shade of the grey parts of her plumage, than to her mother. Two young that she produced when mated to a cock *C.g. guinea* were barely distinguishable from the latter race. Indeed, had I not known their parentage, it would not have occurred to me that they were not pure *C.g. guinea*.

I observed two colour varieties that were bred, undoubtedly from normally coloured parents, in the Snowdon Aviary at the London Zoo in the 1970s. One, that I first noticed as a juvenile in early 1973, had moulted fully into adult plumage when I saw it again in March 1974 and took notes on it.

It had some white primary feathers in each wing. The grey parts of its plumage (but not the purplish chestnut parts) were slightly paler than normal. The tips of the display feathers on its neck were paler, more silvery and less pinkish or greenish than normal. Its irides were not orange but dark, like a "bull-eyed" pied or white domestic pigeon. Its bill, instead

of being black, was a pale fleshy grey, inclining to pure pale flesh at the tip. The orbital skin and feet seemed rather dull but did not otherwise differ from that of a normal bird.

The other bird was far more handsome. It was perfectly normal in plumage colour but when first seen (by me) in 1974, when it was in adult plumage but probably quite young, it had the orbital skin brick red, strongly tinged with orange. In 1976, when I saw it again, its orbital skin was a lovely bright deep orange, which contrasted very strongly with the red or purple-red orbital skins of all the other Speckled Pigeons in the aviary. It was a cock and was displaying vigorously on my last visit to the Snowdon Aviary in March 1976.

Voice and display

I have seen the display flight of this bird only in the Snowdon Aviary at the London Zoo. To my surprise it appeared more similar to that of the Wood Pigeon *Columba palumbus* than to that of the Rock Pigeon. The displaying bird would fly upwards with a loud clatter and an odd (for a pigeon) “fluttery looking” flight, then glide with wings held slightly below the horizontal and with tail partly spread. Perhaps some of our readers can give us details of display flights of wild Speckled Pigeons with unlimited space available to them?

I have discussed the other displays and voice of this bird in a previous article in our Magazine (Goodwin, 1956). Suffice here to say that its displays are very similar to but by no means identical with those of the Rock and domestic pigeons. Its coos are loud and have a tone and intensity very suggestive of the display coo of the Wood Pigeon. Its advertising coo starts with a few muffled and slow notes which increase in speed and loudness. Its display coo suggests a long-drawn version of the Rock Pigeon's but quite lacks the “broken” effect and has a more Wood Pigeon-like *tone* throughout.

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HAND-REARING THE AFRICAN BLACK CRAKE

Limnocorax flavirostra

AT THE PHOENIX ZOO, ARIZONA, USA

By MARGARET SPRECKELS (Aviculturist)

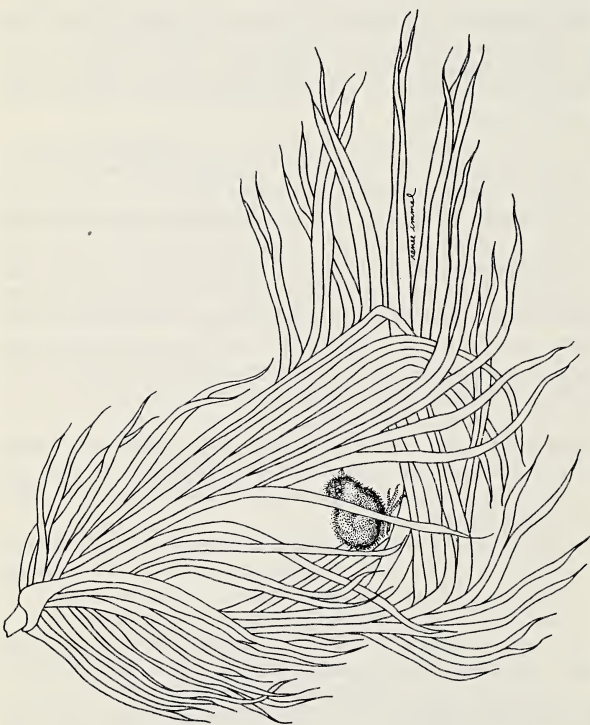
The crake aviary at the Phoenix Zoo houses one pair of African Black Crakes. The aviary is 2.4 x 6.1 x 3 m (8 x 20 x 10 ft) and encloses a pond 0.92m (3ft) in diameter, having varying depths of 1.3 to 7.6cm (½-3in). We have found our Crakes to be extremely aggressive and intolerant of any other birds in their enclosure.

The Crakes were purchased in February 1977 and they first went to nest in the spring of 1978. They nested in palm fronds set up on the ground in "A frames", one frond flat against the wire and one leaning about 20.3-25.4cm (8-10in) apart. They reared several clutches but only one chick (probably the oldest) from each clutch would survive. The others would grow weaker by the day and finally die. Some attempts were made to hand-rear the weakest chicks on mealworms but with no success. In December 1978, the female began eating her eggs. Sometimes she would eat them as soon as they were laid, other times she would eat them after they had been incubated for awhile. Many times she did not even eat them, she just dragged them to the pond and broke them. However, she still incubated some clutches full term.

According to S. Dillon Ripley (1977), egg-eating is a common practice with Black Crakes. In some instances, both sexes destroy the eggs. Our male, however, has never been known to destroy an egg and incubates them very conscientiously.

By 1982 the female was destroying all her eggs, so we decided to remove them and incubate them artificially; no easy task as the eggs are laid at night, a clutch of four eggs being laid on successive nights. We would take them away as soon as they were laid and incubate them in our waterfowl incubator at 99.5°F dry bulb and 89°F wet bulb or 68% humidity. The incubator automatically makes a 90° turn once every hour. The incubation period is 20 days.

Our female then began to re-lay every two weeks for the entire summer. We became concerned about her health and offered her dummy eggs as replacements, but she continued to lay. We supplemented the hard-boiled egg yolk and mealworms of the diet with Osteoform, a calcium and vitamin supplement by Vet-A-Mix. Finally, in September she stopped laying and she and the male have been incubating the dummy eggs. This occurrence coincided with the addition of new and more spacious palm



Renee Immel, Phoenix Zoo

Crake chick sitting in its palm frond nest

frond nests which afforded the pair more seclusion and privacy.

Of the several clutches that we hand-reared, we found that the chick from the first laid egg was always strong with a good appetite and easily reared. The second chick would be a little less willing to thrive. The third chick would often be quite weak and only the keeper's determination would keep it alive. The fourth chick would be weaker still and often have crooked toes; by gently massaging the toes frequently throughout the day, they would correct themselves in about one or two weeks.

We also found that chicks must be hand-reared separately. The oldest and strongest chick seems to intimidate the others and will grow while the others will not, even though the others are getting food. When chicks are eating well on their own, they can and should (for socialisation) be re-introduced. This is a gradual process as chicks are very territorial even at a young age.

The chicks are kept in boxes with a heating pad at one end so that they can move closer to or further from the heat source. The heating pad is placed half on the bottom of the box and half going up one side. Towelling is then placed over the entire bottom of the box, covering the heating pad to keep it from getting soiled. A smaller cloth is placed over all and is removed once or twice daily for cleaning. The chicks also like to have a cloth to burrow under. A 1.3 x 1.3cm ($\frac{1}{2}$ x $\frac{1}{2}$ in) welded wire top is fitted over the top of the box to keep the chicks from jumping out. A towel is put over the top of the box on the heating pad side to keep heat in and provide privacy.

Given below are the formulae used for hand-rearing the chicks:

1st week:

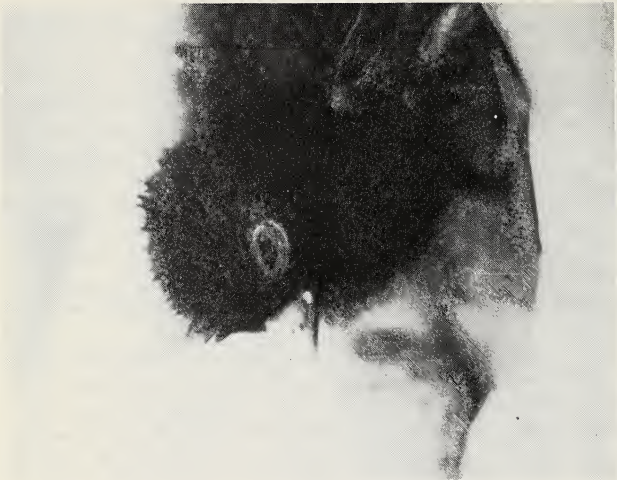
Soaked freeze-dried ocean plankton)
Soaked trout chow) - sprinkled with spirulina
hard-boiled egg yolk)
live brown worms (available at aquarium shops) served in water

In daylight hours only, feed from tip of finger every half hour to hour, beginning when chick is 12 hours old. Some chicks are much more active and willing to eat than others. Feed as much as they will eat at each time. They will refuse when full. Dip beaks in fresh water to accustom them to water supply.

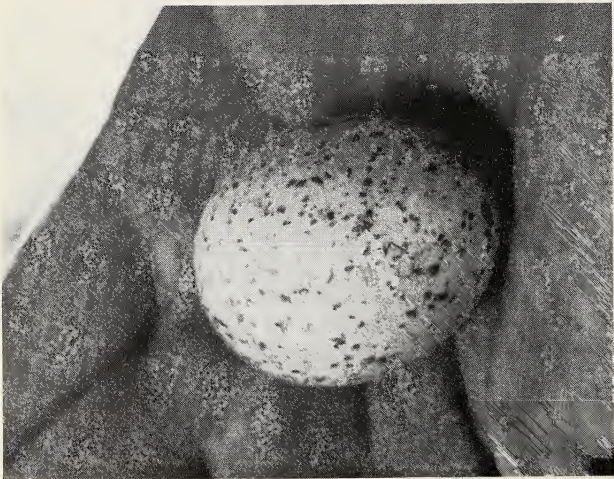
2nd week

Start encouraging chicks to eat independently. Each chick will respond to this differently.

Add to the first week's diet:-



Tom Blackledge, Phoenix Zoo
Three-day old Crake chick



Pipping Crake chick

Ground bird of prey diet (canned dog food can be substituted) and white stage mealworms (after hard chitin skin has been shed). Ground dry dog food, high-protein crumbles, chick starter, and parrakeet seed (all dry and kept in a dish available to chicks at all times).

Continue to feed all that the chick can eat at half to one hour intervals. Even when the chick is eating independently, it is often the keeper's presence that triggers him to go to his food dish. When it is established that the chick is eating independently, it can be left for longer periods. The nature of the food, however, requires that it is changed often.

3rd-4th weeks

Start introducing soaked egg-maker pellets, shrimp meal, occasional brown mealworms, whole bite-sized dog food in with other dry mixture, and finely chopped fruits, vegetables and greens (they particularly like avocado). Decrease plankton and brown worms.

8th week

By now the chick should be on the adult diet which is:

A pan of egg-maker pellets, trout chow, shrimp meal, chopped fish, VilecSol vitamins (by Vet-A-Mix), soaked in water.

A fruit pan consisting of various fruits, vegetables, hydroponic barley, hard-boiled egg and bird of prey diet.

A pan containing dog chow, egg-maker pellets, high-protein crumbles, pigeon mix and parrakeet seed.

6-12 mealworms per day per bird.

Grit and oyster shell.

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NOTES ON THE THICK-BILLED GREEN PIGEON

Treron curvirostra

By C.A.N. JOSEPH
(Newmarket, Cambridgeshire)

Whilst surveying an Essex importer's stock in 1970, I observed a single greenish, almost featherless pigeon, covered with droppings, on the bottom of a small aviary with a wounded Turtle Dove and various finches. More out of pity than interest I purchased both the unidentified pigeon and the Turtle Dove, on my terms.

After proper feeding and conditions I found that I had a hen Thick-billed Green Pigeon who, having found her self respect, provided my collection of doves and pigeons with its first fruit-eating pigeon.

In 1972, at the November *Cage and Aviary* Show, I finally identified a healthy male out of about 20 assorted birds in various conditions and ages in a cage at the bottom of the display. I bought the bird at my price since the salesman had no idea what the bird was and was obviously glad to get rid of it. The nuptial introduction established the dominance of the female which I suspect stemmed from greed - two feeding dishes restored the marital bliss. Because of the copious production of loose droppings, the birds enjoyed their first year of marriage in a large mynah cage with a wire floor.

Daily life consisted of parrot-like walking their perches when not facing each other on opposite perches in contemplation. This behaviour continued when released into a large flight. From observations it would appear that these birds climb rather than fly and this is further confirmed by the unusual grip of the foot which is more like that of a climbing bird than of a pigeon.

Year round food consisted of diced pear, apple, peach, melon, bananas and British garden fruit when available. Dry Universal Food was sprinkled on the fruit twice weekly and mynah pellets were given daily. Water, although available, was taken infrequently and I suspect only for cleaning the beak and preening.

During 1973 the pair showed little sign of courting or mating and, apart from the odd grunt, had little or no voice. It appeared that the birds were either too old or were incompatible. Each autumn I returned the birds to the original mynah cage in a heated bird room but, in the autumn of 1973, I put several branches and some straw in the cage with them. I did this purely out of sympathy, to provide them with plenty of climbable material.

Early in 1974, still in their fairly confined quarters, the pair started tail-bobbing and displayed obvious interest in each other, sexually. Guttural notes and owl-like hooting or wooing preceded and terminated with the cock lowering his head towards the hen. The hen then responded in a similar manner. The cock's display appeared to be in attraction and the hen's response one of aggression.

Several eggs, two in a clutch and pure white, were casually laid on the wire floor. The third clutch finally encouraged an attempted incubation by the hen.

This serious attempt at breeding prompted the removal of the pair to quarters 2m wide x 1m deep x 0.70m high ($6\frac{1}{2} \times 3\frac{1}{2} \times 2\frac{1}{2}$ ft) with the floor covered with approximately 0.30m depth of peat. These quarters were filled almost totally with branches and were part of an outside flight complex, roofed with translucent ribbed plastic which, in summer reached a temperature of 90°F during the day and dropped, at night, to $40\text{--}45^{\circ}\text{F}$.

In the seclusion of this environment and provided with a handful of straw, the pair made a nest on the peat floor furthest from the access door. Two eggs were laid with both birds taking turns to incubate.

Both birds, when approached on the nest, turned to display a cocked tail and vent with the head lowered away from the intruder. The unoccupied mate would perform a positive injured flapping away from the nest to attract the "predator's" attention. The sitting bird always "sat" very firmly regardless of approaches and there was no wing clouting associated with pigeon defence.

Generally my observations indicate that in captivity the birds do not breed until they are quite mature, possibly two to three years old, and must have complete seclusion and a warm environment. Seclusion can be provided by giving plenty of branches for cover. I suspect that in the wild these birds do not stray very far from their roost which provides them with the cover and their food. There is very little flight and movement is confined to climbing, so much so that one would think they were parrots rather than pigeons.

The chronicle of the brood, as observed, is as follows:-

6th July	1st egg laid - not incubated
8th July	2nd egg laid - incubation is started by the hen with the cock alternating. Both adopting defence behaviour as described above and sitting very tight.
22nd July	1st egg hatched, two halves of egg removed by parents away from nest and left. Squab dark grey with fine light fluff. Hen brooding.
23rd July	Hen continues brooding.

24th July	Second egg hatched as first egg and shell removed well away from the nest.
25th-26th July	Single brooding of both squabs by hen and cock.
27th-29th July	Cock and hen brood one squab each. Development of second squab accelerates to match first squab in size and activity.
30th July	Both squabs leave nest, capable of flight, to perch some 23cm high. Tail bobbing evident with tail and wing feathers developed for reasonably controlled flight. Rest of body still in original downy fluff. Legs and orbital skin dark grey, beak dark grey with whitish tip. Feeding habits not observable.
4th August	Beak and legs colouring towards adult markings.
9th August	Both birds self-feeding and independent of adults.
18th August	Beak coloration pale yellow with red base patches, and legs light coral red.
22nd August	Orbital skin turning from dark grey to bright blueish green.
15th September	Juvenile feathers moulting.

The two birds developed into adult plumage indicating a cock and a hen bird. The hen bird was slightly smaller than the parent adult hen and the cock bird very much smaller. I suspect the initial acceleration in development of the second squab to be lost during development on self-feeding, means that they, like the parents, needed separate feeding dishes as they would not share.

Previous notes from the Avicultural Magazine-

WHITMORE, G.E. (1964). Breeding the Thick-billed Green Pigeon (British first)
P. 146.

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ON THE OCCASION OF THE NINETIETH ANNIVERSARY OF THE AVICULTURAL SOCIETY

By F.C. BARNICOAT

(Johannesburg, Republic of South Africa)

Origins are always fascinating. The Avicultural Society was founded in Brighton towards the end of 1894 by Horatio R. Fillmer and C.S. Simpson, two intimate personal friends, who had recently entered upon their professional careers in law and medicine respectively. They coined the term 'aviculture', edited the first two volumes jointly - they were published monthly at five shillings per annum or sixpence an issue - and acted as Treasurer and Secretary respectively.

Having been bird enthusiasts from childhood, they had a fair amount of experience in the care of a number of foreign species but, as Fillmer himself admitted in 1933, it is doubtful whether they would have succeeded in making the Society a success without the co-operation of two much older and more experienced bird keepers. Reginald Phillips, an elderly, white-bearded retired civil servant, lived in a small house in the Hammersmith district of London with his charming wife. The entire back garden was wired over and connected to the drawing room of the house, and here they achieved amazing breeding successes with birds such as the Australian Blue Wren and Regent Bowerbird. And Dr. A.G. Butler, who worked for the Entomological Department of the Natural History Museum, kept a large and varied collection of birds as a hobby at his home in Beckenham. They were both very keen and fruitful contributors to the Magazine from their vast fund of knowledge on all matters avicultural.

Simpson relinquished his work for the Society after two years owing to the demands of his profession, but Fillmer continued as Editor to the end of the century, when his proposal to widen the scope of the Magazine by including domestic birds, such as canaries, was opposed. This apparently distressed him to such an extent that he resigned and subsequently founded an opposition journal called *Bird Notes* in October 1901, which was destined for a highly successful run until 1924. From 1925 on Fillmer was made a Vice-President of the Avicultural Society and came back into the fold. Shortly before his death in 1942, he disclosed a long and well-guarded secret. There was always a certain mystery about the articles and correspondence in the Magazine from a Mr. Septimus Perkins. This was obviously an experienced aviculturist, but he was constantly changing his address and no one could get to visit him. The truth was that there was "never no sich person" and Septimus Perkins was a *nom de*

plume for Fillmer himself, who also contributed frequently under his own name thereby the more easily maintaining the deception. No doubt our current Editor still has problems getting copy for the Magazine but I doubt that she is having to go to such lengths!

In November 1894 David Seth-Smith, then a dashing young man of 19, paid a visit to J.B. Housden, a retired business man, whose home was high on Sydenham Hill, almost outside the gates of the Crystal Palace, south-east London, where he won so many prizes with his birds. The young David was after some Australian Crested Doves which Housden was breeding at the time. He was much impressed by Housden's business-like aviaries and the number and condition of the many rare species he was seeing for the first time. As David Seth-Smith was leaving, Housden rather tentatively took from his pocket what looked like a small pamphlet, saying that he thought it might interest him as it was the first number of a new publication called the *Avicultural Magazine*, published by a new Society he thought he might like to join. So Housden put up Seth-Smith as a member. What a fortuitous moment! For so began David Seth-Smith's 70 years of distinguished service to the Society. As a most forceful Editor he took the Magazine to unprecedented success during two terms of editorship (1901-1909 and 1925-1934). Though a qualified civil engineer he became Curator of Birds and Mammals at the London Zoo and was famous throughout Britain as the pioneer of natural history broadcasts. His friendly voice came over the air in the 1930s every Monday in the "Children's Hour", beginning, "This is the Zoo Man speaking". When he died in 1963 he was the much loved and respected President of the Avicultural Society.

Likewise James Housden's great interest in birds, ardent support of the Avicultural Society and numerous contributions to its Magazine were never failing. In 1942 at the ripe age of 92 he spent part of the last evening of his life perusing his favourite bird books.

These, and so many, many others, who followed on, have through the vicissitudes of ninety years (which included two World Wars) kept the Avicultural Society together and maintained its matchless Magazine. They have loved bird-keeping with the "love life-long-o" and been loyal to the Society to the end of their earthly road. They are far too many to mention and they come from all walks of life, from the most humble to doctors, professors, dukes and even a King of Great Britain.

We believe that with the sources of birds for aviculture fast closing to us on all sides, there has never been as great a need for the type of information of which the *Avicultural Magazine* is a possible purveyor as at the present time. Let us hope that where some have led the way, others will continue to follow proudly on.

From the Avicultural Magazine:

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 SETH-SMITH, D. (1942). Obituary: Horatio R. Fillmer. (5) 7:57.
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 60: 104-108.

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NEWS AND VIEWS

Fred Barnicoat writes from South Africa: "The Golden Jubilee Show of the South African National Cage Bird Association was staged in Cape Town on 12th to 14th July 1984. The Supreme Award went to Messrs. H. & L. Blane's outstanding specimen of a King Blackhead *Alario alario leucolaema*, that is the rare subspecies of the Blackhead Canary or Alario which hails from the north-western part of the Cape Province and southern Namibia and has the black head attractively striped with white. The rare breedings submitted for 1984 were, on the whole, less noteworthy than usual. The rare breeding award of the year went to Dr. W.D. Russell for the Black-capped Conure *Pyrrhura rupicola*, though the Silver Medal was withheld."

* * *

The world-famous Wassenaar Zoo is co-operating with the World Wildlife Fund in a project to bring together young Bearded Vultures, now thought to be extinct in the Alps. Out of approximately 550 zoological gardens in the world, only eight zoos are recorded as breeding this rare species and Wassenaar is the only Dutch zoo to join in this project.

Their female Bearded Vulture "Benno", born in 1983, will, for the present, make up a pair with a male in Neumunster Zoo, West Germany, and the intention is to release their possible offspring in the Alps.

"Benno" was hatched in an incubator and hand-reared with the greatest care. Now independent, she can be safely put on the aeroplane to Neumunster, in the hope that soon her children may be given their freedom far away from Wassenaar Zoo. It would be interesting to have later news of how this project, which is being co-ordinated by the World Wildlife Fund, succeeds since it seems to be an admirable example of aviculture helping conservation.

Further to the interesting article by Mr. and Mrs. W. Grunebaum on Breeding the Hyacinthine Macaw (Vol. 90, No. 1: pp. 11-16), believed to have been a British 'first' for which the Society's Medal will be awarded, Mrs. Grunebaum writes (October 1984) that the pair of Hyacinthines have successfully reared another baby. The latest offspring is now flying outside strongly and the full length of the flight. It was hatched on 5th June and left the nesting box 14 weeks later. Apart from giving extra food and heat, Mrs. Grunebaum did not interfere in any way and says that it was much easier to rear than the first chick!

* * *

Malcolm Ellis has sent the following African notes:

The new species of sunbird collected on the Uzungwa Mountains, Tanzania, in August 1981 (see "News and Views", Vol. 89, No. 3, 1983), has been named the Rufous-winged Sunbird *Nectarinia rufipennis*. Its secondaries are rufous-cinnamon, so is the outer web of the primaries. Presumably this characteristic applies to the male and female. Otherwise, the male is described as having a deep blue neck and back and a purple throat with a blue then maroon breast band and a dark grey belly. The female is heavily streaked and spotted on the underside.

Kenya has issued a new set of postage stamps featuring rare birds. The five species figured are all considered endangered or vulnerable, in some cases because of the threat to their habitat. The five are the White-backed Heron, Quail Plover, Heller's Ground Thrush, White-winged Apalis and Papyrus Gonolek.

Heller's or the Taita Ground Thrush is treated now as a very distinctive race of the Northern Olive Thrush. The Apalis (a small, brightly coloured warbler) may already be extinct in Kenya. Known there first from two specimens collected in 1878, the White-winged Apalis has not been recorded in Kenya since 1961, when a third was collected.

In Tanzania, this Apalis was rediscovered in the Uzungwa Mountains by Simon Stuart, who discovered the Rufous-winged Sunbird.

Three ornithologists have claimed for Kenya the world record for the most bird species seen in a single day. The three left Lake Baringo just after midnight and finished in a suburb of Nairobi at 11.30 p.m., when an African Wood Owl brought their tally to 290 species. The previous record was 288 species, seen in Zambia in 1975.

* * *

A little-known watercolour of an American Egret painted by the great naturalist and artist, John James Audubon, has been reproduced for the first time anywhere in a poster being issued by the New York Historical Society. The full-colour poster reproduces the 1813 watercolour (37 3/8 x 25 1/4 in.) of a lifesize Egret in a version of the bird that was not included in the artist's monumental *The Birds of America*. The poster is the first in a planned series of full-colour reproductions to be issued by the Society from its unique Audubon watercolour collection and its publication coincides with the approaching bicentennial of the artist's birth on 26th April 1785.

The poster, priced at 16.50 US dollars (unframed), measures 36 x 24in (91.5 x 61.0 cm), was designed by Bruce Campbell and printed by Rapoport Printing Corporation on 80lb Warren's Lustro Offset Enamelled Dull Cover. It is available at the Museum Shop at the New-York Historical Society, 170 Central Park West, New York, N.Y. 10024, or by mail (postage and packing extra - please write for an estimate).

For more than 100 years, the New-York Historical Society has been the home of hundreds of Audubon watercolours and memorabilia, including 433 of the 435 original watercolours that served as the models for *The Birds of America*. In February 1863, twelve years after Audubon's death his widow offered these pieces to the Society for the modest sum of 4000 US dollars; today the value of this unique collection is nearly impossible to estimate.

The habitat of the American Egret is widespread, ranging through North and South America. In the United States it can most often be found in the Gulf States.

D.C.

* * *

CORRESPONDENCE

A Cinnamon Senegal Dove

In the October-December, 1977, issue of the Magazine (Vol. 83, No. 4), W.D. Cummings refers to white, pied and other mutations of the Senegal, Palm or Laughing Dove being 'popular' in South African aviaries. A further note by the same author, in the first issue of the current year (Vol. 90, No. 1) refers to Pied, Black-eyed White, albino and Cinnamon *Streptopelia senegalensis* at Mitchell Park Aviaries, Durban.

Early this year I saw a 'Cinnamon Senegal Dove' advertised in *Cage and Aviary Birds* and sent away for it. On arrival, the bird proved to be of a basic fawn colouring, with all the normal markings present, bearing the same relation to the original as the domestic Barbary Dove does to its progenitor, the African Collared Dove *S. roseogrisea*. Although kept with a normal male all summer, the Cinnamon Senegal (said by the dealer to have laid infertile eggs while in his possession) showed no response to the former's nest-calling, and was found dead a few days ago. A pity, as I naturally had hopes of establishing the mutation. I should be very interested to hear of anyone else having this or other colour varieties of the species in their possession outside South Africa.

Little Maen,
37 Prince of Wales Road,
Dorchester,
Dorset DT1 1QE.

Philip Schofield

* * *

Fieldfares refusing unnatural foods

The Fieldfare *Turdus pilaris* often visits gardens where birds are fed, especially during hard weather. I have not, however, met anyone who has actually seen it take any food more unnatural to it than cultivated varieties of fruits, and these usually of species whose wild forms occur within its normal range.

In the hard weather of January 1982, two Fieldfares spent much time in the garden of my former home at Herne Hill, in south-east London. Both were first seen on 8th January, one on 13th January, both were present on 14th, 15th, 16th and 17th. When first seen, they appeared to be in a starving condition, so I endeavoured to provide them with foods

richer in fats and proteins than fruit, but these efforts proved vain.

On the day the Fieldfares were first seen in the garden, many other birds, including Blackbirds *Turdus merula* were feeding on soaked bread and various scraps. I had the impression that it was the sight of these other birds feeding that first attracted the Fieldfares but by the time they had alighted, their interest was centred on a small wild Rose *Rosa canina* bush that still had some ripe hips on it. One of the Fieldfares plucked a hip and swallowed it with some difficulty. Then, taking alarm for some unknown reason, both flew off.

On 13th, when I was again home all day, one Fieldfare came and fed on the hips. As few were now left, I cut a sweet apple in two and impaled the halves, cut side up, in the rose bush. When the Fieldfare returned a few minutes later, it went at once to one of these (ignoring the rose hips) and eagerly ate the pulp. I then cut some bits of raw, lean meat into "worm-like" short strips of a suitable size for a Fieldfare to swallow, washed them to remove the stickyness that sometimes makes birds refuse raw meat, when they would otherwise accept it, and laid the strips, each separate, on the cut surface of the apples. When the Fieldfare returned, it not only refused to sample the meat, it even picked up three pieces in its bill and flung them aside in the course of eating the apple pulp.

On the next three days both Fieldfares came to the garden for food several times each day. I supplied impaled halved apples, their cut surfaces rubbed and covered with fine white sugar and with suitably sized morsels of meat, milksop and cooked egg placed on them. The Fieldfares very eagerly ate the sugared apple pulp but, except to toss them aside at times, made no attempt to eat any of the other foods placed on them (all incidentally, prime favourites with the local Song Thrushes *T. philomelos* and Blackbirds). Most of the time there were various scraps on the ground and much soaked bread with other birds feeding on these. The Fieldfares were mutually hostile so that, at any one period, only one would be in the apple-supplied rose bush and one would be seeking food on the ground. At such times the bird on the ground never attempted to sample any food other than fallen apple or rose hips and the droppings of its companion or itself when these apparently consisted mainly of only partly or poorly digested hips.

Many birdwatchers assume that birds of any species, when hungry, will take any food, natural or unnatural, that they come across, provided, of course, that they are physically capable of dealing with and digesting it, but this is not always the case. Even individuals, and perhaps especially *starving* individuals, of such species as the Wood Pigeon *Columba palumbus*, feral pigeon *C. livia*, and Black Kite *Milvus migrans*, may refuse to sample a "new" food if they do not see conspecifics eating it and, at least

in the case of the Wood Pigeon (pers. obs.), sometimes even if they do. I was, however, surprised that the Fieldfares refused meat and cooked egg that was carefully prepared so as to be easily swallowed and placed so that they almost certainly would (and, in fact, did) pick it up in their bills (though only to discard it) in the course of feeding.

On the morning of the 17th, both Fieldfares came and fed but it was then thawing fast and they were not seen again in the garden. Some modern dieticians tell us that sugar is positively harmful to the human system, except when taken in the forms in which it occurs naturally in fruits or other food but these Fieldfares showed a striking improvement in condition after only a few feeds on the sugared apples. White sugar too!

6 Crest View Drive,
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Derek Goodwin

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